FINAL~~DRAFT~~ SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT
AMENDMENT TO THE 2021 REGIONAL PLAN

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Acronyms and Abbreviations

Acronym	Definition
µPa	microPascals
2016 SIP	2016 Eight-Hour O3 Attainment Plan
2020 SIP	2020 Plan for Attaining the National Ozone Standards
2022 RAQS	2022 Revision of the Regional Air Quality Strategy for San Diego County
2050 RTP/SCS	2050 Regional Transportation Plan/Sustainable Communities Strategy
AB	Assembly Bill
ABM2+	second generation Activity Based Model
AIA	Airport Influence Area
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plans
approved Plan	2021 Regional Plan
AQMP	Air Quality Management Plan
ATDM	Active Transportation and Demand Management
ATP	Active Transportation Program
BIL	Bipartisan Infrastructure Law
BMPs	best management practices
BNSF	Burlington Northern and Santa Fe
Board	SANDAG Board of Directors
BTU	British thermal unit
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy Standards
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CAP	Climate Action Plan
CAPP	Community Air Protection Program
CARB	California Air Resources Board
CCA	Clean Air Act
CCAA	California CAA
CCT	California Coastal Trail
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane

Acronym	Definition
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CTC	California Transportation Commission
dB	decibel
dBA	A-weighted decibels
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
EIR	environmental impact report
EIS	environmental impact statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EV	electric vehicle
FHWA	Federal Highway Administration
GHG	greenhouse gas
GWH	gigawatt hours
GWP	global warming potential
HAPs	hazardous air pollutants
HCD	Housing and Community Development
HFCs	hydrofluorocarbons
HOV	high-occupancy vehicle
hp	horsepower
HST	High Speed Train
I-15	Interstate 15
I-5	Interstate 5
I-8	Interstate 8
ICAPCD	Imperial County Air Pollution Control District
IIJA	Infrastructure Investment and Jobs Act
IMPLAN 2013	2034 Tijuana, Tecate, and Playas de Rosarito Metropolitan Strategic Plan
IPCC	Intergovernmental Panel on Climate Change
kHz	kilohertz
kW	kilowatts
LCFS	Low Carbon Fuel Standard
L_{eq}	equivalent sound level
L_{max}	Maximum Sound Level
L_{min}	Minimum Sound Level
LOS	Level of Service
LOSSAN	Los Angeles–San Diego–San Luis Obispo
LV	Vibration Velocity Level

Acronym	Definition
ML	Managed Lanes
MMRP	Mitigation Monitoring and Reporting Program
MMT	million metric tons
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
$MTCO_2e$	metric tons of CO2e
MTS	Metropolitan Transit System
MWh	megawatt hours
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAVWAR	Naval Information Warfare Systems Command
Navy	U.S. Department of the Navy
NCTD	North County Transit District
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOC	Notice of Completion
NOP	Notice of Preparation
NO_X	nitrogen oxides
O_3	ozone
OME POE	Otay Mesa East Port of Entry Project
OPR	Office of Planning and Research
OTC	Old Town Campus
Pb	lead
PE	Program Environmental Impact Report
PEIR	Program EIR
PIP	Public Involvement Plan
PM	particulate matter
PM10	PM smaller than or equal to 10 microns in diameter
PM2.5	PM smaller than or equal than 2.5 microns in diameter
POE	Port of Entry
ppb	parts per billion
ppm	parts per million
PPV	Peak Particle Velocity
PRC	Public Resources Code
PV	photovoltaic

Acronym	Definition
RAS	Regional Arterial System
RCP	Regional Comprehensive Plan
ReCAP	Climate Action Planning Framework
RHNA	Regional Housing Needs Assessment
ROG	Reactive Organic Gas
ROW	right-of-way
RPS	Renewables Portfolio Standard
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
RUC	road usage charge
SAFE	Safer Affordable Fuel-Efficient
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCH	State Clearinghouse
Scoping Plan	Climate Change Scoping Plan
SCS	Sustainable Communities Strategy
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SDCRAA	San Diego County Regional Airport Authority
SDIA	San Diego International Airport
SDIV	San Diego and Imperial Valley Railroad
SEIR	Supplemental Environmental Impact Report
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
SPL	sound pressure level
SR 11	State Route 11
SR 125	State Route 125
SR 56	State Route 56
SR 94	State Route 94
TAC	toxic air contaminant
TCMs	Traffic Control Measures
TDM	Transportation Demand Management
THI	total health hazard index
TIA	Tijuana International Airport
TPAs	Transit Priority Areas

Acronym	Definition
TSM	Transportation System Management
TSMO	Transportation System Management and Operations
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration decibels
VMT	vehicle miles traveled
VOC	volatile organic compounds
ZEV	zero-emission vehicle

EXECUTIVE SUMMARY

This is the San Diego Association of Governments' (SANDAG's) ~~Draft~~ Final Supplemental Environmental Impact Report (SEIR) for the Amendment to the 2021 Regional Plan (the proposed Amendment). The SANDAG Board of Directors adopted the 2021 Regional Plan (approved Plan) and Final Program EIR (PEIR) (SCH No. 2010041061) on December 10, 2021.

This SEIR has been prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) and the Guidelines for Implementation of CEQA (CEQA Guidelines) (14 California Code of Regulations Sections 15000 et seq.). It analyzes whether the changes associated with the proposed Amendment would result in new or substantially more significant impacts than what was discussed in the approved Plan PEIR, mitigation measures to avoid or reduce any such impacts, and alternatives to the proposed Amendment. It was prepared to disclose this information to decision makers, members of the public, and public agencies so that informed decisions can be made about the proposed Amendment. CEQA requires that decision makers make informed decisions on a project, considering the information presented in the SEIR, along with social, economic, and other factors.

The Draft SEIR ~~is~~ was available for a 47~~5~~-day public review period, from July 13, 2023, to August 28, 2023. Following the public review period, SANDAG ~~will~~ prepared written responses to significant environmental concerns raised in the comments on the Draft SEIR. The Final SEIR ~~will~~ includes revisions to the Draft SEIR, comments received on the Draft SEIR either verbatim or in summary, and SANDAG's responses to significant environmental concerns raised in the public comments (Appendix F).

ES.1 SUMMARY OF THE PROPOSED AMENDMENT

Following adoption of the approved Plan, the SANDAG Board directed staff to prepare a focused amendment to the approved Plan that deletes the regional road usage charge. A road usage charge is a direct user fee whereby drivers pay to use the roadway network, whether the vehicle is powered by gas, electricity, or hydrogen, based on distance traveled or other factors. The proposed Amendment refines the financial strategies in the approved Plan in order to continue achieving the region's greenhouse gas emissions target set by the California Air Resources Board (CARB) without the regional road usage charge. No roadway or transportation network elements of the approved Plan are altered or modified in the proposed Amendment.

The underlying purposes of the approved Plan, which remain unchanged for the proposed Amendment, are to develop a Regional Plan that meets federal and State planning requirements, and continues to address the many regional transportation challenges that are deeply connected to larger societal issues that impact everyone's quality of life, including economic and social inequities, climate change, public health, and safety. Consistent with this underlying purpose, SANDAG developed the following project objectives for the approved Plan PEIR that remain unchanged for this SEIR:

1. Focus population and employment growth in mobility hubs and existing urban areas to protect sensitive habitat and natural resource areas.
2. Provide transportation investments that support compact land development patterns and reduce sprawl.
3. Meet greenhouse gas emissions targets established for the San Diego region by the California Air Resources Board and the SANDAG Board of Directors.
4. Provide transportation investments and land use patterns that promote social equity.

5. Provide transportation investments and land use patterns that reduce vehicle miles traveled and improve air quality.
6. Provide multi-modal access to employment centers and key destinations for all communities.
7. Enhance the efficiency of the transportation network for moving people and goods through the deployment of new technologies.

The proposed Amendment has the additional objective of removing the regional road usage charge while continuing to meet State and federal planning requirements, regional greenhouse gas (GHG) reduction targets, and federal air quality conformity standards.

ES.2 PROJECT LOCATION

The project location of the proposed Amendment is the same as the approved Plan and includes the entire San Diego region, which encompasses more than 4,200 square miles. The project location and environmental setting are discussed further in Chapter 3, *Environmental Setting,* of this SEIR.

ES.3 AREAS OF CONTROVERSY

CEQA Guidelines Section 15123(b)(2) requires that an environmental impact report (EIR) contain a discussion of areas of controversy known to the lead agency, including issues raised by agencies and the public. Several areas of controversy were identified during the SEIR scoping process.

These areas of concern were brought forth through letters and presented at the SANDAG scoping meeting. In no particular order, areas of controversy known to SANDAG include:

- Whether unmitigable impacts would result from the removal of the regional road usage charge.
- How the approved Plan would be funded without the revenue from the regional road usage charge.
- Whether the regional road usage charge is equitable, particularly for those who live far from public transportation.

ES.4 ISSUES TO BE RESOLVED

CEQA Guidelines Section 15123(b)(3) requires that an EIR contain a discussion of issues to be resolved. Issues to be resolved in this SEIR include choosing among alternatives to the proposed Amendment, and deciding how to mitigate the proposed Amendment's significant environmental impacts. Additionally, if it adopts the proposed Amendment, the SANDAG Board of Directors must decide whether specific social, economic, or other benefits of the proposed Amendment outweigh its significant unavoidable environmental impacts; if so, the Board of Directors must adopt a Statement of Overriding Considerations.

ES.5 SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Table ES-1 provides a summary of environmental impacts, mitigation measures to avoid or reduce significant impacts, and significance of the impact after mitigation is applied, for 2020, 2035, and 2050. This summary is based on the impact analyses provided in Chapter 4, *Environmental Impact Approach,* Sections 4.1 through 4.5. A detailed analysis of cumulative impacts is provided in Chapter 5, *Cumulative Impact Analysis,* which identifies probable future projects, as well as regional planning documents and other growth projections, and analyzes the cumulative environmental impacts for each environmental resource area when combined with the proposed Amendment.

Table ES-1
Summary of Environmental Impacts and Mitigation Measures

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
4.1 Air Quality				
AQ-1 Conflict with or obstruct implementation of the Regional Air Quality Strategy and/or State Implementation Plan Less-than-significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable
AQ-2 Result in a cumulatively considerable net increase in nonattainment criteria pollutants, including VOC, NO_X, PM10, PM2.5, and SO_X Significant impact in 2050 and less-than-significant impact in 2025 and 2035 consistent with the approved Plan PEIR.	**AQ-2a. Secure Incentive Funding** **AQ-2b. Purchase Zero Emission Trains** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects** **GHG-5g. Prepare/Develop a Regional Climate Action Plan**	Not applicable	Not applicable	Significant and Unavoidable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
	TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects			
AQ-4 Expose sensitive receptors to substantial PM10 and PM2.5 concentrations Significant impact in 2025 consistent with the approved Plan PEIR. Substantially more severe significant impact in 2035 and 2050 compared to the approved Plan PEIR.	**AQ-2a. Secure Incentive Funding** **AQ-4. Reduce Exposure to Localized Particulate and/or TAC Emissions** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects** **GHG-5g. Prepare/Develop a Regional Climate Action Plan** **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
AQ-5 Expose sensitive receptors to substantial TAC concentrations Substantially more severe significant impact in 2025, 2035, and 2050 compared to the approved Plan PEIR.	**AQ-2a. Secure Incentive Funding** **AQ-4. Reduce Exposure to Localized Particulate and/or TAC Emissions** **AQ-5a. Reduce Exposure to Localized Toxic Air Contaminant Emissions** **AQ-5b. Reduce Exposure to Localized Toxic Air Contaminant Emissions during Railway Design** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects** **GHG-5g. Prepare/Develop a Regional Climate Action Plan** **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
AQ-6 Expose sensitive receptors to carbon monoxide hot-spots Less-than-significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable
4.2 Energy				
EN-1 Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operations Less-than-significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable
EN-2 Conflict with or obstruct a state or local plan for renewable energy or energy efficiency Less-than-significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable
4.3 Greenhouse Gas Emissions				
GHG-1 Directly or indirectly result in an increase in GHG emissions compared to existing conditions (2016) Less-than-significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable
GHG-2 Conflict with the SANDAG region's achievement of SB 375 GHG emissions reduction targets for 2035 Less-than-significant impact in 2035 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
GHG-3 Conflict with or impede achievement of an at least 30% reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016) Less-than-significant impact in 2035 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable
GHG-4 Conflict with or impede the implementation of local plans adopted for the purpose of reducing GHG emissions Less-than-significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable
GHG-5 Be inconsistent with the State's ability to achieve the 2030 reduction target of SB 32, the accelerated 2030 reduction target of the 2022 Scoping Plan, and long-term reduction goals of Executive Orders S-3-05, B-55-18, and AB 1279. New significant impact in 2030, 2045, and 2050 compared to the approved Plan PEIR.	**GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5c. Implement Nature-Based Climate Solutions to Remove Carbon Dioxide from the Atmosphere** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5e. Implement Measures to Reduce GHG Emissions from Transportation Projects**	Significant and Unavoidable (in 2030)	Significant and Unavoidable (in 2045)	Significant and Unavoidable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
	GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects **GHG-5g. Prepare/Develop a Regional Climate Action Plan** **AQ-3c. Reduce Diesel Emissions from On-Road Vehicles** **AQ-4. Reduce Exposure to Localized Particulate and/or TAC Emissions** **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects** **WS-1a. Implement Water Conservation Measures for Transportation Network Improvements** **WS-1b. Implement Water Conservation Measures for Development Projects**			

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
4.4 Noise and Vibration				
NOI-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or generate a substantial absolute increase in ambient noise Significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	**NOI-1a. Implement Construction Noise Reduction Measures for Development Projects and Transportation Network Improvements** **NOI-1b. Implement Operational Noise Reduction Measures for Transportation Network Improvements** **NOI-1c. Implement Operational Noise Reduction Measures for Development Projects**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable
NOI-2 Generation of excessive groundborne vibration or groundborne noise levels Significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	**NOI-2a. Implement Construction Groundborne Vibration and Noise Reduction Measures** **NOI-2b. Implement Groundborne Vibration and Noise-Reducing Measures for Rail Operations**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable
4.5 Transportation				
TRA-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities Less-than-significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	Not applicable	Not applicable	Not applicable	Not applicable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
TRA-2 Conflict or be inconsistent with CEQA Guidelines Section 15064.3 by not achieving the substantial VMT reductions needed to help achieve statewide GHG reduction goals Significant impact in 2025 consistent with the approved Plan PEIR. Substantially more severe significant impact in 2030, 2035, 2045, and 2050 compared to the approved Plan PEIR.	**TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects**	Significant and Unavoidable	Significant and Unavoidable (and in 2030)	Significant and Unavoidable (and in 2045)

ES.6 ALTERNATIVES TO THE PROPOSED AMENDMENT

Chapter 6, *Alternative Analysis,* in this SEIR analyzes five alternatives to the proposed Amendment. The analysis determines the extent to which alternatives are capable of avoiding or substantially lessening the significant environmental effects of the proposed Amendment. The five alternatives analyzed in detail are listed below and summarized in Table ES- 2:

- **Alternative 1**: No Project Alternative
- **Alternative 2**: 2019 Transportation Network with New Value Pricing and User Fee Policies
- **Alternative 3**: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies
- **Alternative 4**: Progressive Pricing and No Regional Road Usage Charge
- **Alternative 5**: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge

Based on the analysis of alternatives provided in Chapter 6, Alternative 5 is the environmentally superior alternative. Compared to the proposed Amendment's significant impacts, Alternative 5 would have decreased impacts for one or more significance criteria for the following environmental resources: air quality, energy, greenhouse gas emissions, noise and vibration, and transportation.

Alternative 5 would result in a 23.5 percent per capita GHG reduction in 2050, which would result in a greater reduction than the proposed Amendment (19.7 percent below 2005 in 2050) (see Appendix E, *Alternatives Data*, Table E-2). In addition, Alternative 5 would result in slightly lower vehicle miles traveled (VMT) per capita of 23.3 (home-based) compared to the proposed Amendment VMT per capita of 24.3 in 2050 (see Appendix E, Table E-1). Alternative 5 would result in a total VMT increase of 3,298,516 miles per day in year 2050 compared to 2025, which is approximately 33 percent lower than the proposed Amendment (total VMT increase of 4,907,031 miles per day in year 2050). Alternative 5 would also result in a decrease in reactive organic gases (ROG), nitrous oxides (NO_X) carbon monoxide (CO), fine and respirable particulate matter (PM2.5 and PM10), and sulfur oxide (SO_X) emissions compared to the proposed Amendment from on-road sources (see Appendix E, Table E-3).

Table ES-2
Summary of Alternatives Considered in Detail

Components		Alternative 1: No Project	Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies	Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies	Alternative 4: Progressive Pricing and No Regional Road Usage Charge	Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge
Land Use Pattern		Approved Plan, Sustainable Communities Strategy (SCS) Land Use Pattern	2019 Federal Regional Transportation Plan (2019 Federal RTP) Land Use Pattern	Land use pattern focusing all regional growth in mobility hubs	Approved Plan, SCS Land Use Pattern	Land use pattern focusing all regional growth in mobility hubs
Transportation Network		Approved Plan transportation network	2019 Federal RTP transportation network	Approved Plan transportation network	Approved Plan transportation network	Approved Plan transportation network
Value Pricing and User Fees Policies	*Toll Pricing*	Approved Plan	Approved Plan	Approved Plan	Increase toll pricing by 100% for all horizon years	Increase toll pricing by 100% for all horizon years
	Regional Road User Charge	Approved Plan	None	Increase regional road usage charge by 50% compared to the approved Plan	None	None
	Parking Costs	Approved Plan	2019 Federal RTP	Increase parking costs by 50% compared to the approved Plan	Increase parking costs by 100% compared to approved Plan	Increase parking costs by 100% compared to approved Plan

Components		Alternative 1: No Project	Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies	Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies	Alternative 4: Progressive Pricing and No Regional Road Usage Charge	Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge
	Transit Costs	Approved Plan	2019 Federal RTP (no planned transit fare discounts)	Free transit by 2035	Free transit by 2035	Free transit by 2035
	Microtransit Costs	Approved Plan	N/A	Free microtransit by 2035	Free microtransit by 2035	Free microtransit by 2035
	Micro-Transponder Ownership	Approved Plan	Approved Plan	Approved Plan	Approved Plan	Approved Plan
	Telework Assumptions	Approved Plan	Approved Plan	Approved Plan	Approved Plan	Approved Plan
	Micromobility	Approved Plan	Approved Plan	Approved Plan	Approved Plan	Approved Plan
Funding		Approved Plan	2019 Federal RTP ($130 billion)	Approved Plan	Approved Plan	Approved Plan

1 INTRODUCTION

This Supplemental Environmental Impact Report (SEIR) has been prepared by the San Diego Association of Governments (SANDAG) in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) and the CEQA Guidelines (14 California Code of Regulations, Sections 15000 et seq.).

The SANDAG Board of Directors adopted the 2021 Regional Plan (the approved Plan) and Final Program EIR (PEIR) (State Clearinghouse [SCH] No. 2010041061) on December 10, 2021. The approved Plan was an update of the 2015 Regional Plan/Sustainable Communities Strategy (SCS) for the San Diego region and the 2019 Federal Regional Transportation Plan (RTP). SANDAG is a regional planning agency and Metropolitan Planning Organization (MPO) composed of 18 cities and the county government within the San Diego region. SANDAG must prepare an RTP every 4 years (Government Code Section 65080 et seq.; 23 United States Code Section 134). The RTP must include an SCS consisting of land use, housing, and transportation strategies that, if implemented, would allow the region to meet its regional targets for greenhouse gas emissions reductions from passenger vehicle use established by the California Air Resources Board (CARB) (Sustainable Communities and Climate Protection Act of 2008, Senate Bill 375, Chapter 728, Statutes of 2008).

The approved Plan integrates land use, transportation systems, infrastructure needs, and public investment strategies within a regional framework intended to preserve and improve quality of life, maximize mobility and transportation choices, and conserve and protect natural resources. It meets the requirements of federal and State transportation planning law, and also meets the requirements for the Regional Comprehensive Plan for the San Diego region established by State law (Assembly Bill 361, Chapter 508, Statutes of 2003).

Following the adoption of the approved Plan, the SANDAG Board of Directors directed staff to prepare a focused amendment to the approved Plan that deletes the regional road usage charge (proposed Amendment).

1.1 PURPOSE OF THIS SEIR

The analysis in this SEIR focuses on the activities associated with the project modifications included in the proposed Amendment. This approach is taken because CEQA review has already occurred for the approved Plan, including identification of environmental effects, feasible mitigation measures, and feasible alternatives. This SEIR is a supplement to the approved Plan PEIR and incorporates the information necessary to make the PEIR adequate for the project modifications included in the proposed Amendment. This SEIR was prepared to disclose this information to decision makers, members of the public, and public agencies, so that decision makers can make informed decisions about the proposed Amendment.

This SEIR does not recommend to decision makers whether the proposed Amendment should be approved. CEQA requires that decision makers make informed decisions on a project, considering the information presented in the environmental impact report (EIR). CEQA allows for the proposed Amendment to be approved even if there are significant and unavoidable environmental impacts. This can occur if decision makers find that social, economic, or other benefits outweigh the unavoidable significant impacts. In such a case, a "statement of overriding considerations" would be adopted, listing the specific reasons for approving the project, based on information contained in the EIR and other information in the record (CEQA Guidelines Section 15093).

1.2 SCOPE OF THIS SEIR

This environmental impact report for the proposed Amendment is a Supplemental EIR. A lead agency may choose to prepare a supplement to an EIR when "[a]ny of the conditions described in Section 15162 would require the preparation of a subsequent EIR" and when "only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation" (CEQA Guidelines Section 15163 (a)(1)–(2)). A supplement to an EIR "need only contain the information necessary to make the previous EIR adequate for the project as revised" (CEQA Guidelines Section 15163(b)).

For a description of the intended uses of this SEIR, refer to Section 2.5 in Chapter 2, *Project Description*. For a detailed discussion of the content and approach to the analysis in this SEIR, see Chapter 4, *Environmental Impact Analysis Approach*. Table 1-1 summarizes the findings for all resources in the approved Plan PEIR. The following five resource areas are analyzed in this SEIR.

- Air Quality
- Energy
- Greenhouse Gas Emissions
- Noise and Vibration
- Transportation

Project modifications associated with the proposed Amendment would not alter the impact conclusions described in the approved Plan PEIR for the remaining resource areas. A brief discussion explaining why the impacts on these resources would not be significant is provided under each subheading following Table 1-1.

- Aesthetics and Visual Resources
- Agricultural and Forestry Resources
- Biological Resources
- Cultural Resources
- Geology, Soils, and Paleontological Resources
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use
- Mineral Resources
- Population and Housing
- Public Services and Utilities
- Tribal Cultural Resources
- Water Supply
- Wildfire

Table 1-1
Summary of Resource Areas Analyzed

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
Aesthetics and Visual Resources		
AES-1 Have a substantial adverse effect on a scenic vista	☒	☐
AES-2 Substantially damage scenic resources, including, but not limited to, trees, rocks, outcroppings, and historic structures within a state scenic highway	☒	☐

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
AES-3 Substantially degrade the existing visual character or quality of public views of the site and its surroundings, including adding a visual element of urban character to an existing rural or open space area, conflicting with regulations governing scenic quality	☒	☐
AES-4 Substantially degrade the existing visual character or quality of public views of the site and its surroundings by creating a new source of substantial light or glare that would adversely affect day or nighttime views	☒	☐
Agricultural and Forestry Resources		
AG-1 Convert agricultural lands to nonagricultural use	☒	☐
AG-2 Conflict with existing zoning for agricultural use, or a Williamson Act contract	☒	☐
FR-1 Convert or result in the loss of "Forest Land" as defined in the California Forest Legacy Act of 2007 (Public Resources Code Section 12220(g))	☒	☐
Air Quality		
AQ-1 Conflict with or obstruct implementation of the Regional Air Quality Strategy and/or State Implementation Plan	☐	☒
AQ-2 Result in a cumulatively considerable net increase in nonattainment criteria pollutants, including VOC, NO_X, PM10, PM2.5, and SO_X	☐	☒
AQ-3 Result in construction-related emissions above regional mass emission thresholds	☒	☐
AQ-4 Expose sensitive receptors to substantial PM10 and PM2.5 concentrations	☐	☒
AQ-5 Expose sensitive receptors to substantial TAC concentrations	☐	☒
AQ-6 Expose sensitive receptors to carbon monoxide hot-spots	☐	☒
AQ-7 Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people	☒	☐

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
Biological Resources		
BIO-1 Have a substantial adverse effect on any sensitive natural communities identified in local or regional plans, policies, regulations, or by CDFW or USFWS; or have a substantial adverse effect on state or federally regulated waters and wetlands through direct removal, filling, hydrological interruption, or other means	☒	☐
BIO-2 Have a substantial adverse effect, either directly or indirectly, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or listed by CDFW or USFWS, including their federally designated critical habitat, or species that are considered sensitive in CEQA Guidelines Section 15380	☒	☐
BIO-3 Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites	☒	☐
BIO-4 Conflict with the provisions of an adopted HCP, NCCP, or other conservation plan, or with any local policies or ordinances protecting biological resources	☒	☐
Cultural Resources		
CULT-1 Cause a substantial adverse change in the significance of a historical resource or unique archaeological resource	☒	☐
CULT-2 Disturb any human remains, including those interred outside of dedicated cemeteries, in violation of existing laws and regulations protecting human remains	☒	☐
Energy		
EN-1 Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operations	☐	☒
EN-2 Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	☐	☒

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
Geology, Soils, and Paleontological Resources		
GEO-1 Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: • Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area, or based on other substantial evidence showing an earthquake fault is active; • Strong seismic ground shaking; • Seismic-related ground failure, including liquefaction; and • Landslides	☒	☐
GEO-2 Locate projects on a geologic unit or soil that is expansive or unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction or collapse, creating substantial direct or indirect risks to life or property	☒	☐
GEO-3 Result in substantial soil erosion or the loss of topsoil	☒	☐
GEO-4 Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater, potentially causing adverse groundwater impacts	☒	☐
PALEO-1 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	☒	☐
Greenhouse Gas Emissions		
GHG-1 Directly or indirectly result in an increase in GHG emissions compared to existing conditions (2016)	☐	☒
GHG-2 Conflict with the SANDAG region's achievement of SB 375 GHG emissions reduction targets for 2035	☐	☒
GHG-3 Conflict with or impede achievement of an at least 30% reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016)	☐	☒

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
GHG-4 Conflict with or impede the implementation of local plans adopted for the purpose of reducing GHG emissions	☐	☒
GHG-5 Be inconsistent with the State's ability to achieve the 2030 reduction target of SB 32 and long-term reduction goals of Executive Orders S-3-05 and B-55-18	☐	☒
Hazards and Hazardous Materials		
HAZ-1 Create a significant hazard by generating hazardous emissions or handling hazardous materials, or result in the release of hazardous materials into the environment during pre-construction, demolition, and/or construction activities, including being located on a Government Code Section 65952.5 hazardous materials site	☒	☐
HAZ-2 Create a significant hazard to the public, schools within one-quarter mile, or the environment through the routine use, handling, transport, or disposal of hazardous materials	☒	☐
HAZ-3 For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area	☒	☐
HAZ-4 Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan or result in inadequate emergency access	☒	☐
Hydrology and Water Quality		
HWQ-1 Substantially degrade surface water or groundwater quality, including in violation of any water quality standards or waste discharge requirements or in conflict with a water quality control plan or its implementation	☒	☐
HWQ-2 Substantially alter the existing drainage pattern of an area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site	☒	☐

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
HWQ-3 Substantially alter the existing drainage pattern of an area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would (i) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site or (ii) impede or redirect flood flows	☒	☐
HWQ-4 Substantially increase risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone	☒	☐
Land Use		
LU-1 Physically divide an established community	☒	☐
LU-2 Cause a significant environmental impact due to a conflict with any land use plan, policy or regulation (including, but not limited to, the general plan, local coastal program, or zoning ordinance) and result in a physical change to the environment not already addressed in the other resource chapters of this EIR	☒	☐
Mineral Resources		
MR-1 Result in the loss of availability of known aggregate and mineral resources supply sites that would be of value to the region and the residents of the state, or result in the loss of availability of a locally important mineral resource recovery site delineated in a local general plan, specific plan, or other land use plan	☒	☐
Noise and Vibration		
NOI-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or generate a substantial absolute increase in ambient noise	☐	☒
NOI-2 Generation of excessive groundborne vibration or groundborne noise levels	☐	☒
NOI-3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would	☒	☐

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
expose people residing or working in the project area to excessive noise levels		
Population and Housing		
POP-1 Induce substantial unplanned population growth to areas of the region either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., by extending roads and other infrastructure)	☒	☐
POP-2 Displace substantial numbers of people or housing units, which would necessitate the construction of replacement housing elsewhere	☒	☐
Public Services and Utilities		
PS-1 Result in substantial adverse physical impacts associated with the provision of or need for new or physically altered (i.e., expanded) public facilities, in order to maintain adequate fire and police protection, emergency services, schools, libraries, and recreation facilities	☒	☐
REC-1 Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	☒	☐
U-1 Result in the expansion, relocation, or construction of wastewater collection and treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities to adequately meet projected capacity needs, the construction of which could cause significant environmental impacts	☒	☐
U-2 Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure; negatively impact the provision of solid waste services or impair the attainment of solid waste reduction goals; or fail to comply with federal, state, and local management and reduction statutes and regulations related to solid waste	☒	☐
Transportation		
TRA-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities	☐	☒

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
TRA-2 Conflict or be inconsistent with CEQA Guidelines Section 15064.3 by not achieving the substantial VMT reductions needed to help achieve statewide GHG reduction goals	☐	☒
TRA-3 Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses	☒	☐
TRA-4 Lead to a lack of parking supply that would cause significant secondary environmental impacts not already analyzed in other resource chapters of this EIR	☒	☐
Tribal Cultural Resources		
TCR-1 Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 that is either (1) listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k); or (2) determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1	☒	☐
Water Supply		
WS-1 Not have sufficient water supplies available to serve the projected regional demand during normal, dry and multiple dry years	☒	☐
WS-2 Substantially decrease groundwater supplies, or interfere substantially with groundwater recharge such that the proposed Plan would impede sustainable management of groundwater basins or obstruct implementation of a sustainable groundwater management plan	☒	☐
WS-3 Require or result in the relocation or construction of new or expanded water facilities, the construction or relocation of which could cause significant environmental effects	☒	☐
Wildfire		
WF-1 Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or	☒	☐

Resource Areas	Impact Adequately Analyzed in Prior EIR	Potential New or Substantially More Severe Impacts with Proposed Amendment
the uncontrolled spread of a wildfire; or expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires		
WF-2 Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment	☒	☐
WF-3 Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes	☒	☐

1.2.1 RESOURCE AREAS AND THRESHOLDS NOT ALTERED BY THE PROPOSED AMENDMENT

AESTHETICS AND VISUAL RESOURCES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern, and therefore would not impact any scenic vistas, substantially damage scenic resources, degrade the existing visual character of the areas, or create a new source of light or glare beyond what was identified in Section 4.1, *Aesthetics and Visual Resources,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on aesthetics and visual resources associated with the removal of the regional road usage charge.

AGRICULTURAL AND FORESTRY RESOURCES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. The proposed Amendment does not include the acquisition of new areas of permanent right-of-way, permanent easement, and temporary construction easement on agricultural lands or require the conversion of farmland beyond what was identified in Section 4.2, *Agricultural and Forestry Resources,* of the approved Plan PEIR. Additionally, the proposed Amendment would not result in the loss of forest land or conversion of forest land to non-forest use or conflict with existing zoning for agricultural use or a Williamson Act contract. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions beyond what was identified in the approved Plan PEIR. Therefore, there would be no impact on agricultural and forestry resources associated with the removal of the regional road usage charge.

AIR QUALITY

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not result in construction-related emissions above regional mass emission thresholds or substantial odor emissions that would affect a substantial number of people beyond what was identified in Section 4.3, *Air Quality,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified for AQ-3 and AQ-7 in the approved Plan PEIR. Therefore, there would be no impact on AQ-3 and AQ-7 associated with the removal of the regional road usage charge.

BIOLOGICAL RESOURCES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, beyond what was identified in Section 4.4, *Biological Resources,* of the approved Plan PEIR, the proposed Amendment would not cause a substantial adverse effect on any sensitive natural communities, state or federally regulated waters and wetlands, or on any species identified as a candidate, sensitive, or special-status species. Additionally, the proposed Amendment would not interfere substantially with the movement of any native or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites, and would not conflict with the provisions of any local Habitat Conservation Plan, Natural Community Conservation Planning programs, or other conservation plan, or with any local policies or ordinances protecting biological resources on any grounds beyond what was identified in the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on biological resources associated with the removal of the regional road usage charge.

CULTURAL RESOURCES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not cause a substantial adverse change in the significance of a cultural resource or unique archaeological resource beyond what was identified in Section 4.5, *Cultural Resources,* of the approved Plan PEIR. Additionally, the proposed Amendment would not disturb any human remains in violation of existing laws and regulations protecting human remains. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on cultural resources associated with the removal of the regional road usage charge.

GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. The proposed Amendment would be located on the same surficial geology and soil formations as identified in Section 4.7, *Geology, Soils, and Paleontological Resources,* of the approved Plan PEIR. Additionally, the proposed Amendment would not cause potential substantial adverse effects involving primary or secondary seismic hazards, would not locate projects in areas of difficult excavation caused by soil that is expansive or unstable, would not result in substantial soil erosion, and would not involve soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems. Additionally, the proposed Amendment would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature beyond what was identified in the approved Plan

PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on geology, soils, and paleontological resources associated with the removal of the regional road usage charge.

HAZARDS AND HAZARDOUS MATERIALS

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not create a significant hazard by generating hazardous materials or emissions during any construction or demolition processes. Additionally, the proposed Amendment would not create a significant hazard to the public, schools, or the environment through release of hazardous materials or a safety hazard for people residing or working in the area within 2 miles of an airport. The proposed Amendment continues to improve vehicular delay and congestion compared to the baseline; therefore it would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan or result in inadequate emergency access beyond what was identified in Section 4.9, *Hazards and Hazardous Materials,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on hazards and hazardous materials associated with the removal of the regional road usage charge.

HYDROLOGY AND WATER QUALITY

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not substantially degrade surface or groundwater quality to any level greater than what was identified in Section 4.10, *Hydrology and Water Quality,* of approved Plan PEIR. Additionally, the proposed Amendment would not alter the course of waterways affecting the existing drainage pattern of an area that would result in substantial erosion, siltation, or flooding on- or offsite, or impede or redirect flood flows. The proposed Amendment also would not substantially increase risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on hydrology and water quality associated with the removal of the regional road usage charge.

LAND USE

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not physically divide an established community beyond what was identified in Section 4.11, *Land Use,* of the approved Plan PEIR. Additionally, the proposed Amendment would not conflict with any land use plan, policy or regulation or result in a physical change to the environment not already discussed in other resource chapters of the approved Plan PEIR or this SEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on land use associated with the removal of the regional road usage charge.

MINERAL RESOURCES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not result in the loss of mineral resources that are locally important or of regional or state value beyond what was identified in

Section 4.12, *Mineral Resources,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on mineral resources associated with the removal of the regional road usage charge.

NOISE AND VIBRATION

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not develop noise-sensitive land uses within the vicinity of a private airstrip or airport land use plan that would expose people residing or working in the area to excessive noise levels beyond what was identified in Section 4.13, *Noise and Vibration,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified for NOI-3 in the approved Plan PEIR. Therefore, there would be no impact to NOI-3 associated with the removal of the regional road usage charge.

POPULATION AND HOUSING

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not induce, directly or indirectly, substantial unplanned population growth to areas of the region or displace substantial numbers of people or housing units that would necessitate the construction of replacement housing elsewhere beyond what was already identified in Section 4.14, *Population and Housing,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on population and housing associated with the removal of the regional road usage charge.

PUBLIC SERVICES AND UTILITIES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not generate any excess solid waste, negatively impact the provision of solid waste services, impair the attainment of solid waste reduction goals, or fail to comply with management and reduction statutes and regulations beyond what was identified in Section 4.15, *Public Services and Utilities,* of the approved Plan PEIR. Additionally, the proposed Amendment would not result in the expansion, relocation, or construction of wastewater collection and treatment, stormwater drainage, electric power, natural gas, or telecommunication facilities that could cause significant environmental impacts. The proposed Amendment also would not result in substantial adverse physical impacts associated with the provision of or need for new or physically altered public facilities in order to maintain adequate fire and police protection, emergency services, schools, libraries, and recreational facilities, and would not increase the use of existing neighborhood and regional parks or other recreational facilities such that a substantial deterioration of the facility would occur or be accelerated. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on public services and utilities associated with the removal of the regional road usage charge.

TRANSPORTATION

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not increase hazards due to a design feature or incompatible use beyond what was identified in Section 4.16, *Transportation,*

of the approved Plan PEIR. Additionally, the proposed Amendment would not lead to a lack of parking supply that would cause significant secondary environmental impacts not already analyzed in other resource chapters of the approved Plan PEIR and this SEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified for TRA-3 or TRA-4 in the approved Plan PEIR. Therefore, there would be no impact on TRA-3 or TRA-4 associated with the removal of the regional road usage charge.

TRIBAL CULTURAL RESOURCES

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not adversely alter the significance of a tribal cultural resource beyond what was identified in Section 4.17, *Tribal Cultural Resources*, of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on tribal cultural resources associated with the removal of the regional road usage charge.

WATER SUPPLY

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not require or result in the relocation or construction of new or expanded water facilities, or affect the sufficiency of water supplies. Additionally, the proposed Amendment would not substantially decrease the supply of groundwater or interfere with the groundwater recharge beyond what was identified in Section 4.18, *Water Supply,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved Plan PEIR. Therefore, there would be no impact on water supply associated with the removal of the regional road usage charge.

WILDFIRE

The proposed Amendment does not include any transportation network changes or new construction, or change the approved Plan SCS land use pattern. Therefore, the proposed Amendment would not expose any people or structures either directly or indirectly to a significant risk of loss, injury, or death from wildfire, or require the installation or maintenance of associated infrastructure. Additionally, the proposed Amendment would not expose more people or structures to downslope or downstream risks associated with post fire instability such as flooding or landslides beyond what was already identified in Section 4.19, *Wildfire,* of the approved Plan PEIR. The proposed Amendment would not result in any changes to the impact analysis or impact conclusions identified in the approved PEIR. Therefore, there would be no impact on wildfire associated with the removal of the regional road usage charge.

1.3 ORGANIZATION OF THIS SEIR

The *Executive Summary* of this SEIR, which precedes this introduction, provides a condensed version of the SEIR identifying the proposed Amendment's significant impacts, mitigation measures, and alternatives that would reduce or avoid those impacts; as well as known areas of controversy and issues to be resolved. Chapter 1 is this *Introduction,* which provides a general overview of the CEQA process, describes the public participation process and opportunities for input, and outlines the contents of this SEIR.

Chapter 2, *Project Description*, describes the features of the proposed Amendment in sufficient detail to support the impact analysis. The general physical characteristics of the natural and built environments of the San Diego

region are described in Chapter 3, *Environmental Setting*. Chapter 4, *Environmental Impact Analysis Approach*, provides the impact analysis, beginning with a detailed explanation of the approach for the analysis, followed by analysis for five different resource areas in Sections 4.1 through 4.5. Each resource area section describes existing conditions (which serve as the baseline for impact analysis), regulatory setting, significance criteria, impact analysis, and mitigation measures (where significant impacts are identified). Chapter 5, *Cumulative Impact Analysis,* contains the cumulative impacts analysis, while the alternatives to the proposed Amendment are discussed and evaluated in Chapter 6, *Alternative Analysis*. Chapter 7, *Other Considerations Required by CEQA,* discusses growth inducement, significant irreversible impacts, and significant and unavoidable impacts. Chapter 8, *References*, provides the references consulted in preparing this SEIR, and Chapter 9, *Preparers*, lists the preparers of this environmental document.

This Final SEIR reproduces the text of the Draft SEIR, and shows changes to the text of the Draft SEIR in underline and strikeout format.

Appendices include the Notice of Preparation (NOP) and written comments received during the NOP period and scoping meeting (Appendix A), as well as technical documents (Appendices B through E) that provide supporting data and information for this SEIR. Appendix F, Response to Comments on the Draft SEIR, reproduces the comments received on the Draft SEIR, and presents the responses to those comments.

In compliance with PRC Section 21081.6, a Mitigation Monitoring and Reporting Program (MMRP) will be prepared as a separate document that will be considered after certification of the Final SEIR, when the SANDAG Board of Directors considers whether to adopt the proposed Amendment.

1.4 LEAD AND RESPONSIBLE AGENCIES

A lead agency is the public agency that has the principal responsibility for carrying out or approving a project (CEQA Guidelines Section 15367). Responsible agencies are other public agencies that propose to carry out or approve a project for which a lead agency is preparing an EIR, including all other agencies that have discretionary approval for a project (CEQA Guidelines Section 15381).

In the case of the proposed Amendment and this SEIR, SANDAG serves as the lead agency. No responsible agencies for this SEIR have been identified.

1.5 PUBLIC REVIEW AND PARTICIPATION PROCESS

Consistent with CEQA, SANDAG contacted affected agencies, organizations, and individuals who may have an interest in the proposed Amendment and SEIR. This consultation assisted in defining the scope of this SEIR, which is described in Section 1.2.

1.5.1 NOTICE OF PREPARATION

SANDAG initiated the EIR scoping process on December 9, 2022, through the circulation of an NOP. The 30-day comment period ended January 9, 2023.

The NOP provided formal notification to all federal, State, and local agencies involved with funding, and to other interested organizations and members of the public, that an SEIR will be prepared for the proposed Amendment. The NOP was intended to encourage interagency communication concerning the proposed Amendment and provide sufficient background information so that agencies, organizations, and individuals

could respond to SANDAG with specific comments and questions on the scope and content of this SEIR. The NOP and the written comments received are provided in full in Appendix A.

1.5.2 PUBLIC SCOPING

Consistent with CEQA (PRC Section 21083.9), SANDAG noticed and held a virtual public scoping meeting on December 21, 2022. The purpose was to receive perspective and input from agencies, organizations, and individuals on the scope and content of the environmental information to be addressed in the SEIR.

1.5.3 AB 52 CONSULTATION

Consistent with Assembly Bill (AB) 52, SANDAG contacted representatives from the following tribes in San Diego County, via certified mail, inviting each tribe to consult on the proposed Amendment:

- Agua Caliente Band of Cahuilla Indians
- Barona Band of Mission Indians
- Cahuilla Band of Indians
- Campo Band of Mission Indians
- Chemehuevi Indian Tribe
- Ewiiaapaayp Band of the Kumeyaay Nation
- Iipay Nation of Santa Ysabel
- Inaja Band of Diegueño Mission Indians
- Jamul Indian Village of California
- Kwaaymii Laguna Band of Mission Indians
- La Jolla Band of Luiseño Indians
- La Posta Band of the Kumeyaay Nation
- Los Coyotes Band of Cahuilla/Cupeño Indians
- Manzanita Band of the Kumeyaay Nation
- Mesa Grande Band of Mission Indians
- Pala Band of Mission Indians
- Pauma Band of Luiseño Indians
- Rincon Band of Luiseño Indians
- San Luis Rey Band of Mission Indians
- San Manuel Band of Mission Indians
- San Pasqual Band of Diegueño Mission Indians
- Santa Rosa Band of Cahuilla Indians
- Soboba Band of Luiseño Indians
- Sycuan Band of the Kumeyaay Nation
- Torres Martinez Desert Cahuilla Indians
- Viejas Band of Kumeyaay Nation

The Rincon Band of Luiseño Indians and the San Luis Rey Band of Mission Indians responded and requested consultation pursuant to AB 52 on January 26, 2023, and March 6, 2023, respectively. On March 7, 2023, March 28, 2023, and May 11, 2023, SANDAG contacted the Rincon Band of Luiseño Indians to discuss the consultation process. On May 26, 2023, SANDAG met with the Rincon Band of Luiseño Indians to consult on the proposed Amendment. On April 14, 2023, May 11, 2023, and May 23, 2023, SANDAG contacted the San Luis Rey Band of Mission Indians to discuss the consultation process, but did not receive any further response. On June 7, 2023, SANDAG concluded the AB 52 consultation process.

1.5.4 COMMENTS ON THE DRAFT SEIR

The Draft SEIR was released to the public on July 13, 2023, and was ~~will be~~ available for a 45~~7~~-day public review period, as required by CEQA. The public review period ended ~~will end~~ on August 28, 2023. SANDAG published a Notice of Availability (NOA) for the Draft SEIR in the *Union Tribune* on July 12, 2023, and in *Hispanos Unidos* on July 14, 2013, and mailed the NOA to an extensive distribution list. SANDAG also filed a Notice of Completion (NOC) with the State Clearinghouse to indicate the availability of the Draft SEIR for public review and comment on July 12, 2023. In accordance with CEQA Guidelines Section 15204, reviewers were asked to "focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the project might be avoided or mitigated."

The Draft SEIR and all appendices were ~~are~~ available for review online at www.sandag.org and at SANDAG offices located at 401 B Street, Suite 800, San Diego, California 92101. The Draft SEIR was distributed to the agencies, organizations, and individuals that provided written comments on the NOP, the SANDAG Board of Directors, SANDAG member agencies, the San Diego Central Library (which is capable of transferring the document to other local libraries), and other interested parties and stakeholders.

Agencies, organizations, and individuals were ~~are~~ invited to provide written comments on the Draft SEIR during the public review period from July 13, 2023, to August 28, 2023. Comments should be emailed with subject line "Regional Plan SEIR" to: RegionalPlanSEIR@sandag.org. Written comments were asked to ~~can~~ be addressed and sent to:

San Diego Regional Plan SEIR
C/O Kirsten Uchitel, Associate Planner
401 B Street, Suite 800
San Diego, CA 92101

Comments could ~~can~~ also be submitted using a comment form at: www.sandag.org/RegionalPlanSEIRComments.

Following the public review period, SANDAG ~~will~~ prepared written responses to significant environmental concerns raised in comments on the Draft SEIR. The Final SEIR ~~will~~ includes revisions to the Draft SEIR, comments received on the Draft SEIR either verbatim or in summary, and SANDAG responses to significant environmental concerns raised in the public comments. Appendix F contains comments received on the Draft SEIR and responses to those comments. The Final SEIR and all appendices are available for review online at www. sandag.org and at SANDAG offices located at 401 B Street, Suite 800, San Diego, California 92101. Certification of the Final SEIR and adoption of the proposed Amendment are anticipated to be considered by the SANDAG Board of Directors on October 13~~27~~, 2023.

2 PROJECT DESCRIPTION

The project evaluated in this Supplemental Environmental Impact Report (SEIR) is the San Diego Association of Governments' (SANDAG) proposed *Amendment to the 2021 Regional Plan* (proposed Amendment) (SANDAG 2023a). The SANDAG Board of Directors (Board) adopted the 2021 Regional Plan on December 10, 2021 (approved Plan). The project location is the San Diego region, shown on Figure 2-1. The San Diego region is coterminous with San Diego County.

2.1 PROJECT BACKGROUND

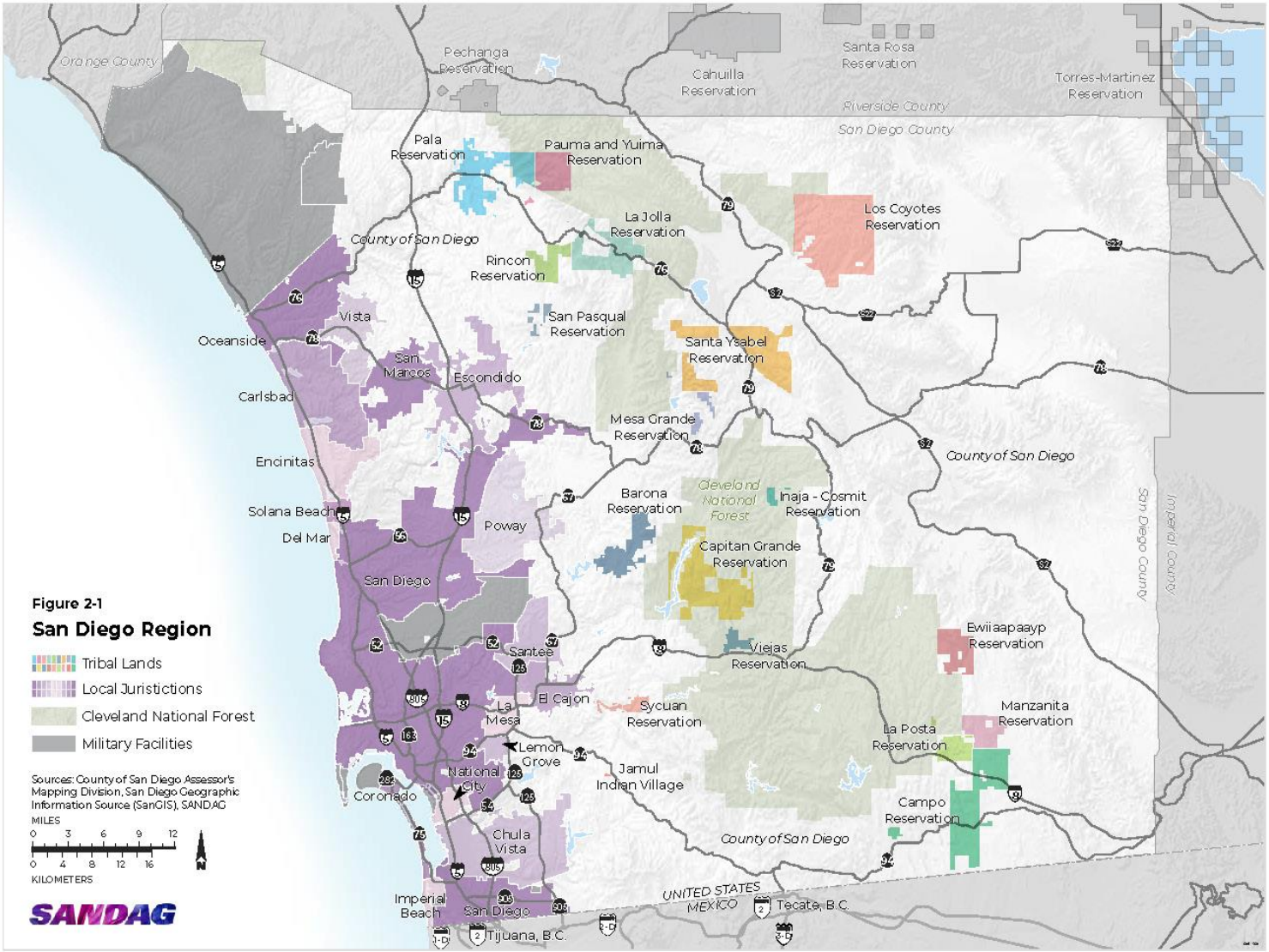
Every 4 years the SANDAG prepares an updated Regional Plan in collaboration with the 18 cities and County of San Diego, along with regional, State, and federal partners. The Regional Plan consists of the Regional Transportation Plan (RTP), Sustainable Communities Strategy (SCS), and Regional Comprehensive Plan (RCP) for the San Diego region. The current Plan, the 2021 Regional Plan was approved in December 2021 by the SANDAG Board of Directors. At the same time, the Board certified the Final Program Environmental Impact Report (PEIR) for the 2021 Regional Plan (State Clearinghouse [SCH] No. 2010041061).

The approved Plan includes the SCS as well as the 5 Big Moves (Complete Corridors, Transit Leap, Mobility Hubs, Flexible Fleets, and Next OS), transportation network improvements, and supporting policies and programs. Further, the approved Plan creates an integrated transportation system throughout the 11 Major Travel Corridors and the Rural Corridors of the San Diego region. The system components in each Major Travel Corridor consist of transportation improvements under each of the 5 Big Moves, enhanced airport connectivity, improved border/ports of entry, and supporting policies and programs. These components are described in further detail in Chapter 2, *Project Description*, of the approved Plan PEIR. The approved Plan PEIR is available online at https://www.sandag.org/regional-plan/2021-regional-plan/environmental-impact-report.

Following adoption of the approved Plan, the SANDAG Board directed staff to prepare a focused amendment to the approved Plan that deletes the regional road usage charge. A road usage charge is a direct user fee whereby drivers pay to use the roadway network, whether the vehicle is powered by gas, electricity, or hydrogen, based on distance traveled or other factors. The proposed Amendment refines the financial strategies in the approved Plan in order to continue achieving the region's greenhouse gas (GHG) emissions target set by the California Air Resources Board (CARB) without the regional road usage charge. No roadway or transportation network elements of the approved Plan are altered or modified in the proposed Amendment.

After adoption of the approved Plan, staff observed low traffic counts and employment at some large employment location sites and made minor corrections resulting in slight changes to regional employment figures. Staff also fixed a software bug resulting in more accurate traffic volumes on State Route (SR) 11. A full discussion of the activity-based modeling inputs is included in Attachment B, *Air Quality Planning and Transportation Conformity*, to the proposed Amendment.

This SEIR analyzes the potential significant environmental impacts resulting from the proposed Amendment.


Orange County
Pechanga Reservation
Cahuilla Reservation
Santa Rosa Reservation
Torres-Martinez Reservation
Riverside County
San Diego County
Pala Reservation
Pauma and Yuima Reservation
La Jolla Reservation
Los Coyotes Reservation
County of San Diego
Rincon Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Vista
Oceanside
San Marcos
Escondido
Carlsbad
Mesa Grande Reservation
Encinitas
Barona Reservation
Cleveland National Forest
Inaja - Cosmit Reservation
Solana Beach
Del Mar
Poway
Capitan Grande Reservation
San Diego
Imperial County
Ewiiaapaayp Reservation
Santee
Viejas Reservation
El Cajon
Sycuan Reservation
Manzanita Reservation
La Mesa
La Posta Reservation
Lemon Grove
National City
Jamul Indian Village
Coronado
Campo Reservation
Chula Vista
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tecate, B.C.
Tijuana, B.C.
Figure 2-1
San Diego Region
Tribal Lands
Local Jurisdictions
Cleveland National Forest
Military Facilities
Sources: County of San Diego Assessor's Mapping Division, San Diego Geographic Information Source (SanGIS), SANDAG
MILES
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2.2 PROPOSED AMENDMENT BACKGROUND

The Vision of the approved Plan is: "A fast, fair, and clean transportation system and a resilient region." The approved Plan set three primary goals to achieve this Vision:

- The efficient movement of people and goods.
- Access to affordable, reliable, and safe mobility options.
- Healthier air and reduced GHG.

To achieve these goals, the approved Plan used a framework of coordinated land use and transportation strategies:

- **Invest in a reimagined transportation system**: Build a network and fund services that include multimodal roadways; an expanded network of fast, frequent, and low-cost transit; 21st century technology that manages the entire transportation system and connects people to on-demand services; and zero-emission options for vehicles and *micromobility*, which includes small, low-speed vehicles such as e-scooters, bikes, and other rideables that support short trips around a community.
- **Incentivize sustainable growth and development**: Collaborate with local jurisdictions and fund programs to accelerate housing production while also addressing equity, climate resilience, and mobility.
- **Implement innovative demand and system management**: Reduce solo driving and congestion through increased remote work, carsharing, vanpooling, pricing strategies, and parking management programs that leverage partnerships and technology.

The Vision, goals, and strategies identified in the approved Plan remain unchanged for the proposed Amendment to the 2021 Regional Plan.

2.2.1 LEGISLATION RELEVANT TO THE DEVELOPMENT OF THE PROPOSED AMENDMENT

Development of the proposed Amendment was guided by federal and State laws and regulations, as well as engagement with the public.

FEDERAL REQUIREMENTS

To be eligible for federal transportation funding, the U.S. Department of Transportation (USDOT) requires every Metropolitan Planning Organization (MPO) to conduct long-range transportation planning and develop RTPs. Each MPO must develop at least a 20-year vision and goals plan matched to the unique characteristics of its region. MPOs in areas designated as "nonattainment" or "maintenance" for federal air quality standards must update their RTP every 4 years rather than every 5 years.

Under Federal Highway Administration (FHWA) regulations (23 Code of Federal Regulations [CFR] 450.324, et seq., Metropolitan transportation planning and programming), an RTP must identify "transportation facilities (including major roadways, public transportation facilities, intercity bus facilities, multimodal and intermodal facilities, nonmotorized transportation facilities, and intermodal connectors) that should function as an integrated metropolitan transportation system, giving emphasis to those facilities that serve important national and regional transportation functions" (23 United States Code [USC] 134(i)(2)). RTP transportation network improvements must be "revenue constrained" (23 CFR 450.324(f)(11)), meaning that the MPO has

specified the public and private funds that are reasonably expected to be available and that are needed to implement the proposed transportation plan.

FHWA federal consultation requirements (23 CFR 450.316) for the proposed Amendment include (1) a process involving the MPO, State and local air quality planning agencies, State and local transportation agencies, U.S. Environmental Protection Agency (EPA), and USDOT; and (2) a proactive public involvement process that provides opportunity for public review and comment by, at a minimum, providing reasonable public access to technical and policy information considered by the agency. Pursuant to 176(c) of the federal Clean Air Act (42 USC 7506(c)) and in consultation with EPA, SANDAG and USDOT must determine that the RTP and the Regional Transportation Improvement Program (RTIP) conform to the State Implementation Plan (SIP) for air quality.

CALIFORNIA REQUIREMENTS

In addition to USDOT requirements, the proposed Amendment is guided by several California statutory requirements.

California Regional Transportation Plan Guidelines

The State statutory requirements for RTPs are found in Government Code Section 65080 et seq., which states that an RTP must contain:

- A Policy Element that reflects the mobility goals, policies, and objectives of the region.
- An Action Element that identifies programs and actions to implement the RTP.
- A Financial Element that summarizes the cost of implementing the projects in the RTP in a financially constrained environment.

The California Transportation Commission (CTC) has issued RTP Guidelines (CTC 2017) to clarify the planning practices needed to meet State statutory requirements for RTPs.

California Global Warming Solutions Act of 2006 and Scoping Plans

The California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32, Chapter 488, Statutes of 2006) required CARB to develop and enforce regulations for reporting, verifying, and reducing statewide GHG emissions to 1990 levels by 2020. The law requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

AB 32 requires that CARB develop a Climate Change Scoping Plan (Scoping Plan) consisting of the main strategies California will implement to reduce statewide GHG emissions to 1990 levels by 2020. It must be updated every 5 years. CARB released its initial Scoping Plan in 2008, with updates in 2014, 2017, and 2022. The 2022 Scoping Plan identifies how California can achieve carbon neutrality and an 85 percent reduction in GHG emissions from 1990 levels no later than 2045, consistent with AB 1279 (Chapter 337, Statutes of 2022).

Sustainable Communities and Climate Protection Act of 2008

To help implement AB 32, the California Legislature passed the Sustainable Communities and Climate Protection Act of 2008 (Senate Bill [SB] 375, Chapter 728, Statutes of 2008), one of several steps the State has taken to implement AB 32. SB 375 required CARB to set regional targets for reducing GHG emissions from

passenger vehicle use. In 2018, CARB updated targets for 2020 and 2035 for each region in California governed by an MPO. SANDAG is the MPO for the San Diego region. SANDAG's State-mandated target is to reduce regional emissions of GHGs from cars and light trucks by 15 percent, per capita, by 2020, compared with a 2005 baseline (CARB 2017). By 2035, a 19 percent reduction is required. The Sustainable Communities Act does not require CARB to establish post-2035 targets.

To achieve the targets, SANDAG and other MPOs are required to develop an SCS as a component of the RTP. The SCS is required by Government Code Section 65080(b)(2)(B) to:

- Identify the general location of uses, residential densities, and building intensities within the region.
- Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population.
- Identify areas within the region sufficient to house an 8-year projection of the regional housing need for the region.
- Identify a transportation network to serve the transportation needs of the region.
- Gather and consider the best practically available scientific information regarding resource areas and farmland in the region.
- Consider specified State housing goals.
- Set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the GHG emissions from automobiles and light trucks, to achieve, if there is a feasible way to do so, the GHG emission reduction targets approved by CARB.
- Allow the RTP to comply with federal Clean Air Act requirements related to air quality conformity.

Under SB 375, an SCS cannot be interpreted to supersede the land use authority of cities and counties within the region. Chapter 2 of the approved Plan focuses on the SCS; however, components of the SCS are integrated throughout the Regional Plan chapters and appendices. SCS documentation is updated in Attachment A to the proposed Amendment to reflect changes due to removal of the regional mileage-based road usage charge.

Regional Housing Needs Assessment

The Regional Housing Needs Assessment (RHNA), required by State law (Government Code Section 65584[a]), quantifies the need for housing in the region and informs land use planning in addressing identified existing and future housing needs resulting from population, employment, and household growth.

As a council of governments, SANDAG is responsible for overseeing the RHNA process for the San Diego region. SANDAG, in consultation with the California Department of Housing and Community Development (HCD), assessed the region's housing needs in four income categories—very low, low, moderate, and above moderate. SANDAG and its member agencies developed a methodology for allocating a share of the RHNA Determination to each jurisdiction. SB 375 requires the RHNA to be integrated with the SCS. The proposed Amendment does not impact the RHNA Plan included in the approved Plan.

Regional Comprehensive Plan for the San Diego Region

California law (AB 361, Chapter 508, Statutes of 2003) governs the contents and process for updating the RCP for the San Diego region. Under AB 361, the RCP must be based on local general and regional plans and integrate land uses, transportation systems, infrastructure needs, and public investment strategies, within a regional framework, in cooperation with member agencies and the public. The RCP must be updated as necessary and be consistent with the RTP. Beginning with the 2015 Regional Plan, the RCP requirements have been integrated with the RTP/SCS in the Regional Plan. RCP documentation is updated in Attachment A to the proposed Amendment.

Public Involvement Strategy for the Proposed Amendment

To support the development of the approved Plan, SANDAG implemented a comprehensive public outreach and involvement program consistent with State and federal requirements. Early in the 2021 Regional Plan development process, SANDAG developed a Public Involvement Plan (PIP) to guide the public outreach program, which was updated in mid-2019. It also describes how to connect with hard to reach communities such as tribal nations and low-income and minority populations. For the proposed Amendment, SANDAG developed a Public Involvement Strategy that identifies public engagement techniques to involve the public and collect input based on the PIP for the approved Plan, including public meetings, social media, visualizations, and other means.

2.2.2 SAN DIEGO REGIONAL GROWTH FORECAST

As described above, after adoption of the approved Plan SANDAG made model corrections. Tables 2-1 and 2-2 show the changes resulting from the model corrections described in Section 2.1, *Project Background*. In addition, minor differences in population across mobility hubs resulted from stochastic allocation by the Series 14 Regional Growth Forecast subregional allocation model. More information on the development of the regional growth forecast can be found in Chapter 2, *Project Description*, of the approved Plan PEIR.

Table 2-1
Series 14 San Diego Regional Growth Forecast and SCS Land Use Pattern

Year	Population	Housing Units	Jobs
2016	3,309,510	1,190,555	1,646,419
2025	3,470,848	1,288,216	1,762,537
2035	3,620,348	1,409,866	1,922,240
2050	3,746,073	1,471,299	2,087,056
2016–2050	436,563	280,744	440,637
Percent change 2016–2050	13%	24%	27%

Source: SANDAG 2023b.

Table 2-2
Existing and Forecasted Jobs Growth by Jurisdiction

Jurisdictions	2016	2025	2035	2050	Increase (2016–2050)	
					Jobs	Percent
Carlsbad	75,846	84,096	91,824	99,450	23,604	31.1%
Chula Vista	72,345	80,946	96,209	113,650	41,305	57.1%
Coronado	26,783	27,225	27,916	28,601	1,818	6.8%
Del Mar	4,675	4,717	4,773	4,842	167	3.6%
El Cajon	48,238	52,646	60,116	68,485	20,247	42.0%
Encinitas	28,495	28,911	29,711	30,419	1,924	6.8%
Escondido	58,830	61,368	65,687	70,404	11,574	19.7%
Imperial Beach	5,542	5,801	6,260	6,714	1,172	21.1%
La Mesa	30,992	32,563	35,105	37,885	6,893	22.2%
Lemon Grove	8,958	9,196	9,578	10,013	1,055	11.8%
National City	42,808	54,563	58,004	61,755	18,947	44.3%
Oceanside	47,233	48,521	50,245	51,149	3,916	8.3%
Poway	35,355	35,549	35,866	36,252	897	2.5%
San Diego	893,140	953,079	1,044,329	1,135,978	242,838	27.2%
San Marcos	40,851	46,054	53,539	61,460	20,609	50.4%
Santee	18,042	18,500	19,038	19,593	1,551	8.6%
Solana Beach	9,833	10,079	10,562	10,994	1,161	11.8%
Vista	44,127	45,276	47,130	49,184	5,057	11.5%
Unincorporated	154,326	163,447	176,348	190,228	35,902	23.3%
Region	1,646,419	1,762,537	1,922,240	2,087,056	440,637	26.8%

Source: SANDAG 2023b.

2.2.3 SB 375 SUSTAINABLE COMMUNITIES STRATEGY

As described above, after adoption of the approved Plan SANDAG made model corrections. Tables 2-3 and 2-4 show the changes resulting from the model corrections described in Section 2.1. More information on the SB 375 Sustainable Communities Strategy and general intensification of land uses can be found in Chapter 2, *Project Description*, of the approved Plan PEIR.

Table 2-3
Total Population by Mobility Hub

Mobility Hub Name	2016	2025	2035	2050
Mobility Hub Total	1,453,913	1,658,456	1,875,802	1,988,728
Coastal	172,824	178,738	191,557	198,891
Gateway	318,246	353,913	390,464	394,135
Major Employment Center	253,054	316,411	397,326	431,175
Suburban	392,726	433,436	455,657	488,442

Mobility Hub Name	2016	2025	2035	2050
Urban	317,063	375,958	440,798	476,085
Outside of Mobility Hub Network	1,855,597	1,812,392	1,744,546	1,757,345
Regional Total	3,309,510	3,470,848	3,620,348	3,746,073

Source: SANDAG 2023b.

Table 2-4
Total Jobs by Mobility Hub

Mobility Hub Name	2016	2025	2035	2050
Mobility Hub Total	1,113,785	1,212,986	1,346,519	1,484,618
Coastal	77,375	79,194	82,520	85,840
Gateway	152,981	167,611	192,382	218,904
Major Employment Center	499,003	539,981	600,105	660,362
Suburban	162,358	173,701	191,663	211,942
Urban	222,068	252,499	279,849	307,570
Outside of Mobility Hub Network	532,634	549,551	575,721	602,438
Regional Total	1,646,419	1,762,537	1,922,240	2,087,056

Source: SANDAG 2023b.

2.2.4 GHG REDUCTION TARGETS

In accordance with SB 375, the proposed Amendment must continue to demonstrate that the San Diego region will reduce GHG emissions (GHG emissions for SB 375 compliance are calculated using carbon dioxide [CO_2] emissions) from automobiles and light-duty trucks to achieve, if there is a feasible way to do so, the GHG emission reduction targets approved by CARB. Targets are expressed as percent change in per capita GHG emissions relative to 2005. Consistent with the targets established by CARB, the targets for the San Diego region are a 15 percent per capita reduction in passenger vehicle GHG emissions by 2020 and a 19 percent per capita reduction by 2035. The proposed Amendment would meet the GHG emission reduction targets for 2020 and 2035 established by CARB, as shown in Table 2-5. While CARB does not set targets beyond 2035, SANDAG has provided data in Section 4.3, *Greenhouse Gas Emissions*, of this SEIR utilizing the same methodology to show continued GHG emission reductions beyond 2035.

Table 2-5
Proposed Amendment Estimated SB 375 Greenhouse Gas Emissions Reductions for Cars and Light Trucks

Target Year	CARB Target	Proposed Amendment
2020	15%	17%
2035	19%	19%[1]

Source: SANDAG 2023a (Section 4, SB 375 and the Sustainable Communities Strategy, of the proposed Amendment).
[1] Consistent with the SCS Evaluation Guidelines, the 18.6% reduction was rounded to the nearest integer (CARB 2019:, Appendix D).

2.3 PROJECT OBJECTIVES

The basic project objectives for this proposed Amendment SEIR remain unchanged from the project objectives for the approved Plan PEIR. Those objectives are found in Chapter 2, *Project Description*, of the approved Plan PEIR. The proposed Amendment has the additional objective of removing the regional road usage charge while continuing to meet State and federal planning requirements, regional GHG reduction targets, and federal air quality conformity standards.

2.4 PROJECT CHARACTERISTICS

The proposed Amendment is limited to the removal of the regional mileage-based road usage charge. It does not amend other aspects of the 5 Big Moves and transportation network improvements. With the exception of pricing, the policy and program areas also remain unchanged for the proposed Amendment. While the approved Plan will continue to assume revenue from the State's implementation of a mileage-based road usage charge, the proposed Amendment does not include a regional mileage-based road usage charge. The proposed Amendment refines the financial strategies in the approved Plan as follows in order to continue achieving the region's GHG target set by CARB.

(1) Removal of the Regional Road Usage Charge: Removal of the regional road usage charge reduces anticipated revenues by $14.2 billion over the life of the approved Plan.

(2) Delayed Timing of Future Local Sales Tax Revenue: The approved Plan assumes a half-cent sales tax measure following the 2022 election. In 2022, a proposed citizen initiative for a half-cent sales tax measure to help fund the approved Plan failed to qualify for the November 2022 ballot. The proposed Amendment assumes the citizen initiative will be circulated for the 2024 ballot and postpones the revenue generated from the new measure and potential financing opportunities to begin following the 2024 presidential election, rather than the 2022 midterm election. A second assumed half-cent sales tax measure in 2028 has not been changed with the proposed Amendment.

(3) Update to *TransNet* Revenue: The *TransNet* Program is a voter-approved half-cent sales tax for transportation purposes in the San Diego region. It was approved by voters in 2004 and was estimated to generate $13.0 billion for regional transportation improvements for the remaining years of the measure (2021–2050). On April 22, 2022, the SANDAG Board of Directors approved updated *TransNet* Program revenues based on actual sales tax revenue collections for fiscal year 2022 which are higher than previously anticipated sales tax revenues for fiscal year 2023. The growth rate is applied to the higher base, generating an additional $2 billion through 2050. Those additional revenues have been included in the updated revenue assumptions.

(4) Federal and State Funding: The revenue assumptions for the approved Plan were developed prior to the Infrastructure Investment and Jobs Act (IIJA), aka Bipartisan Infrastructure Law (BIL), being signed into law by President Biden in November 2021. The law authorized $1.2 trillion for transportation and infrastructure spending with $550 billion of that figure going toward "new" investments and programs. The historic level of infrastructure investment from the federal and State government in the early phase years of the approved Plan was unknown and underestimated. The federal and State discretionary programs near-term estimates have been updated to assume historical leveraging rates of local *TransNet* revenue.

These changes would result in a net decrease in revenues from $173 billion identified in the approved Plan to $165 billion. This revenue would still be sufficient to fund the anticipated $163 billion of planned transportation improvements included in the approved Plan.

2.4.1 IMPLEMENTATION ACTIONS

The approved Plan identified priority actions that SANDAG will undertake to support implementation of the approved Plan. All priority actions would remain unchanged for the proposed Amendment except for priority action 4. Changes to priority action 4 are shown in Attachment A of the proposed Amendment.

2.5 INTENDED USES OF THE SEIR

The basic purposes of the California Environmental Quality Act (CEQA) are to inform government decision makers and the public about potential significant environmental impacts of projects, identify ways the impacts can be reduced or avoided, prevent significant avoidable environmental damage through alternatives and mitigation, and disclose to the public the reason that decision makers approved a project that may result in unavoidable significant impacts.

Under CEQA, a lead agency may choose to prepare a supplement to an EIR when substantial changes are proposed that may result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects, but only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation. Pursuant to CEQA Guidelines Section 15163, a supplement to an EIR "need contain only the information necessary to make the previous EIR adequate for the project as revised."

The lead agency is required to consider the information in the previous EIR as revised by the supplemental EIR, along with any other relevant information, in making its decisions on the project approval. SANDAG is the lead agency for the proposed Amendment and SEIR.

2.5.1 AGENCIES EXPECTED TO USE THE SEIR

Lead agencies implementing second-tier land use or transportation projects can use the previously certified approved Plan PEIR, as supplemented by this SEIR, as a first-tier EIR to focus project-specific CEQA documents on project-specific analyses and equally or more effective project-specific mitigation measures. These include but are not limited to cities, the County of San Diego, the California Department of Transportation (Caltrans), and transportation project sponsors.

In addition, CEQA provides several opportunities for further CEQA streamlining for infill projects consistent with the SCS. These opportunities are provided by:

- SB 375 (Public Resources Code Section 21155 et seq.)
- SB 226 of 2011 (Public Resources Code Section 15183.3 et seq.)
- SB 743 of 2013 (Public Resources Code Sections 21099 et seq. and Section 21155.4)

2.5.2 LIST OF PERMITS OR OTHER APPROVALS REQUIRED TO IMPLEMENT THE PROPOSED AMENDMENT

Pursuant to 176(c) of the federal Clean Air Act (42 USC 7506(c)), SANDAG and USDOT, in consultation with EPA, must make a determination that the RTP and the RTIP conform to the SIP for air quality. See Attachment B to the proposed Amendment for the conformity analysis.

2.5.3 ENVIRONMENTAL REVIEW AND CONSULTATION REQUIREMENTS

Preparation of the proposed Amendment met both federal and SB 375 consultation requirements. See Section 7 and Attachment B of the proposed Amendment for documentation.

Federal consultation requirements (23 CFR 450.316) include (1) a process involving the MPO, State and local air quality planning agencies, State and local transportation agencies, EPA, and USDOT; and (2) a proactive public involvement process that provides opportunity for public review and comment by, at a minimum, providing reasonable public access to technical and policy information considered by the agency.

SB 375 (Government Code Section 65080) requires outreach efforts to encourage the active participation of stakeholders, including affordable housing advocates, transportation advocates, neighborhood and community groups, environmental advocates, homebuilder representatives, broad-based business organizations, landowners, commercial property interests, homeowners associations, and consultation with congestion management agencies, transportation agencies, local agency formation commission, and members of city councils and boards of supervisors.

3 ENVIRONMENTAL SETTING

3.1 PHYSICAL CHARACTERISTICS OF THE SAN DIEGO REGION

The physical characteristics of the San Diego region are materially the same as described in Chapter 3, *Environmental Setting*, of the approved Plan PEIR.

3.2 RARE AND UNIQUE ENVIRONMENTAL RESOURCES

The rare and unique environmental resources of the San Diego region are materially the same as described in Chapter 3, *Environmental Setting*, of the approved Plan PEIR.

3.3 EXISTING LAND USE AND DEVELOPMENT PATTERNS

The existing land use and development patterns are materially the same as described in Chapter 3, *Environmental Setting*, of the approved Plan PEIR.

3.4 EXISTING TRANSPORTATION NETWORK

This section describes the existing transportation network as of 2016, the transportation baseline year for the approved Plan PEIR. The existing transportation network consists of freeways, highways, managed lanes, a toll road, regional arterials, local streets and roads, light rail systems, heavy rail, rapid bus service, local bus service, bikeways, commercial and general aviation facilities, seaport facilities, and ports of entry at the United States/Mexico border (Figures 4.16-1 through 4.16-3 in Section 4.16, *Transportation*, of the approved Plan PEIR). These facilities serve the region's 18 cities and the County's unincorporated areas, as well as interregional and international commuting.

The largest proportion of major transportation facilities is located in the western third of the region to best serve the largest and fastest growing population areas. This includes the following major interstate highways and state highway routes:

- Interstate 5 (I-5)
- Interstate 8 (I-8)
- Interstate 15 (I-15)
- Interstate 805 (I-805)
- State Route 15 (SR 15)
- State Route 52 (SR 52)
- State Route 54 (SR 54)
- State Route 56 (SR 56)
- State Route 67 (SR 67)
- State Route 75 (SR 75)
- State Route 76 (SR 76)
- State Route 78 (SR 78)
- State Route 79 (SR 79)
- State Route 94 (SR 94)
- State Route 125 (SR 125)
- State Route 163 (SR 163)
- State Route 188 (SR 188)
- State Route 282 (SR 282)
- State Route 905 (SR 905)

The San Diego Metropolitan Transit System (MTS) operates the San Diego Trolley. The existing San Diego Trolley network consists of electrified light rail vehicles operating on the Blue, Orange, and Green Lines. The Blue Line operates between America Plaza in Downtown San Diego and San Ysidro at the international border with Mexico via National City and Chula Vista. Since the preparation of the approved Plan PEIR, construction finished to extend the Blue Line north to the University City community, also referred to as the Mid-Coast Corridor, and it now serves major activity centers such as the University of California San Diego and Westfield University Town Center. The Orange Line also terminates at America Plaza, with service extending east to El Cajon via southeastern San Diego, Lemon Grove, and La Mesa. The Green Line operates from 12th Street and Imperial Avenue in Downtown San Diego north to Old Town along the bayside, then east to Santee via Mission Valley and San Diego State University.

In North County, the North County Transit District (NCTD) manages the SPRINTER light rail system, which operates diesel-powered light rail vehicles along a 22-mile east-west route serving 15 stations connecting Oceanside, Vista, San Marcos, and Escondido generally along SR 78. NCTD also operates the COASTER commuter rail service along the San Diego region's portion of the Los Angeles–San Diego–San Luis Obispo (LOSSAN) rail corridor from Oceanside to Downtown San Diego.

Amtrak operates the intercity Pacific Surfliner on the LOSSAN corridor connecting San Diego to the rest of the Southern California and nationwide rail system. Metrolink, a regional commuter and passenger train system that operates in Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties, connects with the COASTER and SPRINTER systems via service to the Oceanside Transit Center. There also are three rail freight operators, the Burlington Northern and Santa Fe (BNSF), Pacific Sun Railroad, and the San Diego and Imperial Valley Railroad (SDIV).

Commuter and local bus service is provided throughout the region, including high-volume service to the North County, central, and south bay/border areas. In addition, regional corridor bikeways are primarily aligned in conjunction with major transportation corridors and are supported by an extensive feeder network and local streets.

The movement of goods in the San Diego region involves intermodal systems of air cargo, border crossings, maritime, pipeline, rail, and roadways/truckways. Situated between major production, trade, and population centers, the San Diego region possesses a wide array of transportation and infrastructure assets. The existing transportation system includes interstate highways and state highways, a Class I railroad, a short line railroad, airport cargo systems, the Port of San Diego, and three international border crossings: San Ysidro, Otay Mesa, and Tecate.

Ocean cargo and cruise ship facilities are located on San Diego Bay, providing facilities necessary for the transfer of goods to and from the region via cargo vessels and for the cruise industry. Maritime commerce is carried out at two marine terminals located on San Diego Bay: the 10th Avenue Marine Terminal in the City of San Diego and the National City Marine Terminal at 24th Street. Ferry service operates between Downtown San Diego and Coronado.

The San Diego County Airport System includes 12 public use airports in the San Diego region as well as 4 military airports/airfields. Tijuana International Airport is located directly south of the U.S.-Mexico border. San Diego International Airport (SDIA), McClellan-Palomar, and Tijuana International Airport (TIA) accommodate commercial, general aviation, and corporate services. Brown Field Municipal, Gillespie Field, Montgomery Field, and Ramona accommodate general aviation and corporate services. The remaining airports accommodate general aviation only, and include Oceanside Airport, Fallbrook Community Airpark, Borrego

Valley Airport, Ocotillo Airport, Agua Caliente Airport, and Jacumba Airport. Military airports include Marine Corps Base Camp Pendleton, Marine Corps Air Station Miramar, Naval Air Station North Island, and Naval Outlying Landing Field Imperial Beach. In general, the San Diego County Regional Airport Authority (SDCRAA) is the government entity with jurisdiction over airport planning. In addition, SDCRAA operates SDIA. SANDAG and SDCRAA work together to address long-term ground access improvements to SDIA.

The existing bicycle network in the San Diego region consists of a combination of standard bicycle facilities and regional corridors, including (as of 2021) about 189 miles of Class I bike paths, 1,145 miles of Class II bike lanes, 363 miles of Class III bike routes, and 13 miles of Class IV cycle tracks (SANDAG 2021). In addition, the San Diego region includes 60 miles of the California Coastal Trail (CCT), an interconnected series of coastal hiking, biking, and equestrian trails stretching approximately 1,200 miles along the California coastline from Oregon to Mexico (California Coastal Conservancy 2021).

Sections 4.1 through 4.5 in Chapter 4, *Environmental Impact Analysis Approach*, provide additional, more specific information relating to the existing environmental setting in the San Diego region pertaining to air quality, energy, greenhouse gas emissions, noise and vibration, and transportation.

3.5 PLAN CONSISTENCY

CEQA Guidelines Section 15125(d) requires an EIR to discuss any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans. Land use authority is vested in 18 incorporated cities and the unincorporated County. Consistency of the approved Plan with these agencies' land use plans (general plans and subregional plans such as specific plans) was discussed in Section 4.11, *Land Use,* in the approved Plan PEIR and would not be affected with the changes in the proposed Amendment.

In addition, consistency of the proposed Amendment with applicable regional plans prepared for specific resources is discussed in other Chapter 4 subsections, which analyze the impacts on specific resources. For the specific resources not analyzed in this SEIR, consistency with applicable regional plans remains unchanged from what was analyzed in the approved Plan PEIR.

4 ENVIRONMENTAL IMPACT ANALYSIS APPROACH

This chapter discusses the environmental impacts of implementing the proposed Amendment and identifies mitigation measures to reduce impacts found to be significant. This introductory section describes the resource areas analyzed and the general impact analysis methodology employed.

RESOURCE AREAS ANALYZED

As discussed in Chapter 1, *Introduction*, and consistent with the CEQA Guidelines, the following resources may experience new or greater impacts than those identified in the approved Plan PEIR and are evaluated in detail in this SEIR:

- Air Quality
- Energy
- Greenhouse Gas Emissions
- Noise and Vibration
- Transportation

ANALYSIS METHODOLOGY

As discussed in Chapter 1, this is a Supplemental EIR, which may be prepared when "[a]ny of the conditions described in Section 15162 would require the preparation of a subsequent EIR" and when "only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation" (CEQA Guidelines Section 15163 (a)(1)–(2)). A supplement to an EIR "need only contain the information necessary to make the previous EIR adequate for the project as revised" (CEQA Guidelines Section 15163(b)).

The analysis in this SEIR focuses on the activities associated with the proposed Amendment. This approach is taken because CEQA review has already occurred for the approved Plan, including identification of environmental effects, feasible mitigation measures, and feasible alternatives. This SEIR is a supplement to the originally certified 2021 Regional Plan PEIR (adopted December 10, 2021; SCH No. 2010041061) and incorporates the information necessary to make the EIR adequate for approval of the proposed Amendment,

The degree of specificity in an EIR corresponds to the degree of specificity of the underlying activity being evaluated (CEQA Guidelines Section 15146). This SEIR, in conjunction with the approved Plan PEIR, provides a foundation for second-tier CEQA documents for subsequent projects, but does not analyze the project-specific impacts of individual projects. Project-specific and site-specific details of subsequent transportation and land use projects will vary widely.

This SEIR uses the same baseline conditions that were used in the approved Plan PEIR. The approved Plan PEIR, unless otherwise stated, used the physical conditions as they existed in 2016 as the baseline for the impact analysis, corresponding with the release of the Notice of Preparation (NOP) on November 14, 2016, and the start of Draft PEIR preparation. For a few significance criteria, more recent data was used when available to better represent existing conditions. The impact analysis compares anticipated future physical conditions under implementation of the proposed Amendment to the baseline conditions for each resource area.

Each resource area section includes the following:

Existing Conditions, consistent with CEQA Guidelines Section 15125(a), are described in the SEIR and serve as the baseline physical conditions for the analysis of impacts. As noted above, unless otherwise stated, the *Existing Conditions* sections of the SEIR describe conditions existing in 2016. As with the approved Plan PEIR, this section also describes the anticipated effects from climate change for each resource area, if any.

Regulatory Setting provides a summary of any updates to federal, state, and local laws, regulations, plans, or policies since the preparation of the approved Plan PEIR that are relevant to each resource area and its significance criteria.

Significance Criteria are identifiable quantitative, qualitative, or performance levels used for each resource area to determine whether environmental impacts are significant. The SEIR uses the same significance criteria specifically developed for the approved Plan PEIR. Unless otherwise noted, the significance criteria were based on the checklist questions in Appendix G of the CEQA Guidelines. In some cases, the approved Plan PEIR combined checklist questions, edited their wording, or changed their location in the document in an effort to develop criteria that reflect the programmatic level of the impact analysis and the unique nature of the approved Plan or local conditions. It was determined that the project modifications associated with the proposed Amendment would not alter impact conclusions for certain significance criteria for Air Quality, Noise and Vibration, and Transportation. An explanation for why the proposed Amendment would not result in changes to the impact conclusions for these significance criteria is included in Chapter 1 of this SEIR.

Analysis Methodology describes the methods used to evaluate the impact for each significance criterion and explains how a significant impact is defined for each significance criterion. For some resource areas, technical appendices have been prepared that present more detail on methodology, assumptions, data sheets, and/or results. Unless stated otherwise, the SEIR uses the same analysis methodology used in the approved Plan PEIR. The analysis methodology for certain resource area sections has been revised to reflect new information, including CARB's 2022 Scoping Plan, the updated Safer Affordable Fuel Efficient (SAFE) Vehicles Rule, and minor modeling corrections. These changes are discussed further in the individual resource area sections.

Impact Analysis examines whether the changes associated with the proposed Amendment would result in new or substantially more significant impacts than what was discussed in the approved Plan PEIR. The magnitude, duration, extent, frequency, range, or other parameters of an impact may be described to determine whether impacts are significant; all direct effects and reasonably foreseeable indirect effects are considered, with due consideration to both short-term and long-term impacts. Impacts are analyzed for 2025, 2035, and 2050.

The SEIR provides quantitative analysis of the environmental impacts of the proposed Amendment where possible or meaningful. For example, quantitative analysis is provided in air quality and greenhouse gas emissions sections. However, not all the proposed Amendment's impacts can meaningfully be analyzed quantitatively through the year 2050. Where quantitative analysis of an impact is not possible or meaningful, qualitative analysis is provided.

Chapter 5, *Cumulative Impact Analysis,* examines whether a significant cumulative impact is created when impacts of the proposed Amendment are added to the impacts of one or more related projects, and whether the proposed Amendment's contribution to this impact would be cumulatively considerable (CEQA Guidelines Section 15130). Cumulative impacts are analyzed for the same resource areas analyzed in this chapter.

Mitigation Measures are feasible actions intended to avoid or substantially lessen significant impacts identified in the *Impact Analysis* sections. This SEIR includes prior mitigation measures from the approved Plan PEIR that are still applicable to the proposed Amendment, as well as new mitigation measures, only for those significance criteria where significant impacts have been identified.

The SANDAG Board of Directors has discretion to adopt or reject mitigation measures recommended in the SEIR. This decision will be reflected in findings made by the Board at the time of Project approval. Plan- or policy-level mitigation measures that are accepted will be made formal parts of the proposed Amendment and monitored to help ensure their implementation. Laws and regulations that are applied routinely to similar projects are generally considered in the impact analysis and not repeated as mitigation. However, some mitigation measures do describe specific impact-reducing actions that would be taken to achieve compliance with laws and regulations. In addition, many policies and programs already included in the approved Plan would have the effect of reducing environmental effects that might otherwise occur from regional growth and land use change, and transportation network improvements and programs. The effects of these intrinsic elements of the approved Plan are accounted for in the impact analysis. These intrinsic measures may be identified in the impact analysis text; however, they are not considered "mitigation measures" for purposes of the SEIR.

SANDAG is responsible for implementing those mitigation measures within its responsibility, jurisdiction, and statutory authority. Mitigation can also include measures that are within the responsibility and jurisdiction of another public agency (CEQA Guidelines Section 15091 [a][2]). Mitigation measures included in this SEIR to avoid or substantially lessen significant impacts of the proposed Amendment may fall under the responsibility and jurisdiction of other implementation agencies, such as cities, the County, Caltrans, public transit agencies, or other special districts. Because other project agencies would be responsible for certain mitigation measures identified in this SEIR, SANDAG in its CEQA findings may find that those measures, if feasible, can and should be adopted by those other agencies (CEQA Guidelines Section 15091(a)(2)). Details regarding responsibilities for mitigation measure implementation will be provided in a separate mitigation monitoring and reporting program (MMRP) that the SANDAG Board of Directors will consider for approval in conjunction with approval of the proposed Amendment.

Significance After Mitigation describes the effect of the mitigation measure(s) on the significant impact(s) and determines whether the mitigation measure(s) will reduce the impact to less than significant, or whether the impact will remain significant. Impacts that remain significant after feasible mitigation measures are applied are identified as "significant and unavoidable impacts."

In each resource area section, this SEIR identifies mitigation measures that generally are performance standards–based, which SANDAG shall and other implementing agencies "can and should" comply with in mitigating project-specific impacts. Where applicable, SANDAG then identifies examples of project-level mitigation measures that may be required by lead agencies to meet performance standards. In project-specific CEQA reviews, lead agencies may also identify other comparable measures capable of reducing impacts below the specified threshold. SANDAG cannot require other lead agencies to adopt mitigation, and it is ultimately the responsibility of the lead agency to determine and adopt project-specific mitigation as appropriate and feasible for each individual project. As a result, this SEIR concludes significant and unavoidable for impacts where SANDAG does not have authority to implement or enforce project-specific mitigation measures, or where State or local action might be needed to reduce impacts to less-than-significant levels.

4.1 AIR QUALITY

This section evaluates the impacts of the proposed Amendment related to air quality. See Appendix B, *Air Quality Technical Report,* for more details on the air quality technical analysis. For this analysis, the same air quality methodology used in the approved Plan PEIR was implemented with the model corrections described in Chapter 2, *Project Description*.

4.1.1 EXISTING CONDITIONS

The existing conditions included in Section 4.3, *Air Quality,* of the approved Plan PEIR are used for this evaluation and have not materially changed since the preparation of the approved Plan PEIR.

4.1.2 REGULATORY SETTING

The regulatory setting in Section 4.3 of the approved Plan PEIR included relevant federal, State, regional, and local regulations. The regulatory setting included in Section 4.3 of the approved Plan PEIR used for this evaluation has not materially changed since the preparation of the approved Plan PEIR, except for the following updates.

FEDERAL LAWS, REGULATIONS, PLANS, AND POLICIES

Corporate Average Fuel Economy Standards

The National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (EPA) set the Corporate Average Fuel Economy Standards (CAFE) to improve the average fuel economy and reduce GHG emissions generated by cars and light duty trucks. NHTSA and EPA had adopted a rule in 2019 for the current fuel efficiency standards for passenger cars and light trucks and established new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 (Safer Affordable Fuel-Efficient [SAFE] Vehicles Rule). NHTSA and EPA had also issued a regulation revoking California's Clean Air Act waiver, which allows California to set its own emissions standards, asserting that the waiver was preempted by federal law (SAFE Rule Part One, 84 *Federal Register* 51310, September 27, 2019).

On December 21, 2021, the NHTSA finalized its repeal of the SAFE Vehicles Rule Part One. NHTSA's 2021 rule thus reopens pathways for State and local fuel economy laws (NHTSA 2021).

SAFE Rule Part Two was finalized on March 31, 2020, and went into effect on June 29, 2020. Part Two of the SAFE Rule sets the CAFE standards to increase in stringency by 1.5 percent per year above model year 2020 levels for model years 2021–2026. These standards are lower than the previous CAFE standards, which required that model years 2021–2026 increase in stringency by 5 percent per year.

STATE LAWS, REGULATIONS, PLANS, AND POLICIES

2022 Climate Change Scoping Plan

Pursuant to Assembly Bill (AB) 1279 (see Section 4.3, *Greenhouse Gas Emissions*, of this SEIR for description), the California Air Resources Board (CARB) updated the 2017 Scoping Plan to address implementation of GHG reduction strategies to meet the 2045 reduction target. The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) was approved in December 2022. The Scoping Plan Scenario achieves the AB 1279 target

of 85 percent below 1990 levels by 2045 and identifies a need to accelerate the 2030 target to 48 percent below 1990 levels. The plan builds upon GHG reduction measures of the previous Scoping Plans and includes additional measures to capture and store atmospheric carbon through the State's natural and working lands and using a variety of mechanical approaches. By incorporating GHG emission reduction and carbon capture methods, the 2022 Scoping Plan identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 (CARB 2022). Appendix D of the Scoping Plan includes recommendations for local government actions to help the State meet AB 1279's GHG reduction targets.

Regional Air Quality Strategy and State Implementation Plan

CARB and the San Diego Air Pollution Control District (SDAPCD) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the San Diego Air Basin (SDAB). Consistent with the approved Plan PEIR, the most relevant air quality plan is the 2020 State Implementation Plan (SIP), which addresses federal ozone (O_3)_nonattainment and represents the San Diego region's portion of the SIP. In addition, the *San Diego Regional Air Quality Strategy* (RAQS) is SDAPCD's most recent plan for attaining and maintaining State standards. The RAQS was initially adopted in 1991 and is updated on a triennial basis. The RAQS was updated in 1995, 1998, 2001, 2004, 2009, 2016, and (most recently) 2022 (SDAPCD 2022).

Both the RAQS and SIP demonstrate the effectiveness of CARB measures (mainly for mobile sources) and SDAPCD's plans and control measures (mainly for stationary and area-wide sources) for attaining the O_3 National Ambient Air Quality Standards (NAAQS). The SIP is also updated on a triennial basis. For the 8-hour O_3 standard, the 2016 SIP outlines SDAPCD's portion of the SIP, and also outlines plans and control measures designed to attain and maintain the 8-hour O_3 NAAQS (2008 standard). The 2020 SIP outlines plans and control measures designed to attain and maintain the 8-hour O_3 NAAQS (2008 and 2015 standard). On July 12, 2021, the 2020 SIP was found complete by EPA by operation of law 6 months after the submittal date. Under the Clean Air Act, EPA has 12 months from the completeness date to take a final action on the 2020 SIP.

Chapter 5 of the RAQS includes three categories of emission control programs to reduce nitrogen oxides (NO_X) and volatile organic compounds (VOCs) emissions from mobile sources: Incentive Programs, Indirect Source Programs, District Mobile Source Compliance Programs, and Transportation Control Measures (TCMs).

Incentive programs found in the RAQS augment traditional control programs to further encourage technology development and provide cost-effective emission reductions in advance of regulatory requirements. The following Incentive Programs provide funding to reduce emissions of ozone precursors:

- Carl Moyer Memorial Air Quality Attainment Program;
- Community Air Protection Program (CAPP);
- Funding Agricultural Replacement Measures for Emission Reductions (FARMER);
- Voluntary NOx Remediation Measure Program (NRM);
- Voucher Incentive Program (VIP);
- Proposition 1B Goods Movement Emission Reduction Program (GMERP);
- Vehicle Registration Fund Program (VRF);
- Air Quality Power Generation Mitigation Fund;
- School Bus Compressed Natural Gas (CNG) Tank Replacement Incentive Program (TRIP);

- Drayage Truck Demonstration Project;
- Scrap Car Reimbursement Assistance Program (SCRAP)("T-3.3");
- CALeVIP ("T-3.5");
- Portside Air Quality Improvement and Relief (PAIR) Program;
- Clean Cars 4 All;
- Lawn and Garden Equipment Exchange Programs; and
- Short-Haul Zero Emission Truck Pilot Project.

SDAPCD's Indirect Source Program described in the RAQS consists of ongoing outreach and assistance to local governments, land developers, citizen groups, and non-profit organizations to reduce vehicle trips and associated emissions through voluntary land use and street design improvements (i.e., "smart growth"). SDAPCD efforts include ongoing technical assistance to SANDAG on programs to encourage smart growth; technical assistance to both the City and County of San Diego in crafting their Climate Action Plans (CAPs), to reflect greater reliance on transit and non-motorized transportation modes; workshops, presentations, and technical assistance for city planning staffs, traffic engineers, developers, merchant organizations, neighborhood groups, and others working to improve alternative forms of transportation (walking, bicycling, transit); and smart growth and alternative transportation modes fact sheets.

4.1.3 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines provides criteria for determining the significance of a project's environmental impacts in the form of Initial Study checklist questions. Unless otherwise noted, the significance criteria specifically developed for the approved Plan PEIR and used in this SEIR are based on the Appendix G checklist questions. In some cases, SANDAG has combined checklist questions, edited their wording, or changed their location in the document in an effort to develop significance criteria that reflect the programmatic level of analysis in the approved Plan PEIR and this SEIR, and the unique characteristics of the approved Plan and proposed Amendment.

For purposes of this SEIR, implementation of the proposed Amendment would have a significant air quality impact if it would:

AQ-1	Conflict with or obstruct implementation of the Regional Air Quality Strategy and/or State Implementation Plan
AQ-2	Result in a cumulatively considerable net increase in nonattainment or attainment criteria pollutants, including VOC, NO_X, PM10, PM2.5, and SO_X
AQ-4	Expose sensitive receptors to substantial PM10 and PM2.5 concentrations
AQ-5	Expose sensitive receptors to substantial TAC concentrations
AQ-6	Expose sensitive receptors to carbon monoxide hot spots

The approved Plan PEIR included two additional significance thresholds for air quality (AQ-3 and AQ-7). However, as discussed in Chapter 1, *Introduction*, of this SEIR, it was determined that project modifications associated with the proposed Amendment would not alter the impact conclusions described in the approved Plan PEIR for these thresholds. Therefore, they are not analyzed in this SEIR.

AQ-3	Result in construction-related emissions above regional mass emission thresholds

AQ-7 Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people

4.1.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

AQ-1 CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF THE REGIONAL AIR QUALITY STRATEGY AND/OR STATE IMPLEMENTATION PLAN

ANALYSIS METHODOLOGY

The applicable air quality attainment plans include the 2020 SIP and the 2022 RAQS. While the SDAB is designated as a nonattainment area for the State PM10 and PM2.5 standards (particulate matter smaller than 10 and 2.5 microns, respectively), the California Clean Air Act (CCAA) does not require preparation of attainment plans for these pollutants, and no such plans have been prepared.

Regional Growth and Land Use Change

The analysis evaluates whether forecasted regional growth and land use change under the proposed Amendment would conflict with or obstruct implementation of programs and rules and regulations adopted as part of the RAQS and SIP.

Transportation Network Improvements and Programs

The SANDAG transportation conformity analysis provided in Attachment B to the proposed Amendment is used to determine whether implementation of planned transportation network improvements and programs would conflict with or obstruct implementation of the 2020 SIP. Modeled motor vehicle emissions resulting from implementation of the proposed Amendment are compared to the emissions budgets established in the SIP. In this case, the conformity analysis was conducted for the 2020 SIP, which was adopted by EPA in 2021.

IMPACT ANALYSIS

2025, 2035, and 2050

Regional Growth and Land Use Change

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. Therefore, as with the approved Plan, the proposed Amendment would not conflict with or obstruct implementation of the applicable air quality plans in 2025, 2035, or 2050. This impact is less than significant.

Transportation Network Improvements and Programs

Modeled emissions from the transportation conformity analysis are summarized in Table 4.1-1. As shown, ozone precursors reactive organic gases (ROG) and NO_X in 2025, 2035, and 2050 are less than the conformity budget emissions for both ROG and NO_X in the 2020 SIP. In addition, the proposed Amendment change from the approved Plan is minimal. Thus, implementation of the proposed Amendment would not generate emissions greater than anticipated by relevant federal and State air quality attainment plans. This impact is less than significant.

Table 4.1-1
Air Quality Conformity Emissions (tons per day)

SIP Year	Year	ROG			NO_X		
		SIP Budget	Proposed Amendment	Change from Approved Plan	SIP Budget	Proposed Amendment	Change from Approved Plan
2020 SIP	2023	13.6	13.4	-0.1	19.3	17.3	0.1
	2025	*12.6*	*12.2*	*0.1*	*18.0*	*15.8*	*0.3*
	2026	12.1	11.6	0.2	17.3	15.0	0.3
	2029	11.0	10.3	0.1	15.9	13.5	0.1
	2032	10.0	9.2	-0.1	15.1	12.6	0.0
	2035	*10.0*	*8.5*	*-0.1*	*15.1*	*12.2*	*-0.1*
	2040	10.0	7.3	-0.1	15.1	11.6	-0.1
	2050	10.0	6.7	-0.1	15.1	11.9	-0.1

Source: SANDAG 2023
Note: Conformity years for the 2020 SIP (2023, 2026, 2029, 2032, 2040, 2050) do not align perfectly with the analysis years for the proposed Amendment. SIP budgets and emission estimates for the missing years (2025 and 2035) were estimated based on linearly interpolating between the previous and next conformity year. Interpolated numbers are shown in *italics*.

2025, 2035, and 2050 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact related to conflicts with or obstruction of implementation of the applicable air quality plans because regional growth and land use change would be consistent with the SIP growth forecasts, and applicable rules, regulations, and programs adopted as part of the plans by the SDAPCD and CARB in 2025, 2035 and 2050. Additionally, the approved Plan PEIR found that the transportation network improvements and programs are consistent with the TCMs contained within the SIP and the RAQS. The proposed Amendment would be consistent with the applicable air quality plans because the emissions are less than the conformity emissions budget for ROG and NO_X. Therefore, the conclusion for the proposed Amendment in 2025, 2035, and 2050 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change impacts in the San Diego region that could conflict with or obstruct implementation of the regional air quality plans as described in Section 4.3.1 of the approved Plan PEIR, the proposed Amendment would not exacerbate climate change effects on the air quality plans if it remains in compliance with existing and evolving regulatory requirements, assuming these requirements incorporate consideration of future climate change.

AQ-2 RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE IN NONATTAINMENT OR ATTAINMENT CRITERIA POLLUTANTS, INCLUDING VOC, NO_X, CO, PM10, PM2.5, AND SO_X

ANALYSIS METHODOLOGY

As with the approved Plan PEIR, this analysis focuses on the criteria pollutants for which the region is classified as nonattainment: O_3 (NAAQS and California Ambient Air Quality Standards [CAAQS]) and PM2.5 and PM10 (CAAQS). Emissions are also projected for criteria pollutants for which the region is in attainment: carbon monoxide (CO) and sulfur oxides (SO_X).

Future operational emissions of ozone precursors (VOC and NO_X), PM10, PM2.5, CO, and SO_X associated with implementation of the proposed Amendment are identified. Future emissions under the proposed Amendment are then compared to 2016 levels. Pollutant emissions that show no change or decrease under the proposed Amendment would not contribute to a cumulative increase in emissions and therefore are not addressed further in the analysis. Where operational pollutant emissions increase under the proposed Amendment, the analysis considers whether the increase is cumulatively considerable. Any incremental increase associated with the proposed Amendment is considered cumulatively considerable. Cumulative emissions from all sources in the region are reported from the CARB emissions inventory for 2016, 2025, and 2035. 2050 emissions are extrapolated from 2035 from the CARB emissions inventory, as explained in Appendix B of this SEIR. As discussed above in Section 4.1.3, *Significance Criteria*, construction emissions (Impact AQ-3) were not addressed in this SEIR.

On-road emissions were estimated based on emission factors from CARB's EMFAC2017 model based on the average fleet mix operating in San Diego County for each analysis year, fugitive road dust PM10 and PM2.5 emission factors using CARB methodology, and activity data from SANDAG's activity-based model for each analysis year. Freight rail emissions were estimated based on CARB's freight emissions model in EMFAC for each analysis year. Passenger rail emissions were estimated based on rail activity for existing (e.g., Amtrak, Sprinter, and Coaster) and proposed new rail lines as well as locomotive fleet turnover for each analysis year, as provided by SANDAG staff, along with EPA emission factors for locomotives.

Note that the on-road emission estimates differ from the emissions estimates for the transportation conformity (Table 4.1-1) due to methodological differences. The primary difference here is that on-road emissions estimates are estimated by roadway link using the actual speeds provided in the SANDAG activity-based model. The vehicle miles traveled (VMT) and emission factor model are the same, so differences in emissions are due primarily to speed differences. The methodology employed is discussed further in Appendix B of this SEIR. This more detailed methodology was used here to support the detailed hot spot and human health risk assessment.

Health Impacts

Consistent with the discussion in Section 4.3.1 of the approved Plan PEIR, all criteria pollutants that would be generated by the proposed Amendment are associated with some form of health risk (e.g., asthma, lower respiratory problems). Criteria pollutants can be classified as either regional or localized pollutants. Regional pollutants can be transported over long distances and affect ambient air quality far from the emissions source. Localized pollutants affect ambient air quality near the emissions source. Ozone is considered a regional criteria pollutant, whereas CO, nitrogen dioxide (NO_2), SO_X, and lead (Pb) are localized pollutants. Particulate matter (PM) can be both a local and a regional pollutant, depending on its composition.

Regional Project-Generated Criteria Pollutants (Ozone Precursors, Regional SO_X, and Regional PM)

Adverse health effects induced by regional criteria pollutant emissions generated by the proposed Amendment (ozone precursors, SO_X and PM) are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, and the number and character of exposed individuals [e.g., age, gender]). For these reasons, ozone precursors (ROG and NO_X) contribute to the

formation of ground-borne ozone on a regional scale. Emissions of ROG and NO_X generated in one area may not equate to a specific ozone concentration in that same area. Similarly, some types of particulate and SO_X pollution may be transported over long distances or formed through atmospheric reactions. As such, the magnitude and locations of specific health effects from exposure to increased ozone, SO_X, or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project. Moreover, exposure to regional air pollution does not guarantee that an individual will experience an adverse health effect—as discussed in Section 4.3.1 of the approved Plan PEIR, there are large individual differences in the intensity of symptomatic responses to air pollutants. However, other variables, including the overall health of individuals and other underlying medical conditions, which cannot be known, strongly influence individual health consequences.

Nonetheless, emissions increases by the proposed Amendment, were they to occur, would increase photochemical reactions and the formation of tropospheric ozone, SO_X, and secondary PM, which, at certain concentrations, would lead to increased incidence of specific health consequences, such as various respiratory and cardiovascular ailments, which for the reasons stated above cannot meaningfully be quantified. As discussed previously, air districts develop region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment designations under the NAAQS and CAAQS. The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates there are known safe concentrations of criteria pollutants. Thus, NAAQS and CAAQS are health-based standards.

Localized Project-Generated Criteria Pollutants and Air Toxics (Localized PM, CO, NO_2, SO_X, and Pb)

Localized pollutants generated by a project are deposited and potentially affect populations near the emissions source. Because these pollutants dissipate with distance, emissions from individual projects can result in direct health impacts on adjacent sensitive receptors. Localized pollutants analyzed in this SEIR include localized PM and toxic air contaminants (TACs).

The localized PM analysis is provided in Impact AQ-4. In AQ-4, if the proposed Amendment would contribute to an existing violation or create a new violation, it would also contribute to these adverse health effects. Health impacts of TACs are analyzed separately in Impact AQ-5. Pb was removed from motor vehicle fuels eliminating the activities here as sources of Pb emissions. NO_X are highly reactive gases with regional, not local impact, and are thus not analyzed here. SO_X are present in small amounts in motor vehicle emissions, but most impacts are from stationary power and industrial facilities and large non-road sources. As these are not the focus of this analysis local sulfur dioxide (SO_2) impacts were not analyzed.

IMPACT ANALYSIS

2025

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

As shown in Table 4.1-2, emissions would decrease from 2016 to 2025 under implementation of the proposed Amendment for all emissions as follows:

- ROG reduced by 4.1 tons per day, or 63 percent
- NO_X reduced by 23.2 tons per day, or 65 percent
- CO reduced by 75.8 tons per day, or 53 percent

- PM10 reduced by 0.4 ton per day, or 3 percent
- PM2.5 reduced by 0.5 ton per day, or 13 percent
- SO_X reduced by 0.04 ton per day, or 10 percent

Note that in terms of activity, VMT, freight rail, and passenger rail activity is projected to increase between 2016 and 2025. Reductions in emissions across the board are due primarily to federal and State regulations that reduce emissions from vehicles and locomotives over time. Moreover, while passenger rail activity increases, the rail lines, such as Coaster and Amtrak, are replacing existing older locomotives with modern, Tier 4 engines by 2025. Thus, while activity and fuel consumption increase, emissions are reduced, because Tier 4 engines emit fewer emissions per gallon of fuel consumed than the current locomotive fleet.

For on-road sources, the average vehicle fleet in 2025 is assumed to be substantially cleaner than the existing fleet. Therefore, while total VMT would increase 1.1 percent, emissions of all pollutants decrease, because newer vehicles emit less emissions on a per mile basis. It is worth noting that the decrease in PM10 and PM2.5 is less than other pollutants because PM10 and PM2.5 emissions from on-road sources are dominated (comprising 95 percent of PM10 and 83 percent of PM2.5) by paved road dust as well as brake and tire wear in 2025, and emission rates for paved road dust as well as brake and tire wear do not follow the same downward trend as vehicle exhaust. Therefore, PM10 and PM2.5 emissions trend down by 2025, but only slightly.

As shown, when compared to the 2016 baseline conditions, emissions from the proposed Amendment are reduced for each criteria pollutant, including nonattainment pollutants. There would be no adverse health effects associated with these emissions decreases.

Table 4.1-2
Proposed Amendment Emission Estimates Prior to Mitigation

Emission Category	Emissions (tons per day)					
	ROG	NO_X	CO	PM10	PM2.5	SO_X
2016						
On-Road Sources	6.4	33.5	141.9	13.5	3.6	0.4
Freight Rail	0.0	0.8	0.2	0.0	0.0	0.0
Passenger Rail	0.1	1.4	0.0	0.1	0.0	0.0
Total 2016	6.5	35.7	142.1	13.6	3.7	0.4
Change from Approved Plan[1]	0.0	0.4	-3.2	0.0	0.0	0.0
2025						
On-Road Sources	2.4	11.7	66.1	13.2	3.2	0.3
Freight Rail	0.0	0.5	0.2	0.0	0.0	0.0
Passenger Rail	0.0	0.3	0.0	0.0	0.0	0.1
Total 2025	2.4	12.5	66.3	13.2	3.2	0.3
Change from Approved Plan	0.0	0.5	-1.1	0.1	0.0	0.0
Net Change From 2016	-4.1	-23.2	-75.8	-0.4	-0.5	-0.0
2035						
On-Road Sources	1.8	8.6	52.5	13.5	3.3	0.2
Freight Rail	0.0	0.3	0.3	0.0	0.0	0.0
Passenger Rail	0.0	0.6	0.0	0.0	0.0	0.1

Emission Category	Emissions (tons per day)					
	ROG	NO_X	CO	PM10	PM2.5	SO_X
Total 2035	1.8	9.5	52.8	13.5	3.3	0.4
Change from Approved Plan	0.0	0.7	-0.9	0.1	0.1	0.0
Net Change From 2016	-4.7	-26.2	-89.3	-0.1	-0.4	-0.0
2050						
On-Road Sources	1.6	8.3	50.0	13.9	3.3	0.2
Freight Rail	0.0	0.3	0.3	0.0	0.0	0.0
Passenger Rail	0.1	1.4	0.0	0.0	0.0	0.3
Total 2050	1.7	10.0	50.3	13.9	3.4	0.5
Change from Approved Plan	0.0	0.8	-1.1	0.1	0.0	0.0
Net Change From 2016	-4.8	-25.7	-91.8	+0.3	-0.3	+0.1

Source: Refer to Appendix B for modeling assumptions, inputs, and results.
[1] Throughout this table and in all other results in this section that are compared to the approved Plan it is important to note that results are those from the conditions modeled in this SEIR. These include the removal of the regional road usage charge and its influence on vehicle travel and speeds, but also other changes to the network and the mix of vehicles on the network due to the modeling corrections noted in Chapter 2 of this SEIR. These additional changes affect results in all years. Thus, changes presented here are the net result of all differences between the approved Plan PEIR and this SEIR, and are not solely due to the removal of the regional road usage charge.

2025 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact for AQ-2 in 2025 because implementation of the approved Plan would not result in a cumulatively considerable net increase in any nonattainment or attainment criteria pollutant as emissions would be lower than baseline (2016) conditions. When compared to the approved Plan, the proposed Amendment would result in small increases in the NO_X and PM10 emissions (see Table 4.1-2). However, emissions would remain lower than baseline (2016) conditions. Therefore, the conclusion for the proposed Amendment in 2025 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

As shown in Table 4.1-2, emissions would decrease from 2016 to 2035 under implementation of the proposed Amendment for all emissions as follows:

- ROG reduced by 4.7 tons per day, or 72 percent
- NO_X reduced by 26.2 tons per day, or 73 percent
- CO reduced by 89.3 tons per day, or 63 percent
- PM10 reduced by 0.1 ton per day, or 1 percent
- PM2.5 reduced by 0.4 ton per day, or 11 percent
- SO_X reduced by 0.04 ton per day, or 9 percent

Note that in terms of activity, VMT, freight rail, and passenger rail activity is projected to increase between 2016 and 2035. Reductions in emissions across the board are due primarily to federal and State regulations that reduce emissions from vehicles and locomotives over time. Moreover, while passenger rail activity increases, all passenger rail lines (both current and new) are assumed to be operating completely with modern, Tier 4 engines by 2035. Thus, while activity and fuel consumption increase, emissions are reduced because Tier 4 engines emit fewer emissions per gallon of fuel consumed than the current locomotive fleet.

For on-road sources, the average vehicle fleet in 2035 is assumed to be substantially cleaner than the existing fleet. Therefore, while total VMT would increase (4 percent), emissions of all pollutants decrease, because newer vehicles emit less emissions on a per mile basis. It is worth noting that the decrease in PM10 and PM2.5 is less than other pollutants because PM10 and PM2.5 emissions from on-road sources are dominated (comprising 98 percent of PM10 and 94 percent of PM2.5) by paved road dust as well as brake and tire wear in 2035, and emission rates for paved road dust as well as brake and tire wear do not follow the same downward trend as vehicle exhaust. Therefore, PM10 and PM2.5 emissions trend down by 2035, but only slightly.

As shown, when compared to the 2016 baseline conditions, emissions from the proposed Amendment are reduced for each criteria pollutant. Including nonattainment pollutants. There would be no adverse health effects associated with these emissions decreases.

2035 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact for AQ-2 in 2035 because implementation of the approved Plan would not result in a cumulatively considerable net increase in any nonattainment or attainment criteria pollutant as emissions would be lower than baseline (2016) conditions. When compared to the approved Plan, the proposed Amendment would result in small increases in the NO_X, PM10, and PM2.5 emissions (see Table 4.1-2). However, emissions would remain lower than baseline (2016) conditions. Therefore, the conclusion for the proposed Amendment in 2035 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

2050

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

As shown in Table 4.1-2, emissions would decrease from 2016 to 2050 under implementation of the proposed Amendment as follows:

- ROG reduced by 4.8 tons per day, or 74 percent
- NO_X reduced by 25.7 tons per day, or 72 percent
- CO reduced by 91.8 tons per day, or 65 percent
- PM2.5 reduced by 0.3 ton per day, or 8 percent

As shown in Table 4.1-2, emissions would increase from 2016 to 2050 under implementation of the proposed Amendment as follows:

- PM10 increased by 0.3 ton per day, or 2 percent
- SO_X increased by 0.1 ton per day, or 25 percent

Note that in terms of activity, VMT, freight rail, and passenger rail activity is projected to increase between 2016 and 2050. Reductions in emissions for ROG, NO_X, CO, and PM2.5 are due primarily to federal and State regulations that reduce emissions from vehicles and locomotives over time. Moreover, while passenger rail activity increases, all passenger rail lines (both current and new) are assumed to be operating completely with modern, Tier 4 engines by 2050. Thus, while activity and fuel consumption increase, emissions from passenger rail are reduced because Tier 4 engines emit fewer emissions per gallon of fuel consumed than the current locomotive fleet. Note that in 2050, emissions of CO and SO_X from passenger rail are expected to increase because there are no Tier 4 reductions assumed for CO and SO_X; thus, CO and SO_X emissions from rail increase along with the increase in activity and fuel consumption.

For on-road sources, the average vehicle fleet in 2050 is assumed to be substantially cleaner than the existing fleet. Therefore, while total VMT would increase (7.3 percent), emissions of all pollutants decrease except PM10 and SO_X, because newer vehicles emit less emissions on a per mile basis. The PM10 emissions increase because PM10 emissions from road dust as well as brake and tire wear are not assumed to decrease on a per-mile basis over time, and these emissions are tied to increased VMT.

The SO_X emissions increase because SO_X emissions from passenger rail are assumed to increase along with the increase in fuel consumption. The approved Plan includes various mobility improvements that aim to increase commuter transit ridership from 3 percent under current conditions to 13 percent by 2050. The approved Plan includes four new commuter rail lines by 2050, and facilitates increased activity along existing (e.g., Amtrak, Coaster, and Sprinter) commuter rail lines. Total transit trips (including both electric light rail [trolley] and commuter rail [diesel]) would increase from 631 daily trips under existing conditions, to over 2,900 daily trips by 2050. This results in an increase from passenger rail diesel fuel combustion on the average day from 7,500 gallons per day under existing conditions to almost 62,000 gallons per day in 2050, due solely to the increase in activity and assuming all new passenger rail activity and rail lines will be powered by Tier 4 diesel engines.

While the SEIR modeling, consistent with the approved Plan PEIR, conservatively assumes all new commuter rail will be diesel, future commuter rail, particularly those lines that begin service after 2035, are actually likely to be powered by zero emission or near-zero emission technologies, such as electric, hybrid, and other technologies and fuels, as those technologies improve, costs decrease, and existing diesel locomotives reach the end of their useful life. As agencies and the State look beyond Tier 4 emissions standards, zero emissions rail is set to dictate the next cycle of rail vehicle design. Zero-emissions is supported by the Governor through Executive Order N-79-20 and is likely to become standard practice in the coming years.

As shown, emissions from the proposed Amendment are reduced for VOC, NO_X, CO, and PM2.5 but increase for PM10 and SO_X, representing a significant impact. The increase in these emissions can contribute to short- and long-term human health effects described in Section 4.3-1 of the approved Plan PEIR.

SO_X is a precursor to fine PM formation in the form of sulfates, such as ammonium sulfate, and short-term exposure can aggravate the respiratory system, making breathing difficult. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease.

Broadly, PM contains microscopic solids or liquid droplets that are so small that they can be inhaled and cause serious health problems. However, PM2.5 is more of a concern than PM10. CARB states that PM2.5 is more likely to travel into and deposit on the surface of the deeper parts of the lung, while the EPA states that PM2.5 poses the greatest risk to health (CARB 2023, EPA 2022). As shown in Table 4.1-2 and as discussed above, while PM10 emissions increase slightly (2 percent), PM2.5 emissions decrease (8 percent).

2050 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a significant impact for AQ-2 in 2050 because implementation of the approved Plan would result in a cumulatively considerable net increase in PM10 and SO_X emissions. The proposed Amendment would not result in a change in SO_X emissions (see Table 4.1-2). When compared to the approved Plan, the proposed Amendment would result in a small increase in PM10 emissions (0.1 ton per day) and a more severe cumulatively considerable net increase in PM10 emissions (see Table 4.1-2). Therefore, the conclusion for the proposed Amendment in 2050 would be unchanged from what was identified in the approved Plan PEIR and would remain significant.

Exacerbation of Climate Change Effects

Consistent with the analysis and findings of the approved Plan PEIR, the proposed Amendment is expected to exacerbate climate change effects on increases in some criteria pollutants. Climate change may result in increased wildfire frequency and intensity, which can increase emissions of particulate matter, carbon monoxide, nitrogen oxide, and other volatile organic compounds. Precipitation during dry seasons may also decrease under climate change, reducing regional ability to fight wildfires and reduce this source of particulate matter (Reidmiller et al. 2018). As mentioned in Section 4.3.1 of the approved Plan PEIR and consistent with this analysis, climate change could increase vehicle idling due to traffic disruption from flooding and wildfire that may block routes, thus increasing the amount of particulate matter and SO_X coming from vehicles. Because the proposed Amendment may also result in increased PM10 and SO_X emissions, the air quality impacts from the proposed Amendment may exacerbate climate change impacts.

The proposed Amendment would not cause a considerable net increase in other nonattainment criteria pollutants, such as ROG, NO_X, CO, and PM2.5. Therefore, although there will be climate change impacts in the San Diego region that could increase emissions of these pollutants, the proposed Amendment would not exacerbate climate change-caused increases of these emissions.

MITIGATION MEASURES

AQ-2 RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE IN NONATTAINMENT AND ATTAINMENT CRITERIA POLLUTANTS, INCLUDING VOC, NO_X, PM10, PM2.5, AND SO_X

2050

The following mitigation measures identified in Section 4.3 of the approved Plan PEIR would still be applicable to the proposed Amendment and would help reduce criteria pollutants.

- **AQ-2a. Secure Incentive Funding**
- **AQ-2b. Zero Emission Trains**

As identified in Section 4.3 of the approved Plan PEIR and discussed in further detail in Sections 4.8, *Greenhouse Gas Emissions, and* 4.16, *Transportation*, of the approved Plan PEIR, mitigation measures **GHG-5a**, **GHG-5b**, **GHG-5d**, **GHG-5f**, and **TRA-2** would also reduce PM10, PM2.5, and SO_X emissions and would remain applicable to the proposed Amendment. Section 4.5, *Transportation*, of this SEIR, includes minor updates to mitigation

measure **TRA-2**. Section 4.3, *Greenhouse Gas Emissions*, of this SEIR includes an additional mitigation measure, **GHG-5g**, that would also reduce air quality impacts associated with the proposed Amendment.

- **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans**
- **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure**
- **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide**
- **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects**
- **GHG-5g. Prepare/Develop a Regional Climate Action Plan**
- **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**

SIGNIFICANCE AFTER MITIGATION

Mitigation measures **GHG-5a**, **GHG-5b**, **GHG-5d**, **GHG-5f**, and **GHG-5g** would reduce PM10 and PM2.5 emissions from tire wear, brake wear, and vehicle exhaust. In addition, mitigation measure **TRA-2** would reduce criteria pollutants through project-level VMT reduction measures, as discussed in Section 4.5 of this SEIR. Measures to reduce VMT or vehicle exhaust (e.g., electric vehicles [EVs]) in these mitigation measures would reduce PM10 and SO_X emissions and associated concentrations.

Mitigation measure **AQ-2a** would reduce PM10 and SO_X emissions from on-road sources by securing funding to implement ways to reduce all emissions, including PM10 and SO_X emissions from mobile sources.

Mitigation measure **AQ-2b** would reduce exhaust PM10 and SO_X emissions from commuter trains by replacing diesel fuel combustion with zero-emission energy sources. The SO_X impact in 2050 is due primarily to fuel combustion from commuter trains, since SO_X emissions scale linearly with fuel consumption, regardless of the engine tier. This mitigation measure would be implemented in all new rail lines after 2035, and would reduce diesel fuel consumption by 46 percent in 2050 relative to unmitigated conditions. This would result in a similar 46 percent reduction in SO_X from passenger rail and a 25 percent reduction in SO_X overall, as shown in Table 4.1-3. After mitigation, SO_X emissions would be reduced to below 2016 conditions.

Table 4.1-3
Proposed Amendment Emission Estimates After Mitigation for 2050

Emission Category	Emissions (tons per day)					
	ROG	NO_X	CO	PM10	PM2.5	SO_X
2050 Mitigated						
On-Road Sources[1]	1.6	8.3	50.0	13.9	3.4	0.3
Freight Rail[1]	0.0	0.3	0.3	0.0	0.0	0.0
Passenger Rail[2]	0.0	0.8	0.0	0.0	0.0	0.2
Total 2050	1.7	9.4	50.3	13.9	3.4	0.4
Change from Approved Plan	0.0	0.9	-1.1	0.1	0.1	0.0

Emission Category	Emissions (tons per day)					
	ROG	NO_X	CO	PM10	PM2.5	SO_X
Net Change From 2016[3]	-4.8	-26.3	-91.8	+0.3	-0.3	0.0

[1] On-road and Freight Rail emissions are unchanged from the unmitigated emission estimates shown in Table 4.1-2.
[2] Passenger Rail emissions assume a 46 percent decrease in fuel consumption in 2035.
[3] 2016 emissions are shown in Table 4.1-2.

Mitigation has been identified for PM10 (**AQ-2a**) and SO_X (**AQ-2b**). Mitigation measure **AQ-2b** would reduce SO_X emissions so that they would be less than cumulatively considerable, and therefore less than significant. However, for mitigation measure **AQ-2a** and other PM-reducing mitigation measures, it cannot be guaranteed that PM10 emissions would be reduced to where they would be less than cumulatively considerable. Therefore, impacts related to cumulatively considerable net increases in air pollutant emissions (Impact AQ-2) would remain significant and unavoidable.

AQ-4 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL PM10 AND PM2.5 CONCENTRATIONS

ANALYSIS METHODOLOGY

If the proposed Amendment would violate the PM10 or PM2.5 air quality standards or substantially contribute to an existing violation, then it would be considered to expose sensitive receptors to substantial PM10 and PM2.5 concentrations, which in turn would contribute to adverse health effects. Under the CAAQS, the SDAB is designated as a State nonattainment area for PM10 and PM2.5 (as well as ozone). The San Diego region is in attainment of the NAAQS for PM10 and PM2.5 (as well as other criteria pollutants). This analysis is based on operational emissions associated with forecasted regional growth and land use change and planned transportation network improvements and programs. The assumptions for operational emissions calculations are provided in Appendix B of this SEIR and remain unchanged from the approved Plan PEIR.

Consistent with the analysis used in the approved Plan PEIR, the analysis to evaluate whether the proposed Amendment would violate any PM10 or PM2.5 air quality standard or contribute substantially to an existing projected air quality violation involves two main steps.

1. Existing baseline mass emissions and future mass emissions in 2025, 2035, and 2050 under the proposed Amendment were estimated for on-road, freight rail, and commuter rail sources. Methods and assumptions for projecting mass emissions are presented in Appendix B of this SEIR. Results are presented in Impact AQ-2.
2. Based on these emission estimates, a detailed localized analysis was performed for each analysis year to determine whether the operational emissions of the proposed Amendment would violate an air quality standard or contribute substantially to an existing violation.

Methods and results for the PM10 and PM2.5 modeling are presented in detail in Appendix B of this SEIR. Because San Diego County is designated as a State nonattainment area for both PM10 and PM2.5, localized modeling is performed for both PM10 and PM2.5.

Health Impacts

The ambient air quality standards are health-based standards. Therefore, in this impact analysis, when the proposed Amendment would result in a new violation of a particulate standard or substantially contribute to

an existing violation, it would also contribute to these adverse health effects. Health impacts of diesel particulates, a TAC and subset of PM10 and PM2.5 emissions, are analyzed separately in Impact AQ-5.

This analysis identifies and maps receptors in 2016 and future years within the areas exposed to specified concentrations of PM10 and PM2.5 emitted from the proposed Amendment sources. These receptors would be at greatest risk of experiencing the health effects listed in Section 4.3 of the approved Plan PEIR.

As discussed in the approved Plan PEIR, given the limitations of modeling tools and assumptions, receptor exposure numbers are an indication of relative exposure, and not a precise prediction. Also, because of the conservative modeling assumptions (see Appendix B to the SEIR), the analysis presents maximum ambient air quality impacts. For these reasons, the actual exposure to particulate matter would likely be lower than presented in this analysis. Proven scientific models that are designed to quantitatively correlate mass emissions of particulates from a plan or project to project-specific localized health impacts (e.g., number of cases of decreased lung function) are not available. Similarly, given the limitations of the localized particulate methodology, it is not possible to directly and accurately correlate increased standards violations to project-specific health impacts. The localized health effects of new PM standard violations or substantial contributions to existing violations are best quantified by the Impact AQ-5 health risk assessment for TACs, which include air toxics and diesel particulates.

IMPACT ANALYSIS

2025

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Maximum changes in concentrations of 24-hour and annual levels of PM2.5 and PM10 from 2016 to 2025 from major roadways, freeways, and highways under implementation of the proposed Amendment are shown in Table 4.1-4 and Table 4.1-5, respectively. For PM2.5, modeling shows a small decrease in concentrations in some areas, no change in some areas, and a small increase in some areas. However, all increases would be less than the criteria identified above for a new violation or substantial contribution to an existing violation. This impact is less than significant.

For PM10, modeling shows no change in some areas and a small increase in some areas. However, concentrations would increase above thresholds within the Escondido domain for the annual CAAQS. These exceedances in Escondido are due primarily to road dust from freeway travel.[1] The maximum increases in Escondido are at receptor locations immediately adjacent to I-15. These PM10 increases would contribute to a new violation or substantially contribute to an existing violation. The impact for PM10 is significant. The locations of PM10 exceedances for 2025 are shown on Figure 4.1-1.

[1] While brake and tire wear emissions would make up a portion of the modeled PM10 concentrations in Escondido, the largest source of PM10 emissions that contribute to the modeled PM10 concentrations is from road dust.

Table 4.1-4
Summary of Incremental PM2.5 Concentrations, 2025

Standard	Maximum Incremental Concentration (µg/m³)		Area of Threshold Exceedance (acres)		Significant Impact?
	Proposed Amendment	Change from Approved Plan	Proposed Amendment	Change from Approved Plan	
PM2.5 Annual CAAQS	0.0	-0.6	0	0	No
PM2.5 24-hour NAAQS	0.0	-1.0	0	0	No
PM2.5 Annual NAAQS	0.0	-1.0	0	0	No

Source: Appendix B of this SEIR.
µg/m³ = micrograms per cubic meter

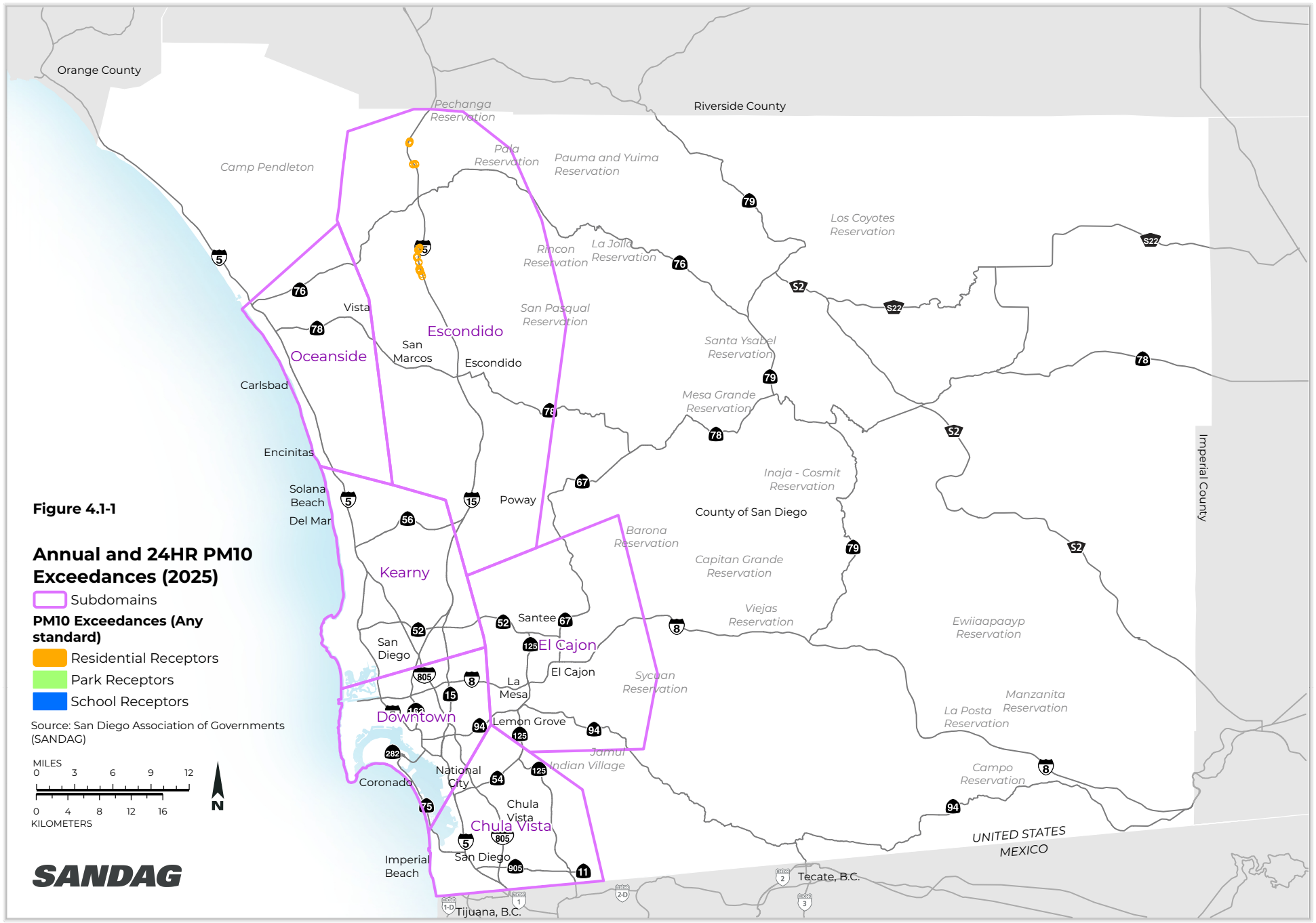
Table 4.1-5
Summary of Incremental PM10 Concentrations, 2025

Standard	Maximum Incremental Concentration (µg/m³)		Area of Threshold Exceedance (acres)		Significant Impact?
	Proposed Amendment	Change from Approved Plan	Proposed Amendment	Change from Approved Plan	
PM10 24-hour NAAQS	5	1	0	0	No
PM10 Annual CAAQS	1	-1	28	-5	Yes[1]
PM10 24-hour CAAQS	6	0	0	-1	No

Source: Appendix B of this SEIR.
[1] These exceedances are in the Escondido domain.
µg/m³ = micrograms per cubic meter

2025 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact AQ-4 would be significant in 2025 because implementation of forecasted regional growth and land use change and planned transportation network improvements and programs under the approved Plan would substantially contribute to violations or create new violations of annual PM10 CAAQS in the Escondido domain and 24-hour PM10 CAAQS in the Chula Vista domain. Although the exceedances of the annual PM10 CAAQS would remain, the proposed Amendment would eliminate the exceedances in Chula Vista and reduce the area of threshold exceedance in Escondido. Therefore, because the proposed Amendment would reduce the areas that exceed the annual PM10 CAAQS, the conclusion for the proposed Amendment in 2025 would be unchanged from what was identified in the approved Plan PEIR and would remain significant.


Orange County
Riverside County
Imperial County
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Camp Pendleton
Los Coyotes Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
Vista
Escondido
Oceanside
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
County of San Diego
Kearny
Santee
El Cajon
San Diego
La Mesa
Downtown
Lemon Grove
National City
Coronado
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Tecate, B.C.
Tijuana, B.C.
Figure 4.1-1
Annual and 24HR PM10 Exceedances (2025)
Subdomains
PM10 Exceedances (Any standard)
Residential Receptors
Park Receptors
School Receptors
Source: San Diego Association of Governments (SANDAG)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Maximum changes in concentrations of 24-hour and annual levels of PM2.5 and PM10 from 2016 to 2035 from major roadways, freeways, and highways with implementation of the proposed Amendment are shown in Tables 4.1-6 and 4.1-7, respectively. For PM2.5, modeling shows no change in some areas and a small increase in some areas. However, all increases would be less than the criteria identified above for a new violation or substantial contribution to an existing violation. This impact for PM2.5 is less than significant.

For PM10, modeling shows no change in some areas and a small increase in some areas. However, concentrations would increase above thresholds within the El Cajon and Escondido domains for the annual CAAQS. These exceedances in El Cajon and Escondido are due primarily to road dust from freeway travel[2] The maximum increase in El Cajon is at a single receptor location immediately adjacent to SR 125; the maximum increases in Escondido are at receptor locations immediately adjacent to I-15. These PM10 increases would contribute to a new violation or substantially contribute to an existing violation. The impact for PM10 is significant. The locations of PM10 exceedances for 2035 are shown on Figure 4.1-2.

Table 4.1-6
Summary of Incremental PM2.5 Concentrations, 2035

Standard	Maximum Incremental Concentration (µg/m³)		Area of Threshold Exceedance (acres)		Significant Impact?
	Proposed Amendment	Change from Approved Plan	Proposed Amendment	Change from Approved Plan	
PM2.5 Annual CAAQS	1.0	0.4	0	0	No
PM2.5 24-hour NAAQS	1.0	0.0	0	0	No
PM2.5 Annual NAAQS	0.5	-0.5	0	0	No

Source: Appendix B of this SEIR.
µg/m³ = micrograms per cubic meter

Table 4.1-7
Summary of Incremental PM10 Concentrations, 2035

Standard	Maximum Incremental Concentration (µg/m³)		Area of Threshold Exceedance (acres)		Significant Impact?
	Proposed Amendment	Change from Approved Plan	Proposed Amendment	Change from Approved Plan	
PM10 24-hour NAAQS	10	0	0	0	No
PM10 Annual CAAQS	3	0	136	23	Yes [1]

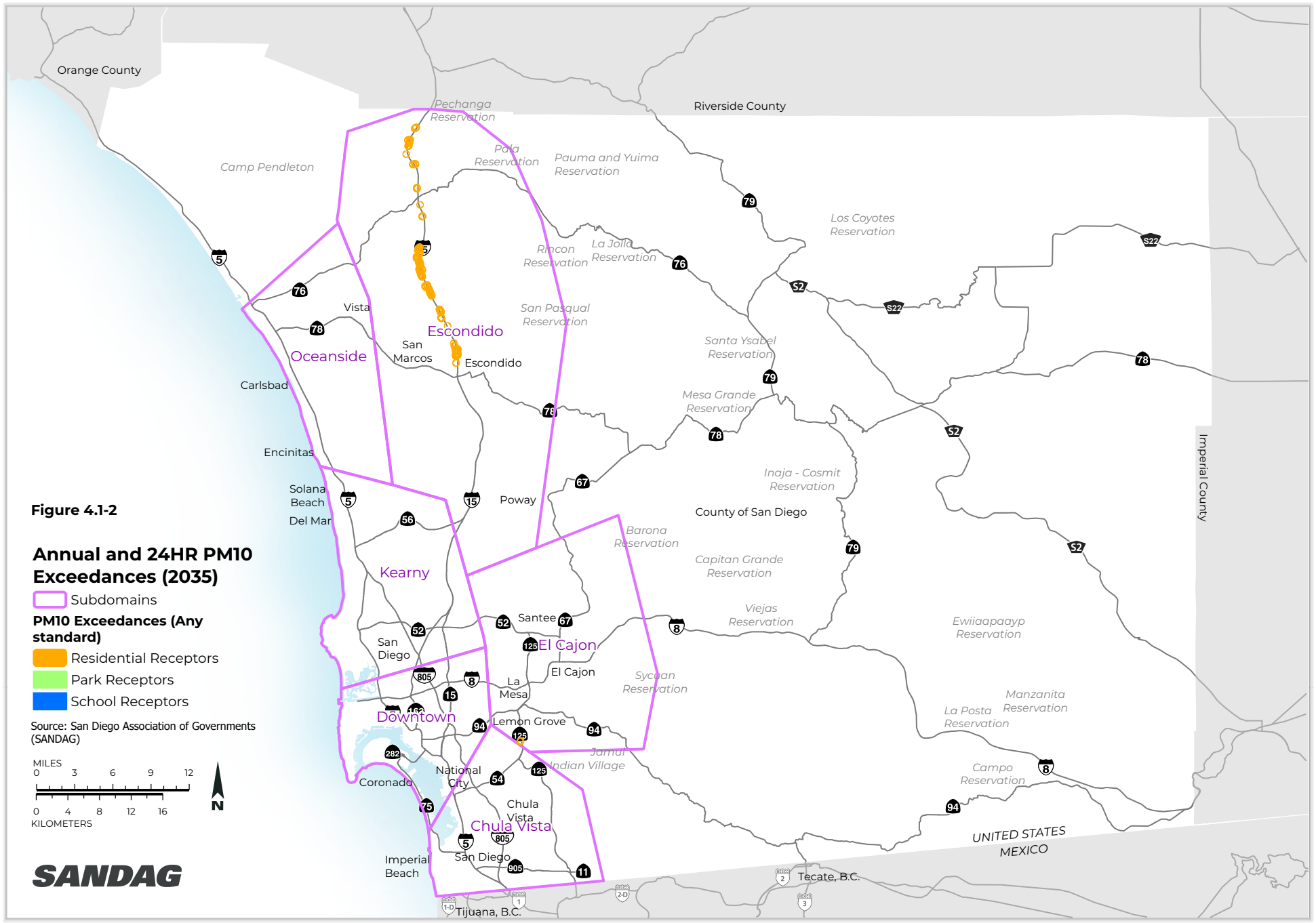
[2] See Footnote 2.

Standard	Maximum Incremental Concentration (µg/m³)		Area of Threshold Exceedance (acres)		Significant Impact?
	Proposed Amendment	Change from Approved Plan	Proposed Amendment	Change from Approved Plan	
PM10 24-hour CAAQS	14	0	0	-6	No

Source: Appendix B of this SEIR.
[1] These exceedances are mostly in the Escondido domain (135 acres), with some exceedances in the El Cajon domain (1 acre)
µg/m³ = micrograms per cubic meter

2035 Conclusion

Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact AQ-4 would be significant in 2035 because implementation of forecasted regional growth and land use change and planned transportation network improvements and programs under the approved Plan would substantially contribute to violations or create new violations of annual PM10 CAAQS in the El Cajon and Escondido domains and 24-hour PM10 CAAQS in the Chula Vista domain. Although the exceedances of the annual PM10 CAAQS would remain, the proposed Amendment would eliminate the exceedances of the 24-hour PM10 CAAQS in the Chula Vista domain and reduce the area of threshold exceedance in Escondido. However, the proposed Amendment would increase the area of threshold exceedance for the annual PM10 CAAQS in Escondido. In addition, the proposed Amendment would substantially contribute to or create new violations of annual PM10 CAAQS in areas not previously identified in the approved Plan PEIR. Therefore, because the proposed Amendment would expose new areas to exceedances of the annual PM10 CAAQS this would be a substantially more severe significant impact in 2035.


Orange County
Riverside County
Imperial County
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Camp Pendleton
Los Coyotes Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
Vista
Escondido
Oceanside
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
County of San Diego
Kearny
Santee
El Cajon
San Diego
La Mesa
Downtown
Lemon Grove
National City
Coronado
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Tecate, B.C.
Tijuana, B.C.
Figure 4.1-2
Annual and 24HR PM10 Exceedances (2035)
Subdomains
PM10 Exceedances (Any standard)
Residential Receptors
Park Receptors
School Receptors
Source: San Diego Association of Governments (SANDAG)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG

2050

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Maximum changes in concentrations of 24-hour and annual levels of PM2.5 and PM10 from 2016 to 2050 from major roadways, freeways, and highways under implementation of the proposed Amendment are shown in Tables 4.1-8 and 4.1-9, respectively. For PM2.5, modeling shows no change in some areas and a small increase in some areas. However, all increases would be less than the criteria identified above for a new violation or substantial contribution to an existing violation. Consistent with the findings and analysis of the approved Plan PEIR, the impact for PM2.5 is less than significant.

For PM10, modeling shows no change in some areas and a small increase in some areas. However, concentrations would increase above thresholds within the El Cajon, Escondido, and Oceanside domains for the annual CAAQS, as well as in Chula Vista for the 24-hour CAAQS. These exceedances in El Cajon, Escondido, Oceanside, and Chula Vista are due primarily to road dust from freeway travel.[3] The maximum increase in El Cajon is at receptor locations immediately adjacent to SR 125; the maximum increases in Escondido are at various receptor locations immediately adjacent to I-15 and SR 78; the maximum increases in Oceanside are at various receptor locations immediately adjacent to I-5 and SR 76; and the maximum increases in Chula Vista are at receptor locations immediately adjacent to SR 125.

These PM10 increases would contribute to a new violation or substantially contribute to an existing violation. The impact for PM10 is significant. The locations of PM10 exceedances for 2050 are shown on Figure 4.1-3.

Table 4.1-8
Summary of Incremental PM2.5 Concentrations, 2050

Standard	Maximum Incremental Concentration (µg/m³)		Area of Threshold Exceedance (acres)		Significant Impact?
	Proposed Amendment	Change from Approved Plan	Proposed Amendment	Change from Approved Plan	
PM2.5 Annual CAAQS	1	0.3	0	0	No
PM2.5 24-hour NAAQS	1	-1	0	0	No
PM2.5 Annual NAAQS	0.6	-0.4	0	0	No

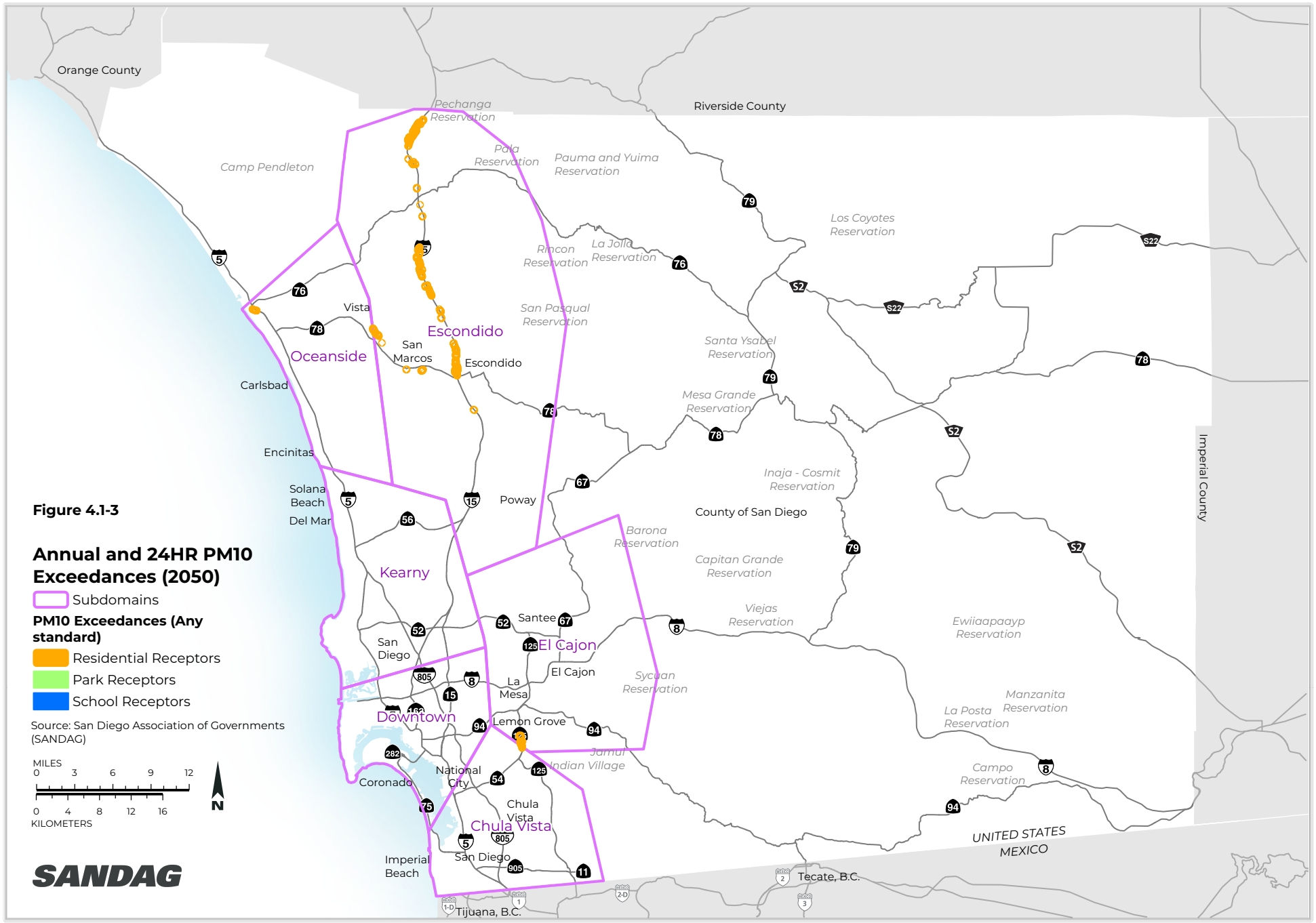
Source: Appendix B of this SEIR.
µg/m³ = micrograms per cubic meter

[3] See Footnote 2.

Table 4.1-9
Summary of Incremental PM10 Concentrations, 2050

Standard	Maximum Incremental Concentration (µg/m³)		Area of Threshold Exceedance (acres)		Significant Impact?
	Proposed Amendment	Change from Approved Plan	Proposed Amendment	Change from Approved Plan	
PM10 24-hour NAAQS	9	-1	0	0	No
PM10 Annual CAAQS	4	0	303	30	Yes [1]
PM10 24-hour CAAQS	13	-2	2	0	Yes [2]

Source: Appendix B of this SEIR.
[1] These exceedances are mostly in the Escondido domain (274 acres) and in the El Cajon domain (22 acres), with some exceedances in the Oceanside domain (7 acres)
[2] These exceedances are in the Chula Vista domain.
µg/m³ = micrograms per cubic meter


Orange County
Riverside County
Imperial County
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Camp Pendleton
Los Coyotes Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
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Del Mar
Poway
County of San Diego
Kearny
Santee
El Cajon
San Diego
La Mesa
Downtown
Lemon Grove
National City
Coronado
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Tecate, B.C.
Tijuana, B.C.
Figure 4.1-3
Annual and 24HR PM10 Exceedances (2050)
Subdomains
PM10 Exceedances (Any standard)
Residential Receptors
Park Receptors
School Receptors
Source: San Diego Association of Governments (SANDAG)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG

2050 Conclusion

Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact AQ-4 would be significant in 2050 because implementation of forecasted regional growth and land use change and planned transportation network improvements and programs under the approved Plan would substantially contribute to violations or create new violations of annual PM10 CAAQS in the Kearny, El Cajon, and Escondido domains and 24-hour PM10 CAAQS in the Chula Vista domain. The proposed Amendment would increase the area of threshold exceedance for the annual PM10 CAAQS. In addition, the proposed Amendment would substantially contribute or create new violations of annual PM10 CAAQS in the Oceanside domain not previously identified in the approved Plan PEIR. Therefore, because the proposed Amendment would expose new areas to exceedances of the annual PM10 CAAQS and 24-hour PM10 CAAQS in 2050, this would be a substantially more severe significant impact.

Exacerbation of Climate Change Effects

Consistent with the analysis and findings of the approved Plan PEIR, the proposed Amendment is expected to exacerbate climate change effects on exposing sensitive receptors to substantial PM10 and PM2.5 concentrations. Climate change may result in increased wildfire frequency and intensity, which can increase emissions of particulate matter. Precipitation during dry seasons may also decrease under climate change, reducing regional ability to fight wildfires and reduce this source of particulate matter (Reidmiller et al. 2018). Furthermore, as mentioned in Section 4.3.1 of the approved Plan PEIR and consistent with this analysis, climate change could increase the incidence of flooding and wildfire that may block routes and disrupt traffic; this could increase vehicle idling and thus increase the amount of PM10 and PM2.5 coming from vehicles (WSP 2018).

As the proposed Amendment would result in increased exposure of sensitive receptors to PM10 and PM2.5 (Impact AQ-4), the air quality impacts expected from climate change may add to the proposed Amendment's PM impacts.

MITIGATION MEASURES

AQ-4 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL PM10 AND PM2.5 CONCENTRATIONS

2025, 2035, and 2050

The following mitigation measures identified in Section 4.3 of the approved Plan PEIR would still be applicable to the proposed Amendment and would help reduce PM emissions and exposure to PM emissions.

- **AQ-2a. Secure Incentive Funding**.
- **AQ-4. Reduce Exposure to Localized Particulate Emissions.**

As identified in Section 4.3 of the approved Plan PEIR, the following mitigation measures identified in Sections 4.8 and 4.16 of the approved Plan PEIR would further reduce PM10 and PM2.5 emissions and would remain applicable to the proposed Amendment. Section 4.5 of this SEIR includes minor updates to mitigation measure **TRA-2**. Section 4.3, *Greenhouse Gas Emissions*, of this SEIR includes an additional mitigation measure, **GHG-5g**, that would also reduce air quality impacts associated with the proposed Amendment.

- **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans**
- **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure**
- **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide**
- **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects**
- **GHG-5g. Prepare/Develop a Regional Climate Action Plan**
- **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**

SIGNIFICANCE AFTER MITIGATION

2025, 2035, and 2050

Mitigation measure **AQ-2a** will help secure incentive funding to reduce PM emissions from mobile sources. Mitigation measure **AQ-4** will reduce the exposure of sensitive receptors to localized PM emissions with the implementation of design measures.

Mitigation measures **GHG-5a**, **GHG-5b**, **GHG-5d**, **GHG-5f**, and **GHG-5g** would reduce PM10 and PM2.5 emissions from tire wear, brake wear, and vehicle exhaust. In addition, mitigation measure **TRA-2** would reduce criteria pollutants through project-level VMT reduction measures. Measures to reduce VMT or vehicle exhaust (e.g., EVs) in these mitigation measures would reduce PM10 and PM2.5 emissions and associated concentrations.

Although mitigation would reduce impacts, there is no guarantee that all projects would be reduced to below a level of significance. Impacts would remain significant for the Escondido area for 2025, 2035, and 2050; the El Cajon area for 2035 and 2050; and the Chula Vista and Oceanside areas for 2050. Thus, impacts would be significant and unavoidable.

AQ-5 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL TAC CONCENTRATIONS

ANALYSIS METHODOLOGY

This analysis addresses the exposure of sensitive receptors to substantial concentrations of TACs. Consistent with the analysis in the approved Plan PEIR, a health risk assessment was performed to analyze exposure of sensitive receptors to substantial concentrations of TACs, and increases in cancer risk associated with such exposure. For this analysis, sensitive receptors are defined as residential, school, and recreational land uses.

Consistent with the methodology used in the approved Plan PEIR, the following criteria were used to evaluate whether implementation of the proposed Amendment would expose sensitive receptors to substantial concentrations of TACs:

1. Does the proposed Amendment result in increases in cancer risk to sensitive receptors over baseline (2016) conditions that exceed 10 in 1 million?
2. Does the proposed Amendment expose sensitive receptors to total cancer risks above 100 in 1 million?
3. Does the proposed Amendment result in increases in health risks to sensitive receptors for non-cancer hazards as measured by a total health hazard index (THI) above 1.0?

The methodology and detailed results for the health risk assessment are described in detail in Appendix B to this SEIR.

Health Impacts

Exposure to diesel particulates and TACs may result in adverse health effects, both increased cancer risk as well as non-cancer health effects, as described in Section 4.3.1 of the approved Plan PEIR and consistent with this analysis.

This health risk assessment identifies and maps sensitive receptors in 2016 and future years within the areas exposed to specified concentrations of TAC emissions to determine where cancer and non-cancer risk thresholds are exceeded. For the assessment, sensitive receptors are locations represented by residential, school, and recreational land uses. Health risk assessment results are presented separately for cancer and non-cancer effects. For cancer risks, the results include a summary of the risk at the maximally exposed sensitive receptor, and the area (in acres) that exceeds the applicable threshold, which is 10 in 1 million for plan-level increase in risk and 100 in 1 million for cumulative effects. For non-cancer risks, the results include a summary of the risk at the maximally exposed sensitive receptor, and the area (in acres) that exceeds the applicable threshold, which is 1.0 for both chronic and acute hazard effects.

Given the limitations of modeling tools and assumptions, sensitive receptor exposure numbers are an indication of relative exposure, and not a precise prediction. Actual exposure would be lower because of the conservative EMFAC 2017 modeling assumptions used in the cancer risk analysis (see Appendix B to this SEIR). The cancer risk of a given area is a measure of any one person's likelihood of contracting cancer due to exposure from a particular carcinogen; it is not a measure of how many people will contract cancer.

IMPACT ANALYSIS

2025

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Criterion 1: Does the proposed Amendment result in increases in cancer risk to sensitive receptors over baseline (2016) conditions that exceed 10 in 1 million?

Table 4.1-10a summarizes health effects in 2025 for the three receptor types. Table 4.1-10b shows the change in health effects from the proposed Amendment compared to the approved Plan in 2025.

For land uses near existing roadway and rail sources, the incremental risk at the maximally exposed sensitive receptors is below 2016 conditions. For all residential, park, or school sensitive receptors near existing roadway and rail sources, there are none that show an increase in cancer risk in 2025 relative to 2016 conditions. Therefore, the impact on sensitive receptors near existing emission sources is less than significant.

For sensitive receptors near new emission sources, the incremental risk at the maximally exposed sensitive receptors exceeds the threshold at residential receptors. (Please note that new emission sources here are the same under the approved Plan and the proposed Amendment.) Under implementation of the proposed Amendment, risk continues to exceed the 10 in 1 million threshold in a number of locations. Therefore, the impact on sensitive receptors near new emission sources is significant.

For new sensitive receptors in new land uses, the incremental risk at the maximally exposed sensitive receptors exceeds the threshold at residential and recreational receptors. Under implementation of the proposed Amendment, risk continues to exceed the 10 in 1 million threshold in a number of locations. Therefore, the impact on new sensitive receptors in new land uses is significant.

Sensitive receptors exposed to new emission sources and new sensitive receptors that show an incremental increase in cancer risk above thresholds in 2025 are shown on Figure 4.1-4.

Table 4.1-10a
Summary of Cancer Health Risk, 2025

Receptor Type	2016		2025	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	444	7,555	-5	0
Recreational	14	20	0	0
School	11	2	0	0
New Sources				
Residential	--	--	53	2
Recreational	--	--	1	0
School	--	--	0	0
New Land Uses				
Residential	--	--	149	964
Recreational	--	--	18	2
School	--	--	3	0

Source: Appendix B of this SEIR.
Notes: Cancer risk threshold is 10 in 1 million. Modeled cancer risks were rounded to the nearest whole number.

Table 4.1-10b
Change in Cancer Health Risk from Approved Plan, 2025

Receptor Type	2016		2025	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	-3	-8	0	0
Recreational	1	-4	0	0
School	0	0	0	0
New Sources				
Residential	--	--	-1	-5
Recreational	--	--	-2	0
School	--	--	0	0

Receptor Type	2016		2025	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
New Land Uses				
Residential	--	--	0	16
Recreational	--	--	18	2
School	--	--	3	0

Source: Appendix B of this SEIR.
Notes: Cancer risk threshold is 10 in 1 million. Modeled cancer risks were rounded to the nearest whole number.

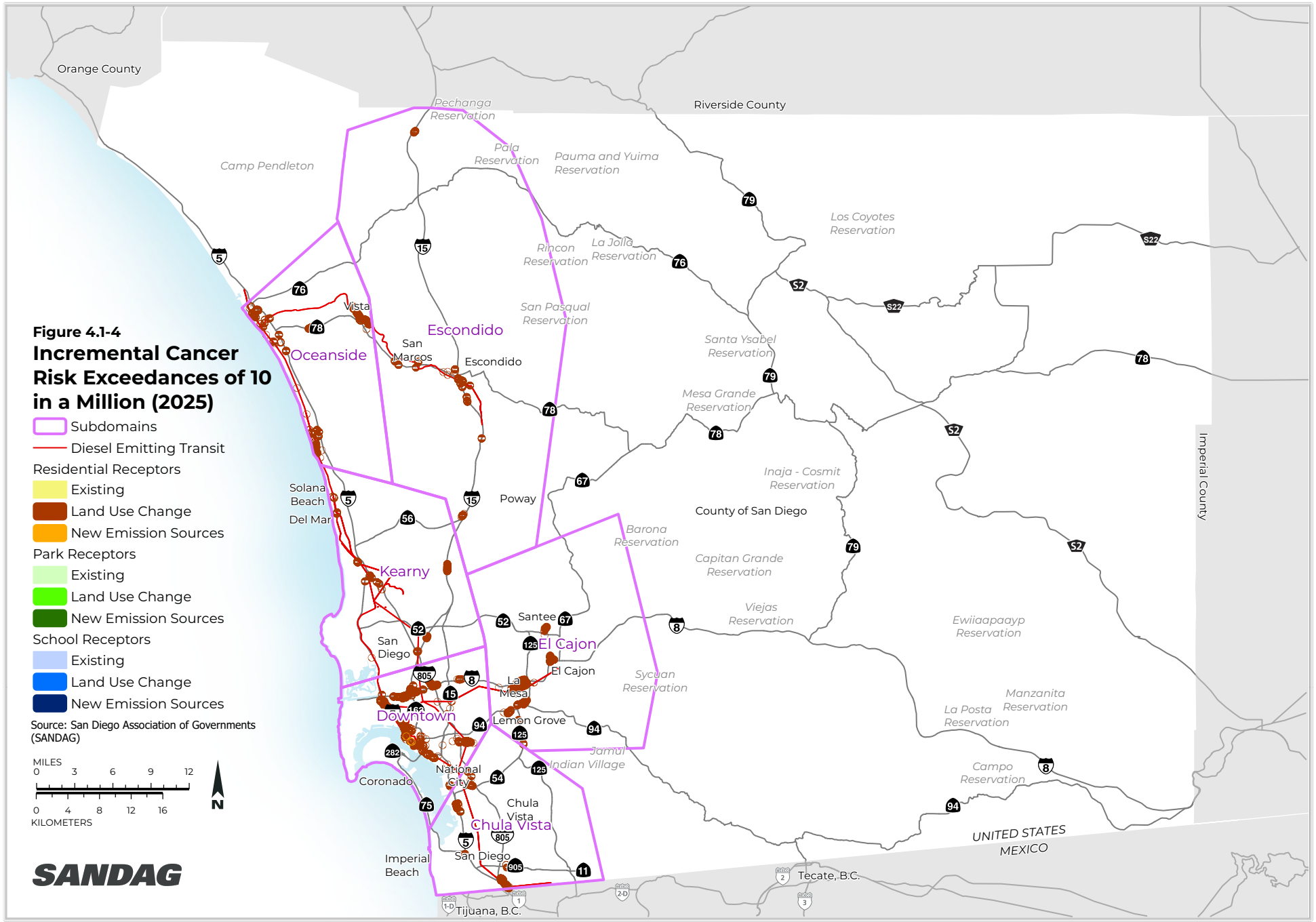
Figure 4.1-4
Incremental Cancer Risk Exceedances of 10 in a Million (2025)
Subdomains
Diesel Emitting Transit
Residential Receptors
Existing
Land Use Change
New Emission Sources
Park Receptors
Existing
Land Use Change
New Emission Sources
School Receptors
Existing
Land Use Change
New Emission Sources
Source: San Diego Association of Governments (SANDAG)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Camp Pendleton
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
Los Coyotes Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
Oceanside
Vista
San Marcos
Escondido
Solana Beach
Del Mar
Poway
Kearny
Santee
El Cajon
San Diego
La Mesa
Lemon Grove
Downtown
National City
Coronado
Chula Vista
Imperial Beach
County of San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
Tecate, B.C.

Criterion 2: Does the proposed Amendment expose sensitive receptors to total cumulative cancer risks above 100 in 1 million?

Table 4.1-11 summarizes cumulative health risk at residential sensitive receptors in 2025 relative to 2016 conditions. As shown, the maximum cumulative cancer risk and the number of sensitive receptors in the modeling exposed to 100 per million health risk would decrease. This reduction in exposure is due in part to regulatory policies that reduce emissions from diesel trains and vehicles and gasoline vehicles due to State and federal programs designed to reduce emissions of TACs and improve fuel efficiency. Thus, reductions in the number of exposed individuals would occur despite the approved Plan's forecasted increase in the population and housing units within the region, which would remain applicable for the proposed Amendment.

Table 4.1-11
Summary of Cumulative Health Risk, 2025

Receptor Type	2016		2025		2025 vs. 2016	
	Maximum Cumulative Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Cumulative Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Change in Maximum Cumulative Cancer Risk (per million)	Change in Area of Threshold Exceedance (acres)
Residential	1,015	7,537	934	7,400	-81	-137
Change from Approved Plan	0	-33	-12	-39	-12	-6

Source: Appendix B of this SEIR.
Note: Modeled cancer risks were rounded to the nearest whole number.

The SCS portion of the approved Plan includes proposed land use changes, with a focus on development within Mobility Hubs or Smart Growth Opportunity Areas, which would remain unchanged with the proposed Amendment. These Mobility Hubs are proposed for communities with a high concentration of people, destinations, and travel choices where densification is envisioned in the SCS. Many of these proposed land uses are within areas that are near existing pollution sources. Although the proposed Amendment, like the approved Plan, would contribute TAC emissions at both the regional and local scale, these contributions would not increase existing hazards, when taking into account the reduction of emissions over time due to regulatory policies.

TAC emissions are summarized in Table 4.1-12. Overall, TAC emissions decline 60 to 91 percent relative to 2016. Given this reduction in TACs, the proposed Amendment would not increase existing hazards, taking into account the effect of regulatory policies over time. Based on the above analysis, this impact is less than significant.

Table 4.1-12
Summary of Toxic Air Contaminants Tons per Year, 2025

Year	Butadiene1,3	Acetaldehyde	Acrolein	Benzene	Ethyl Benzene	Formaldehyde	Naphthalene	PAH	DPM
2016	0.023	0.110	0.0120	0.25	0.120	0.220	0.0230	0.027	0.55
2025	0.002	0.032	0.0028	0.10	0.041	0.077	0.0064	0.0077	0.10
Change vs. 2016	-91%	-71%	-77%	-60%	-66%	-65%	-72%	-71%	-82%
Change from Approved Plan	0.0	0.0	-0.0001	0.0	0.0	-0.002	-0.0001	0.0076	0.007

Source: Appendix B of this SEIR.
Note: Some values have been rounded to the nearest ten thousandths or hundred thousandths.
PAH = polycyclic aromatic hydrocarbons; DPM = diesel particulate matter.

Criterion 3: Does the proposed Amendment result in increases in health risks to sensitive receptors for non-cancer hazards as measured by a THI above 1.0?

Table 4.1-13a summarizes non-cancer health effects in 2025 for the three receptor types. Table 4.1-13b shows the change in non-cancer health effects from the proposed Amendment compared to the approved Plan in 2025.

For land uses near existing roadway and rail sources, the incremental non-cancer risk at the maximally exposed sensitive receptors is below 2016 conditions. For all residential, park, or school sensitive receptors near existing roadway and rail sources, there are no sensitive receptors that show an increase in chronic hazard or acute hazard in 2025 relative to 2016 conditions. Therefore, the impact on sensitive receptors near existing emission sources is less than significant.

For sensitive receptors that would be exposed to new emission sources, the incremental risk at the maximally exposed sensitive receptors exceeds the chronic threshold at residential and recreational receptors. The maximally exposed areas are within the Downtown and Chula Vista domains. Non-cancer chronic risk at various residential and recreational receptor locations exceeds the 1.0 hazard index threshold. Therefore, the impact on sensitive receptors near new emission sources is significant.

For new sensitive receptors in new land uses that would be exposed to existing emission sources, the incremental risk at the maximally exposed sensitive receptors exceeds both the acute and the chronic threshold at residential uses and would exceed the chronic threshold for recreational and school uses. The maximally exposed area for acute hazard is within the Escondido domain. The maximally exposed area for chronic hazard is within the El Cajon domain, with exceedances in each domain. Non-cancer acute and chronic risks at various residential receptor locations exceed the 1.0 hazard index threshold. Therefore, the impact on new sensitive receptors in new land uses is significant.

Table 4.1-13a
Summary of Non-cancer Hazards, 2025

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	7.1	52.8	-0.1	-0.6	0	0
Recreational	2.3	40.0	-0.2	-0.8	0	0
School	1.4	25.0	0	0	0	0
New Sources						
Residential	--	--	0.2	5.2	0	2
Recreational	--	--	0.1	1.7	0	7
School	--	--	0	0	0	0
New Land Uses						
Residential	--	--	2.1	15.1	3	963
Recreational	--	--	0.7	9.5	0	56
School	--	--	0.3	5.9	0	7

Source: Appendix B of this SEIR.
Notes: Non-cancer hazard risk threshold is 1.0 for both Acute and Chronic Hazards. Modeled non-cancer hazard risks were rounded to the nearest one decimal place.

Table 4.1-13b
Change in Non-cancer Hazards from Approved Plan, 2025

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	0.2	-0.1	0.0	0.0	0	0
Recreational	0.0	3.0	-0.1	0.0	0	0
School	-0.1	0.1	0.0	0.0	0	0
New Sources						
Residential	--	--	0.0	-0.2	0	-5
Recreational	--	--	-0.2	-5.1	0	2
School	--	--	0.0	0.0	0	0
New Land Uses						
Residential	--	--	0.0	0.2	-2	13
Recreational	--	--	0.7	9.5	0	56
School	--	--	0.3	5.9	0	7

Source: Appendix B of this SEIR.
Notes: Non-cancer hazard risk threshold is 1.0 for both Acute and Chronic Hazards. Modeled non-cancer hazard risks were rounded to the nearest one decimal place.

2025 Conclusion

Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact AQ-5 would be significant in 2025 because the approved Plan would expose new receptors to substantial TAC emissions. As discussed above, the proposed Amendment would not expose existing sensitive receptors but would expose new receptors to substantial concentrations of TAC emissions in 2025. In addition, the proposed Amendment would increase the incremental area of threshold exceedance for new land uses, result in new cancer risk exceedances for new recreational land uses, and result in new chronic hazard exceedances for new recreational and school land uses. Therefore, this would be a substantially more severe significant impact in 2025.

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Criterion 1: Does the proposed Amendment result in increases in cancer risk to sensitive receptors over baseline (2016) conditions that exceed 10 in 1 million?

Table 4.1-14a summarizes health effects in 2035 for the three receptor types. Table 4.1-14b shows the change in health effects from the proposed Amendment compared to the approved Plan in 2035.

For land uses near existing roadway and rail sources, the incremental risk at the maximally exposed receptors is below 2016 conditions. There are no existing residential, park, or school receptors that show an increase in cancer risk in 2035. Therefore, the impact on existing sensitive receptors near existing emission sources is less than significant.

For sensitive receptors near new emission sources, the incremental risk at the maximally exposed sensitive receptors exceeds the threshold at residential receptors. The threshold is exceeded at various residential receptors within each modeling domain. The maximally exposed areas are within the El Cajon and Downtown domains. Risk exceeds the 10 in 1 million threshold in a number of locations. Therefore, the impact on sensitive receptors near new emission sources is significant.

For new sensitive receptors in new land uses, the incremental risk at the maximally exposed sensitive receptors exceeds the threshold at residential and recreational receptors. The threshold is exceeded at various residential receptors within each modeling domain. The maximally exposed areas are within the Downtown and El Cajon domains. Risk exceeds the 10 in 1 million threshold in a number of locations. Therefore, the impact on new sensitive receptors in new land uses is significant.

Sensitive receptors exposed to new emission sources and new sensitive receptors that show an incremental increase in cancer risk above thresholds in 2035 are shown on Figure 4.1-5.

Table 4.1-14a
Summary of Cancer Health Risk, 2035

Receptor Type	2016		2035	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	444	7,555	-6	0
Recreational	14	20	0	0
School	11	2	0	0
New Sources				
Residential	--	--	114	1,292
Recreational	--	--	2	0
School	--	--	0	0
New Land Uses				
Residential	--	--	137	1,201
Recreational	--	--	18	2
School	--	--	2	0

Source: Appendix B of this SEIR.
Notes: Cancer risk threshold is 10 in 1 million. Modeled cancer risks were rounded to the nearest whole number.

Table 4.1-14b
Change in Cancer Health Risk from Approved Plan, 2035

Receptor Type	2016		2035	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	-3	-8	0	0
Recreational	-1	-5	0	0
School	0	0	0	0
New Sources				
Residential	--	--	-18	31
Recreational	--	--	0	0
School	--	--	0	0
New Land Uses				
Residential	--	--	0	46
Recreational	--	--	18	2
School	--	--	2	0

Source: Appendix B of this SEIR.
Notes: Cancer risk threshold is 10 in 1 million. Modeled cancer risks were rounded to the nearest whole number.

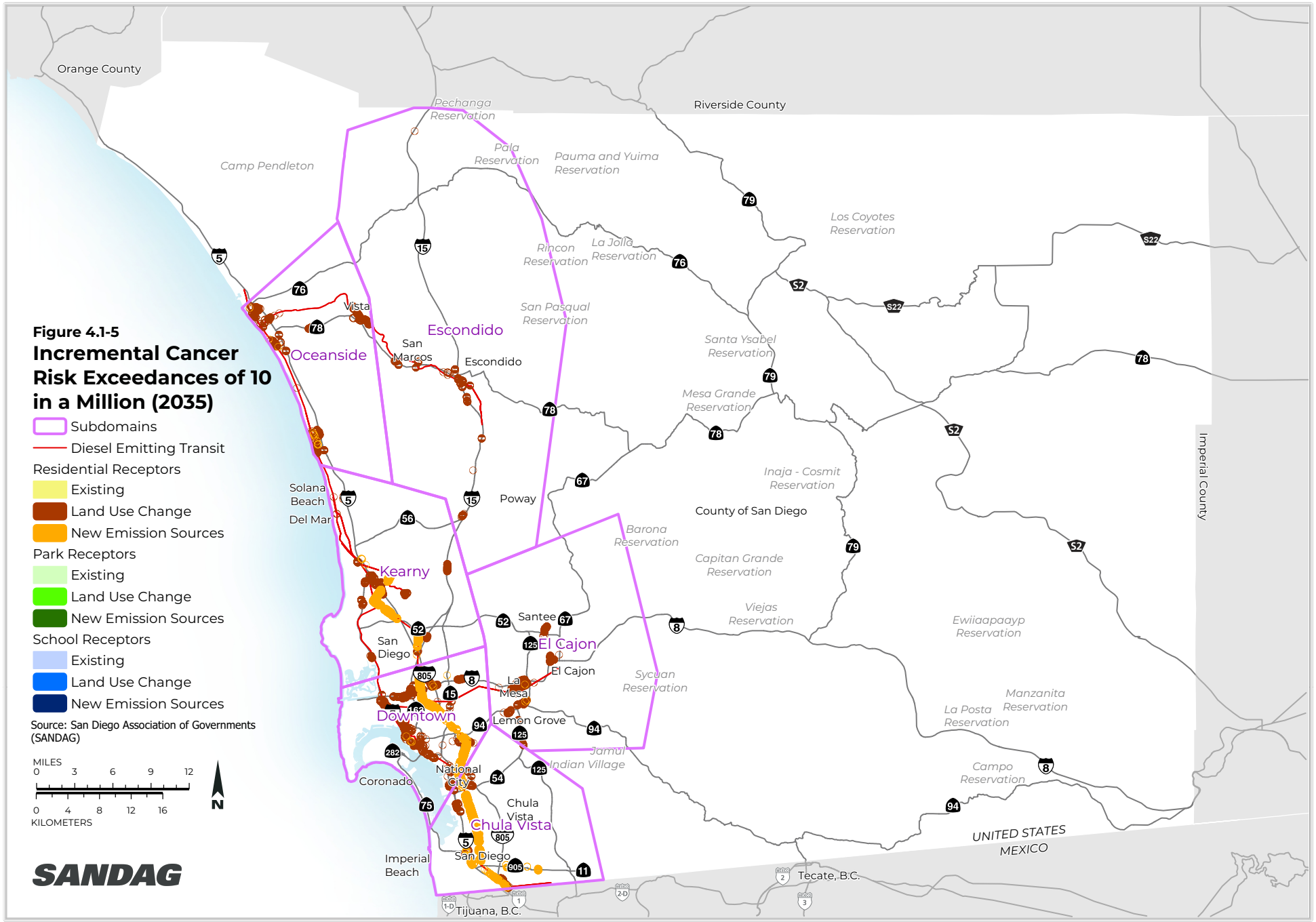
Figure 4.1-5
Incremental Cancer Risk Exceedances of 10 in a Million (2035)
Subdomains
Diesel Emitting Transit
Residential Receptors
Existing
Land Use Change
New Emission Sources
Park Receptors
Existing
Land Use Change
New Emission Sources
School Receptors
Existing
Land Use Change
New Emission Sources
Source: San Diego Association of Governments (SANDAG)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Camp Pendleton
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
Los Coyotes Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Sycuan Reservation
Ewiiaapaayp Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
Oceanside
Vista
San Marcos
Escondido
Solana Beach
Del Mar
Poway
Kearny
Santee
El Cajon
La Mesa
Lemon Grove
Downtown
San Diego
National City
Chula Vista
Coronado
Imperial Beach
County of San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
Tecate, B.C.

Criterion 2: Does the proposed Amendment expose sensitive receptors to total cancer risks above 100 in 1 million?

Table 4.1-15 summarizes cumulative health risk at residential receptors in 2035 relative to 2016 conditions. As shown, the maximum cumulative cancer risk and the number of receptors in the modeling exposed to 100 per million health risk would decrease. This reduction in exposure is due in part to regulatory policies that reduce emissions from diesel trains and vehicles and gasoline vehicles due to State and federal programs designed to reduce emissions of TACs and improve fuel efficiency. Thus, reductions in the number of exposed individuals would occur despite the approved Plan's forecasted increase in the population and housing units within the region, which would remain applicable for the proposed Amendment.

Table 4.1-15
Summary of Cumulative Health Risk, 2035

Receptor Type	2016		2035		2035 vs. 2016	
	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Change in Maximum Cumulative Cancer Risk	Change in Area of Threshold Exceedance (acres)
Residential	1,015	7,537	915	7,217	-100	-320
Change from Approved Plan	0.0	-33	-13	3	-13	36

Source: Appendix B of this SEIR.
Note: Modeled cancer risks were rounded to the nearest whole number.

The SCS portion of the approved Plan includes proposed land use changes, with a focus on development within Mobility Hubs or Smart Growth Opportunity Areas which would remain unchanged with the proposed Amendment. These Mobility Hubs are proposed for communities with a high concentration of people, destinations, and travel choices where densification is envisioned in the SCS. Many of these proposed land uses are within areas that are near existing pollution sources. Although the proposed Amendment, like the approved Plan, would contribute TAC emissions at both the regional and local scale, these contributions would not increase existing hazards, when taking into account the reduction of emissions over time due to regulatory policies.

TAC emissions are summarized in Table 4.1-16. As shown, project conditions in 2035 show a decrease in all TAC emissions. Overall, TAC emissions decline between 70 and 100 percent relative to 2016 conditions. Given this reduction in TACs, the proposed Amendment would not increase existing hazards, taking into account the effect of regulatory policies over time. Based on the above analysis, this impact is less than significant.

Table 4.1-16
Summary of Toxic Air Contaminants Emissions per Year, 2035

Year	Butadiene1,3	Acetaldehyde	Acrolein	Benzene	Ethyl Benzene	Formaldehyde	Naphthalene	PAH	DPM
2016	0.023	0.110	0.0120	0.250	0.120	0.220	0.0230	0.027	0.55
2035	0.0001	0.0250	0.0020	0.075	0.028	0.055	0.0046	0.005	0.092
Change vs. 2016	-100%	-77%	-83%	-70%	-77%	-75%	-80%	-81%	-83%
Change from Approved Plan	0.0	0.0	0.0	0.0	0.0	-0.002	-0.0001	0.005	0.014

Source: Appendix B of this SEIR.
Notes: Some values have been rounded to the nearest ten thousandths or hundred thousandths.
PAH = polycyclic aromatic hydrocarbons; DPM = diesel particulate matter.

Criterion 3: Does the proposed Amendment result in increases in health risks to sensitive receptors for non-cancer hazards as measured by a THI above 1.0?

Table 4.1-17a summarizes non-cancer health effects in 2035 for the three receptor types. Table 4.1-17b shows the change in non-cancer health effects from the proposed Amendment compared to the approved Plan in 2035.

For land uses near existing roadway and rail sources, the incremental non-cancer risk at the maximally exposed sensitive receptors is below 2016 conditions. For all residential, park, or school sensitive receptors near existing roadway and rail sources, there are no sensitive receptors that show an increase in chronic hazard or acute hazard in 2035 relative to 2016 conditions. Therefore, the impact on sensitive receptors near existing emission sources is less than significant.

For sensitive receptors that would be exposed to new emission sources, the incremental change in chronic hazard index at the maximally exposed sensitive receptors exceeds the threshold at residential and recreational receptors. The maximally exposed areas are within the El Cajon, Downtown, and Chula Vista domains, with other increases in Kearny above the threshold. Non-cancer chronic risk at various residential and recreational receptor locations exceeds the 1.0 hazard index threshold. Therefore, the impact on sensitive receptors near new emission sources is significant.

For new sensitive receptors in new land uses that would be exposed to existing emission sources, the incremental risk at the maximally exposed sensitive receptors exceeds both the acute and the chronic threshold at residential uses and the chronic threshold for the recreational and school uses. The maximally exposed area for acute hazard is within the Escondido domain. The maximally exposed area for chronic hazard is within the El Cajon domain, with exceedances in Chula Vista, Downtown, Escondido, and Kearny. Non-cancer acute and chronic risk at various residential, recreational, and school receptor locations exceeds the 1.0 hazard index threshold. Therefore, the impact on new sensitive receptors in new land uses is significant.

Table 4.1-17a
Summary of Non-cancer Hazards, 2035

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	7.1	52.8	-0.1	-0.7	0	0
Recreational	2.3	40.0	-0.2	-0.9	0	0
School	1.4	25.0	0	0	0	0
New Sources						
Residential	--	--	0.5	12.3	0	1,280
Recreational	--	--	0.1	3.3	0	130
School	--	--	0	0	0	0
New Land Uses						
Residential	--	--	1.3	10.9	1	992
Recreational	--	--	0.2	6.0	0	49
School	--	--	0.2	3.9	0	11

Source: Appendix B of this SEIR.
Notes: Non-cancer hazard risk threshold is 1.0 for both Acute and Chronic Hazards. Modeled non-cancer hazard risks were rounded to the nearest one decimal place.

Table 4.1-17b
Change in Non-cancer Hazards from Approved Plan, 2035

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	0.2	-0.1	-0.1	0.1	0	0
Recreational	0.0	3.0	-0.1	0.0	0	0
School	-0.1	-0.1	0.0	0.0	0	0
New Sources						
Residential	--	--	-0.3	-1.9	0	14
Recreational	--	--	-0.1	-1.4	0	7
School	--	--	0.0	0.0	0	0
New Land Uses						
Residential	--	--	0.1	2.3	-1	-169
Recreational	--	--	0.2	6.0	0	49
School	--	--	0.2	3.9	0	11

Source: Appendix B of this SEIR.
Notes: Non-cancer hazard risk threshold is 1.0 for both Acute and Chronic Hazards. Modeled non-cancer hazard risks were rounded to the nearest one decimal place.

2035 Conclusion

Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact AQ-5 would be significant in 2035 because the approved Plan would expose new receptors to substantial TAC emissions. As discussed above, the proposed Amendment would not expose existing sensitive receptors but would expose new receptors to substantial concentrations of TAC emissions in 2035. In addition, the proposed Amendment would increase the incremental area of threshold exceedance for new sources and new land uses and result in new chronic hazard exceedances for new recreational and school land uses. Therefore, this would be a substantially more severe significant impact in 2035.

2050

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Criterion 1: Does the proposed Amendment result in increases in cancer risk to sensitive receptors over baseline (2016) conditions that exceed 10 in 1 million?

Table 4.1-18a summarizes health effects in 2050 for the three receptor types. Table 4.1-18b shows the change in health effects from the proposed Amendment compared to the approved Plan in 2050.

For land uses near existing roadway and rail sources, the incremental risk at the maximally exposed receptors is below 2016 conditions. There are no existing residential, park, or school receptors near existing emission sources that show an increase in cancer risk in 2050. Therefore, the impact on existing sensitive receptors near existing emission sources is less than significant.

For sensitive receptors near new emission sources, the incremental risk at the maximally exposed sensitive receptors exceeds the threshold at residential and recreational receptors. The threshold is exceeded at various residential receptors within each modeling domain due almost exclusively to the new commuter rail lines. The maximally exposed areas are within the El Cajon and Downtown domains, with residential receptor exceedances in each modeling domain. Risk exceeds the 10 in 1 million threshold in a number of locations due to new rail activity. Therefore, the impact on sensitive receptors near new emission sources is significant.

For new sensitive receptors in new land uses, the incremental risk at the maximally exposed sensitive receptors exceeds the threshold at residential and recreational receptors. The threshold is exceeded at various residential receptors within each modeling domain due to siting of new residential uses near existing rail and roadway sources. The maximally exposed areas are within the Downtown, El Cajon, and Escondido domains. Risk exceeds the 10 in 1 million threshold in a number of locations due to the siting of new land uses. Therefore, the impact on new sensitive receptors in new land uses is significant.

Sensitive receptors exposed to new emission sources and new sensitive receptors that show an incremental increase in cancer risk above thresholds in 2050 are shown on Figure 4.1-6.

Table 4.1-18a
Summary of Cancer Health Risk, 2050

Receptor Type	2016		2050	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	444	7,555	-5	0
Recreational	14	20	0	0
School	11	2	0	0
New Sources				
Residential	--	--	102	2,497
Recreational	--	--	18	1
School	--	--	2	0
New Land Uses				
Residential	--	--	135	1,254
Recreational	--	--	17	2
School	--	--	0	0

Source: Appendix B of this SEIR.
Notes: Cancer risk threshold is 10 in 1 million. Modeled cancer risks were rounded to the nearest whole number.

Table 4.1-18b
Change in Cancer Health Risk from Approved Plan, 2050

Receptor Type	2016		2050	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	-3	-8	0	0
Recreational	1	-5	0	0
School	0	0	0	0
New Sources				
Residential	--	--	-29	16
Recreational	--	--	15	1
School	--	--	1	0
New Land Uses				
Residential	--	--	2	31
Recreational	--	--	17	2
School	--	--	0	0

Source: Appendix B of this SEIR.
Notes: Cancer risk threshold is 10 in 1 million. Modeled cancer risks were rounded to the nearest whole number.

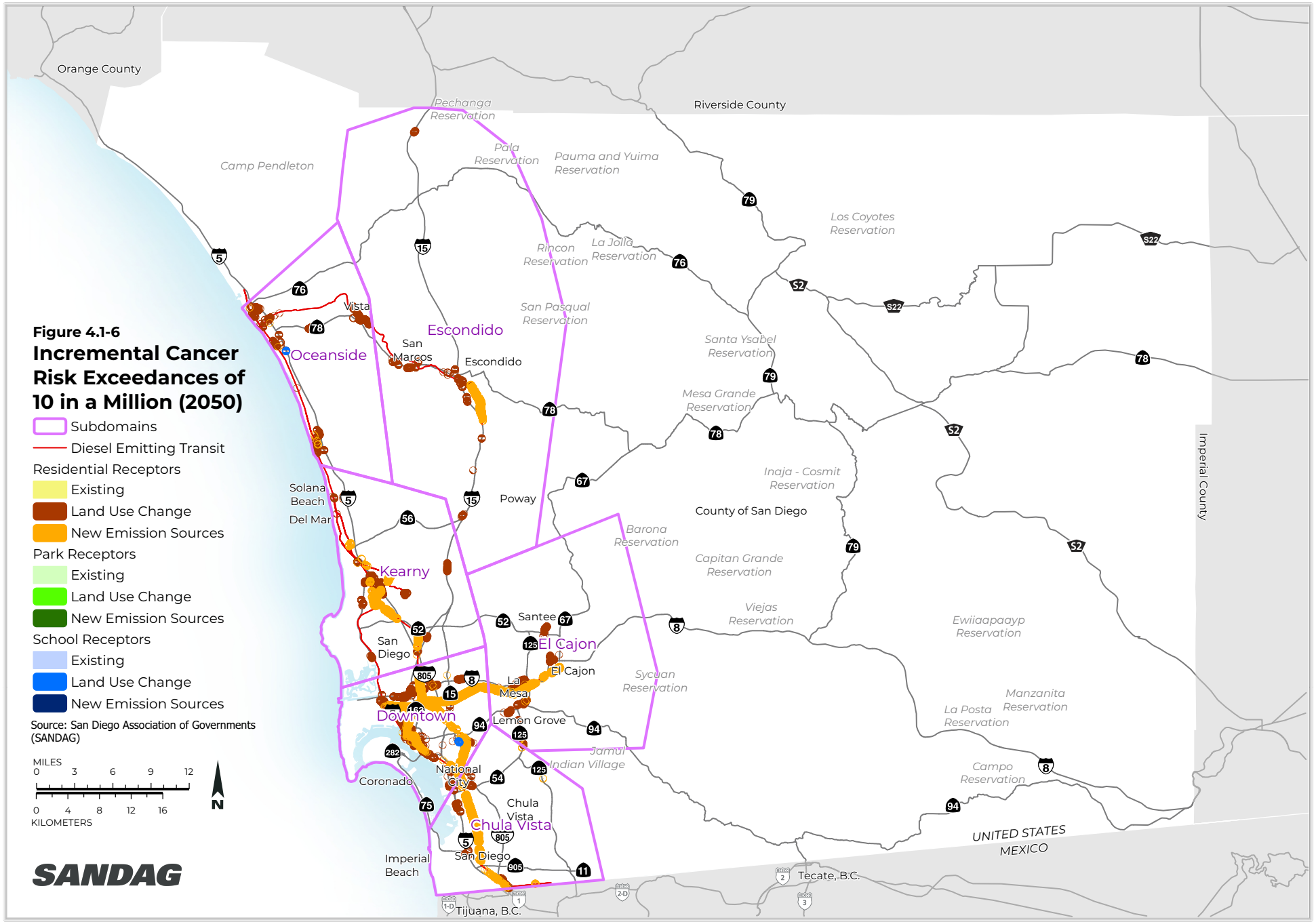
Figure 4.1-6
Incremental Cancer Risk Exceedances of 10 in a Million (2050)
Subdomains
Diesel Emitting Transit
Residential Receptors
Existing
Land Use Change
New Emission Sources
Park Receptors
Existing
Land Use Change
New Emission Sources
School Receptors
Existing
Land Use Change
New Emission Sources
Source: San Diego Association of Governments (SANDAG)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Camp Pendleton
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Los Coyotes Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
County of San Diego
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
Oceanside
Vista
San Marcos
Escondido
Solana Beach
Del Mar
Poway
Kearny
Santee
El Cajon
La Mesa
Lemon Grove
Downtown
San Diego
National City
Coronado
Chula Vista
Imperial Beach
Tijuana, B.C.
Tecate, B.C.
UNITED STATES
MEXICO

Criterion 2: Does the proposed Amendment expose sensitive receptors to total cancer risks above 100 in 1 million?

Table 4.1-19 summarizes cumulative health risk at residential receptors in 2050 relative to 2016 conditions. As shown, the maximum cumulative cancer risk and the number of receptors in the modeling exposed to 100 per million health risk would decrease. This reduction in exposure is due in part to regulatory policies that reduce emissions from diesel trains and vehicles and gasoline vehicles due to State and federal programs designed to reduce emissions of TACs and improve fuel efficiency. Thus, reductions in the number of exposed individuals would occur despite the approved Plan's forecasted increase in the population and housing units within the region, which would remain applicable for the proposed Amendment.

Table 4.1-19
Summary of Cumulative Health Risk, 2050

Receptor Type	2016		2050		2050 vs. 2016	
	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Change in Maximum Cumulative Cancer Risk	Change in Area of Threshold Exceedance (acres)
Residential	1,015	7,537	912	7,167	-103	-370
Change from Approved Plan	0.0	-33	-10	-65	-10	-32

Source: Appendix B of this SEIR.
Note: Modeled cancer risks were rounded to the nearest whole number.

The SCS portion of the approved Plan includes proposed land use changes, with a focus on development within Mobility Hubs or Smart Growth Opportunity Areas, which would remain unchanged with the proposed Amendment. These Mobility Hubs are proposed for communities with a high concentration of people, destinations, and travel choices where densification is envisioned in the SCS. Many of these proposed land uses are within areas that are near existing pollution sources. Although the proposed Amendment, like the approved Plan, would contribute emissions at both the regional and local scale, these contributions would not increase existing hazards, when taking into account the reduction of emissions over time due to regulatory policies.

TAC emissions are summarized in Table 4.1-20. As shown, project conditions in 2050 show a decrease in all TAC emissions. Overall, TAC emissions decline between 73 and 100 percent relative to 2016 conditions. Given this reduction in TACs, the proposed Amendment would not increase existing hazards, taking into account the effect of regulatory policies over time. Based on the above analysis, this impact is less than significant.

Table 4.1-20
Summary of Toxic Air Contaminants Tons per Year, 2050

Year	Butadiene1,3	Acetaldehyde	Acrolein	Benzene	Ethyl Benzene	Formaldehyde	Naphthalene	PAH	DPM
2016	0.023	0.110	0.0120	0.250	0.120	0.220	0.023	0.027	0.55
2050	0.0001	0.024	0.0018	0.067	0.025	0.055	0.0042	0.005	0.0910
Change vs. 2016	-100%	-78%	-85%	-73%	-79%	-75%	-82%	-81%	-83%
Change from Approved Plan	0.0	0.0	0.0	-0.001	0.0	0.003	0.0	0.005	0.02

Source: Appendix B of this SEIR.
Notes: Some values have been rounded to the nearest ten thousandths or hundred thousandths.
PAH = polycyclic aromatic hydrocarbons; DPM = diesel particulate matter.

Criterion 3: Does the proposed Amendment result in increases in health risks to sensitive receptors for non-cancer hazards as measured by a THI above 1.0?

Table 4.1-21a summarizes non-cancer health effects in 2050 for the three receptor types. Table 4.1-21b shows the change in non-cancer health effects from the proposed Amendment compared to the approved Plan in 2050.

For land uses near existing roadway and rail sources, the incremental non-cancer risk at the maximally exposed sensitive receptors is below 2016 conditions. For all residential, park, or school sensitive receptors near existing roadway and rail sources, there are no sensitive receptors that show an increase in chronic hazard or acute hazard in 2050 relative to 2016 conditions. Therefore, the impact on sensitive receptors near existing emission sources is less than significant.

For sensitive receptors that would be exposed to new emission sources, the incremental risk at the maximally exposed sensitive receptors far exceeds the chronic threshold at residential and recreational receptors. The maximally exposed areas are within the El Cajon, Downtown, and Chula Vista domains, with increases in all domains above the threshold. In addition, there is one school location in El Cajon that would exceed the chronic threshold. Non-cancer chronic risk at various residential, recreational, and school receptor locations exceed the 1.0 hazard index threshold. Therefore, the impact on sensitive receptors near new emission sources is significant.

For new sensitive receptors in new land uses that would be exposed to existing emission sources, the incremental risk at the maximally exposed sensitive receptors exceeds both the acute and the chronic threshold at residential uses and the chronic threshold at recreational and school uses. The maximally exposed area for acute hazard is within the Chula Vista domain. The maximally exposed area for chronic hazard is within the El Cajon domain, with exceedances in each domain. Non-cancer chronic risk at various residential, recreational, and school receptor locations exceeds the 1.0 hazard index threshold. Therefore, the impact on new sensitive receptors in new land uses is significant.

Table 4.1-21a
Summary of Non-cancer Hazards, 2050

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	7.1	52.8	0.0	-0.7	0	0
Recreational	2.3	40.0	-0.1	-0.9	0	0
School	1.4	25.0	0	0	0	0
New Sources						
Residential	--	--	0.5	10.7	0	2,463
Recreational	--	--	0.2	4.1	0	220
School	--	--	0.1	2.1	0	1
New Land Uses						
Residential	--	--	1.4	9.9	2	1,212
Recreational	--	--	0.4	5.2	0	44
School	--	--	0.1	3.2	0	22

Source: Appendix B of this SEIR.
Notes: Non-cancer hazard risk threshold is 1.0 for both Acute and Chronic Hazards. Modeled non-cancer hazard risks were rounded to the nearest one decimal place.

Table 4.1-21b
Change in Non-cancer Hazards from Approved Plan, 2050

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	0.2	-0.1	-0.5	-0.1	0	0
Recreational	0.0	3.0	-0.3	0.0	0	0
School	-0.1	0.1	0.0	0.0	0	0
New Sources						
Residential	--	--	-0.4	-3.1	0	-14
Recreational	--	--	-0.4	-0.2	0	-79
School	--	--	-0.1	-0.1	0	0
New Land Uses						
Residential	--	--	-0.1	-1.3	0	-6
Recreational	--	--	0.4	5.2	0	44
School	--	--	0.1	3.2	0	22

Source: Appendix B of this SEIR.

Notes: Non-cancer hazard risk threshold is 1.0 for both Acute and Chronic Hazards. Modeled non-cancer hazard risks were rounded to the nearest one decimal place.

2050 Conclusion

Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact AQ-5 would be significant in 2050 because the approved Plan would expose new receptors to substantial TAC emissions. As discussed above, the proposed Amendment would not expose existing sensitive receptors but would expose new receptors to substantial concentrations of TAC emissions in 2050. In addition, the proposed Amendment would increase the incremental area of threshold exceedance for new sources and new land uses, result in new cancer risk exceedances for new recreational sources and land uses, result in new chronic hazard exceedances for schools exposed to new sources, and result in new chronic hazard exceedances for new recreational and school land uses. Therefore, this would be a substantially more severe significant impact in 2050.

Exacerbation of Climate Change Effects

Consistent with the analysis and findings of the approved Plan PEIR, the proposed Amendment could potentially exacerbate climate change effects on exposing sensitive receptors to substantial TAC concentrations. Climate change could increase exposure to some carcinogens, such as through particulate matter from wildfire and flooding inundation of chemical or waste sites that may release carcinogens (Nogueira et al. 2020).

MITIGATION MEASURES

AQ-5 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL TAC CONCENTRATIONS

2025, 2035, and 2050

The following mitigation measures identified in Section 4.3 of the approved Plan PEIR would still be applicable to the proposed Amendment and would help reduce TAC emissions.

- **AQ-2a. Secure Incentive Funding**
- **AQ-4. Reduce Exposure to Localized Particulate Emissions**
- **AQ-5a. Reduce Exposure to Localized Toxic Air Contaminant Emissions**
- **AQ-5b. Reduce Exposure to Localized Toxic Air Contaminant Emissions during Railway Design**

The following mitigation measures identified in Sections 4.8 and 4.16 of the approved Plan PEIR would further reduce TAC emissions and would remain applicable to the proposed Amendment. Section 4.5 of this SEIR, includes minor updates to mitigation measure **TRA-2**. Section 4.3 of this SEIR includes an additional mitigation measure, **GHG-5g**, that would also reduce air quality impacts associated with the proposed Amendment.

- **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans**
- **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure**

- **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide**
- **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects**
- **GHG-5g. Prepare/Develop a Regional Climate Action Plan**
- **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**

SIGNIFICANCE AFTER MITIGATION

2025, 2035, 2050

Mitigation measure **AQ-2a**, as described under Impact AQ-2, will help secure incentive funding to reduce PM emissions from mobile sources. Mitigation measure **AQ-5a** will reduce TAC emissions and TAC emission exposure for existing and new receptors through design and siting requirements. Mitigation measure **AQ-5b** will reduce diesel emission exposure on existing and new receptors through undergrounding and design.

Mitigation measures **GHG-5a**, **GHG-5b**, **GHG-5d**, **GHG-5f**, and **GHG-5g** would reduce PM10 and PM2.5 emissions from tire wear, brake wear, and vehicle exhaust. In addition, mitigation measure **TRA-2** would reduce criteria pollutants through project-level VMT reduction measures. Measures to reduce VMT or vehicle exhaust (e.g., EVs) in these mitigation measures would reduce TAC emissions and associated concentrations.

Although mitigation would reduce impacts, there is no guarantee that impacts would be reduced to below a level of significance for every project. Thus, this impact (Impact AQ-5) would be significant and unavoidable.

AQ-6 EXPOSE SENSITIVE RECEPTORS TO CARBON MONOXIDE HOT-SPOTS

ANALYSIS METHODOLOGY

This analysis addresses the exposure of sensitive receptors to substantial concentrations of CO. A CO hot spot is a localized concentration of CO, typically found at congested intersections, that is above the State or national 1-hour or 8-hour ambient air standards for the pollutant. Projects that do not generate CO concentrations in excess of the health-based NAAQS or CAAQS would not contribute a significant level of CO such that localized air quality and human health would be substantially affected.

As with the approved Plan PEIR, this analysis qualitatively evaluates proposed Amendment CO concentration impacts, including CO hot spots, by comparing them to CO concentrations disclosed in the 2015 Regional Plan EIR. This is justified due to lower VMT here than in the 2015 Regional Plan, cleaner engine technology here compared to that modeled in the 2015 Regional Plan EIR, and lower background CO concentrations than modeled in the 2015 Regional Plan, all implying that the significance finding of the 2015 Regional Plan is unchanged here and does not need to be modeled. This is explained further below.

IMPACT ANALYSIS

2025

Vehicle travel under the approved Plan would decrease by approximately 4,000,000 VMT daily compared to 2025 projections under the 2015 Regional Plan (see Section 4.16 of the approved Plan PEIR). Vehicle travel under the proposed Amendment would increase by approximately 400,000 VMT daily in 2025 compared to the approved Plan (see Section 4.5 of this SEIR); however, VMT and overall vehicle use would continue to be

less than what was assumed in the 2015 Regional Plan. Proposed transportation infrastructure and programs within the approved Plan would continue to help to reduce VMT by providing alternative forms of transportation, including biking, walking, and transit, which would reduce passenger car travel and thereby reduce any exposure to emissions at congested roadways.

The 2015 Regional Plan EIR analyzed CO concentrations at four congested intersections and found impacts to be well below significance thresholds, even for the EIR baseline year 2012. Consistent with the analysis and findings of the approved Plan PEIR, CO emissions would be even lower under the proposed Amendment due to reduced traffic volumes, cleaner engine technology, and lower background CO concentrations, as compared to what was modeled in the 2015 Regional Plan EIR. Thus, CO concentrations would be lower and continue to be well below significance thresholds.

2025 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact related to exposing sensitive receptors to substantial concentrations of CO in 2025. As discussed above, no new significant environmental effects or a substantial increase in the severity of previously identified significant effects would result due to the proposed Amendment. Implementation of the proposed Amendment would not expose sensitive receptors to substantial concentrations of CO in 2025. Therefore, the conclusion for the proposed Amendment in 2025 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

2035

Vehicle travel under the approved Plan would decrease by approximately 8,500,000 VMT daily compared to the 2035 projections under the 2015 Regional Plan (see Section 4.16 of the approved Plan PEIR). Vehicle travel under the proposed Amendment would increase by approximately 1,700,000 VMT daily in 2035 compared to the approved Plan (see Section 4.5 of this SEIR); however, VMT and overall vehicle use would continue to be less than what was assumed in the 2015 Regional Plan. Proposed transportation infrastructure and programs within the approved Plan would continue to help to reduce VMT by providing alternative forms of transportation, including biking, walking, and transit, which would reduce passenger car travel and thereby reduce any exposure to emissions at congested roadways.

CO emissions for the year 2035 were modeled both for the 2015 Regional Plan EIR and proposed Amendment. According to the 2015 Regional Plan EIR, on-road vehicle sources would be responsible for 71.26 tons per day of CO emissions (Table 4.3-12 of the 2015 Regional Plan EIR). As shown in Table 4.1-2, the proposed Amendment would emit 52.50 tons per day of CO from on-road vehicle sources. Compared to the 2015 Regional Plan EIR, the proposed Amendment would emit approximately 18.75 tons per day fewer CO emissions. According to the 2015 Regional Plan EIR, the implementation of the 2015 Regional Plan would not induce a CO hotspot at four congested intersections for the year 2035. Thus, as the 2015 Regional Plan EIR did not have a CO hot spot impact and modeled higher CO emissions from on-road sources compared to the proposed Amendment, the proposed Amendment would also not have a CO hot spot impact.

2035 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact related to exposing sensitive receptors to substantial concentrations of CO in 2035. As discussed above, no new significant environmental effects or a

substantial increase in the severity of previously identified significant effects would result due to the proposed Amendment. Implementation of the proposed Amendment would not expose sensitive receptors to substantial concentrations of CO in 2035. Therefore, the conclusion for the proposed Amendment in 2035 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

2050

Vehicle travel under the approved Plan would decrease by approximately 10,700,000 VMT daily compared to 2050 projections under the 2015 Regional Plan (see Section 4.16 of the approved Plan PEIR). Vehicle travel under the proposed Amendment would increase by approximately 1,700,000 VMT daily in 2050 compared to the approved Plan (see Section 4.5 of this SEIR); however, VMT and overall vehicle use would continue to be less than what was assumed in the 2015 Regional Plan. Proposed transportation infrastructure and programs within the approved Plan would continue to help to reduce VMT by providing alternative forms of transportation, including biking, walking, and transit, which would reduce passenger car travel and thereby reduce any exposure to emissions at congested roadways.

The 2015 Regional Plan EIR model results were that on-road vehicle sources CO emissions would be approximately 65.08 tons per day (Table 4.3-16 in the 2015 Regional Plan EIR). Furthermore, the 2015 Regional Plan EIR analyzed CO concentrations at four congested intersections and found impacts to be well below significance thresholds for the year 2050. According to Table 4.1-2, on-road sources within the proposed Amendment would emit approximately 50.0 tons per day of CO. This would be 15.08 tons per day less than what was analyzed within the 2015 Regional Plan EIR. Thus, as the 2015 Regional Plan EIR did not find a CO hotspot at four congested intersections while assuming higher on-road source CO emissions, the proposed Amendment would also not create any CO hotspots.

2050 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact related to exposing sensitive receptors to substantial concentrations of CO in 2050. As discussed above, no new significant environmental effects or a substantial increase in the severity of previously identified significant effects would result due to the proposed Amendment. Implementation of the proposed Amendment would not expose sensitive receptors to substantial concentrations of CO in 2050. Therefore, the conclusion for the proposed Amendment in 2050 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Exacerbation of Climate Change Effects

Consistent with the analysis and findings of the approved Plan PEIR, the proposed Amendment would not exacerbate climate change effects on exposing sensitive receptors to substantial concentrations of CO. This impact is less than significant for the proposed Amendment, and climate change is not expected to worsen CO hotspots, so there is unlikely to be an exacerbation of climate change effects.

4.2 ENERGY

This section evaluates energy impacts that would result from implementing the proposed Amendment.

4.2.1 EXISTING CONDITIONS

The existing conditions included in Section 4.6, *Energy*, of the approved Plan PEIR are consistent with this evaluation and have not materially changed since the preparation of the approved Plan PEIR.

4.2.2 REGULATORY SETTING

The regulatory setting in Section 4.6 of the approved Plan PEIR included relevant federal, State, regional, and local regulations. The regulatory setting included in Section 4.6 of the approved Plan PEIR is consistent with this evaluation and has not materially changed since the preparation of the approved Plan PEIR, except for the following updates.

FEDERAL LAWS, REGULATIONS, PLANS, AND POLICIES

Fuel Economy Standards

The National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (EPA) set the Corporate Average Fuel Economy (CAFE) standards to improve the average fuel economy of and reduce greenhouse gas (GHG) emissions generated by cars and light duty trucks. During the previous administration, NHTSA and EPA had amended the fuel efficiency standards for passenger cars and light trucks and established new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 (Safer Affordable Fuel-Efficient [SAFE] Vehicles Rule). NHTSA and EPA had also issued a regulation revoking California's Clean Air Act waiver, which had allowed the State to set its own emissions standards, asserting that the waiver was preempted by federal law (SAFE Rule Part One, 84 *Federal Registers* 51310, September 27 2019). On December 21, 2021, the NHTSA published its CAFE Preemption rule, which finalizes its repeal of the SAFE Vehicles Rule Part One. NHTSA's 2021 rule thus reopens pathways for State and local fuel economy laws (NHTSA 2021).

SAFE Rule Part Two was finalized on March 31, 2020, and went into effect on June 29, 2020. The SAFE Rule Part Two updates the national fuel economy standards for light duty vehicles from 54 miles per gallon to 40 miles per gallon in future years. Following preparation and approval of the approved Plan PEIR, EPA rescinded SAFE Rule Part One on March 9, 2022, and reinstated California's authority under the Clean Air Act to implement its own GHG emission standards and zero-emission vehicle (ZEV) sales mandate. With the same action, EPA also withdrew the SAFE Rule 1 interpretation of the CAA that would prohibit other states from adopting the California GHG emission standards. As a result, other states may now choose to adopt and enforce California's GHG emission standards in lieu of federal standards, consistent with Section 177 of the Clean Air Act.

STATE LAWS, REGULATIONS, PLANS, AND POLICIES

State Agency GHG Reduction Plans and Strategies

California's 2022 Climate Change Scoping Plan

Pursuant to AB 1279, the California Air Resources Board (CARB) updated the 2017 Scoping Plan to address implementation of GHG reduction strategies to meet the 2045 reduction target. The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) was approved in December 2022. The Scoping Plan Scenario achieves the AB 1279 target of 85 percent below 1990 levels by 2045 and identifies a need to accelerate the 2030 target to 48 percent below 1990 levels. The plan builds upon GHG reduction measures of the previous scoping plans and includes additional measures to capture and store atmospheric carbon through the State's natural and working lands and by using a variety of mechanical approaches. By incorporating GHG emission reduction and carbon capture methods, the 2022 Scoping Plan identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 (CARB 2022a). Appendix D of the 2022 Scoping Plan includes recommendations for local government actions to help the State meet AB 1279's GHG reduction targets.

Legislative GHG Reduction Targets

AB 1279, Health and Safety Code Section 38562.2

On September 16, 2022, AB 1279 codified the State's 2045 GHG emissions target expressed under Executive Order (EO) B-55-18. The bill establishes a State policy for California to achieve net zero GHG emissions (i.e., reach a balance between the GHGs emitted and removed from the atmosphere) no later than 2045 and to achieve and maintain net negative GHG emissions from then on. It also mandates an 85 percent reduction in statewide anthropogenic (human-made) GHG emissions (from 1990 levels) by 2045. AB 1279 recognizes that meeting these targets requires direct GHG emission reductions and removal of carbon dioxide (CO_2) from the atmosphere, as well as a nearly complete transition from fossil fuels. As such, the bill directs CARB to work with relevant State agencies to ensure scoping plan updates include measures that put California on a trajectory to achieve these targets. It also tasks CARB with implementing strategies that facilitate CO_2 removal solutions and carbon capture, utilization, and storage technologies.

Fuel Economy Standards

Advanced Clean Cars II

In August 2022, CARB members voted to approve the Advanced Clean Cars II proposal, which will dramatically reduce emissions from passenger cars for model years 2026 through 2035. This requires an increasing proportion of new vehicles to be ZEVs, with the goal of 100 percent ZEVs for new vehicles sold by 2035 (CARB 2022b).

Building Efficiency

California Building Energy Efficiency Standards

The energy consumption of new residential and nonresidential buildings in California is regulated by the Building Energy Efficiency Standards (California Energy Code). The California Energy Commission (CEC) updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions. The 2019 California Energy Code was replaced by the 2022 standards, effective January 1, 2023. The 2022 California Energy Code establishes "electric-ready" requirements for new homes, expands solar photovoltaic (PV) and battery storage requirements, strengthens ventilation standards, and encourages electric heat pumps. The CEC estimates that over the next 30 years, the 2022 standards will reduce 10 million metric tons of CO_2 equivalent emissions (ACE Resources 2022).

California Green Building Standards Code

California has adopted the Green Building Standards Code (CALGreen) (24 California Code of Regulations 11), which identifies aggressive energy efficiency standards for new residential and nonresidential buildings that are continuously updated every few years. The most recent update was the 2022 Building Energy Efficiency Standards, which were adopted in July 2022 and took effect on January 1, 2023. Future standards are expected to result in zero net energy for newly constructed commercial buildings. CALGreen requirements are complementary with the California Energy Code discussed above.

REGIONAL AND LOCAL LAWS, REGULATIONS, PLANS, AND POLICIES

There are no new or updated regional or local laws, regulations, plans, or policies that pertain to energy applicable to the proposed Amendment.

4.2.3 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines provides criteria for determining the significance of a project's environmental impacts in the form of Initial Study checklist questions. This SEIR uses the same significance criteria as in the approved Plan PEIR, which were based on the Appendix G checklist questions for energy. Therefore, implementation of the proposed Amendment would have a significant energy impact if it would:

EN-1 Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operations.

EN-2 Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.2.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

EN-1 RESULT IN A POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACT DUE TO WASTEFUL, INEFFICIENT, OR UNNECESSARY CONSUMPTION OF ENERGY DURING PROJECT CONSTRUCTION OR OPERATIONS

ANALYSIS METHODOLOGY

This section discusses the construction and operation impacts related to energy from regional growth and land use change, and planned transportation network improvements outlined in the approved Plan in comparison to the approved Plan as revised by the proposed Amendment.

In the approved Plan PEIR, the determination of whether transportation projects and land use changes would result in wasteful or unnecessary energy consumption was based on whether the approved Plan would result in a decrease in per capita energy consumption. Consistent with Appendix F of the CEQA Guidelines, a per capita analysis was appropriate for the approved Plan, as that analysis would determine whether the energy use under the approved Plan was more efficient relative to the 2016 baseline year. The analysis combined electricity (gigawatt hours [GWh]), natural gas (million therms), on-road vehicle fuel consumption (million gallons), and construction equipment diesel consumption (million gallons) into a common unit of energy usage (trillion British thermal units [BTU]). Energy consumption from all operational sources was quantified using

industry standard emission and conversion factors. A full list of assumptions and energy calculations can be found in Appendix F to the approved Plan PEIR.

For this SEIR, the regional gasoline and diesel consumption associated with the proposed Amendment was calculated. The energy use associated with gasoline and diesel consumption was then calculated and added to the electricity, natural gas, rail, and construction energy that had been calculated for the approved Plan PEIR. Table 4.2-1 summarizes the total and per capita energy use under the proposed Amendment for 2016, 2025, 2035, and 2050. Table 4.2-2 summarizes the change in total and per capita energy use under the proposed Amendment when compared to the approved Plan.

IMPACT ANALYSIS

2025, 2035, and 2050

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. Because there would be no new construction associated with the proposed Amendment, energy use during construction would remain unchanged from the findings in the approved Plan PEIR.

The proposed Amendment removes the regional road usage charge. As discussed in Section 4.5, *Transportation*, of this SEIR, this modification would result in a slight increase in vehicle miles traveled (VMT) than what was identified in the approved Plan PEIR. As a result of the increased VMT, energy use related to on-road vehicle gasoline and diesel during operations would increase by 4 trillion BTU in 2025, 4 trillion BTU in 2035, and 3 trillion BTU in 2050. However, consistent with the approved Plan PEIR, the proposed Amendment would not result in an increase in overall per capita energy consumption, or otherwise use energy in an inefficient, wasteful, or unnecessary manner, because per capita energy use would still decrease between 2016 and each horizon year (2025, 2035, and 2050).

Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact related to wasteful, inefficient, or unnecessary consumption of energy from implementation of the approved Plan (EN-1) because per capita energy use would decrease from 2016 to all horizon years (2025, 2035, 2050). As discussed above, no new significant environmental effects or a substantial increase in the severity of previously identified significant effects would result due to the proposed Amendment. Therefore, the conclusion for the proposed Amendment during all horizon years (2025, 2035, 2050) would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Table 4.2-1
Total and per Capita Energy Use Under the Proposed Amendment: 2016 and 2025, 2035, 2050

Category	2016 (Baseline)		2025		2035		2050	
	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU
Regional Growth and Land Use Change	--	123	--	123	--	126	--	129
Electricity (GWh)	18,842	64	17,475	60	18,078	62	18,191	62
Natural Gas (million therms)	585	58	629	63	648	65	671	67
Transportation Network Improvements and Programs	--	172	--	136	--	115	--	112
Vehicles, Gasoline (million gallons)	1,268	152	955	115	777	93	747	90
Vehicles, Diesel (million gallons)	133	18	137	19	139	19	142	20
Rail, Diesel (million gallons)	11	1	17	2	19	3	20	3
Total Construction (million gallons)	20	3	24	3	29	4	34	5
Total Energy Use	--	298	--	262	--	245	--	246
Per Capita Energy Use (metric million BTU/person)	91		75		68		66	
Total Energy Use, Percent Change 2016 to Plan Year	**--**		**-12%**		**-18%**		**-17%**	
Per Capita Energy Use, Percent Change 2016 to Plan Year	**--**		**-17%**		**-25%**		**-27%**	

Source: Appendix F of the approved Plan PEIR; Appendix D of this SEIR
Notes:
2016 population = 3,287,280; 2025 population = 3,470,848; 2035 population = 3,620,348; 2050 population = 3,746,073.
Numbers are rounded, and may not add up to the stated totals.
1 GWh = 3,412,141,632.81 BTU; 1 therm = 99,976 BTU; 1 gallon, gasoline = 120,286 BTU; 1 gallon, diesel = 137,381 BTU.

Table 4.2-2
Change in per Capita and Total Energy Under the Proposed Amendment: 2016 and 2025, 2035, 2050

Category	2016 (Baseline)		2025		2035		2050	
	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU
Regional Growth and Land Use Change	--	0	--	1	--	0	--	0
Electricity (GWh)		0		0		0		0
Natural Gas (million therms)		-1		0		0		0
Transportation Network Improvements and Programs	--	5	--	4	--	4	--	3
Vehicles, Gasoline (million gallons)		4		3		3		3
Vehicles, Diesel (million gallons)		1		1		1		0
Rail, Diesel (million gallons)		0		0		0		0
Total Construction (million gallons)		0		0		0		0
Total Energy Use	--	6	--	4	--	4	--	3
Per Capita Energy Use (metric million BTU/person)	2		1		1		1	

Source: Appendix F of the approved Plan PEIR; Appendix D of this SEIR

Exacerbation of Climate Change Effects

The proposed Amendment would not exacerbate climate change effects on inefficient energy use. While the proposed Amendment would result in a slightly higher per capita energy use than what was included in the approved Plan due to the removal of the regional road usage charge, it would still achieve an overall decrease in per capita energy use from 2016 to each horizon year (2025, 2035, 2050). The proposed Amendment would not stimulate population and housing growth and therefore would not exacerbate the increased demand for energy caused by climate change.

EN-2 CONFLICT WITH OR OBSTRUCT A STATE OR LOCAL PLAN FOR RENEWABLE ENERGY OR ENERGY EFFICIENCY

ANALYSIS METHODOLOGY

This analysis evaluates whether implementation of the proposed Amendment would obstruct State and local renewable energy and energy efficiency plans, regulations, and policies, discussed in Section 4.2.2, *Regulatory Setting,* above and in Section 4.6, *Energy,* of the approved Plan PEIR. The applicable State and local plans that address renewable energy and energy efficiency are the Warren-Alquist Act, Requirements for In-Use Off-Road Diesel-Fueled Fleets, Advanced Clean Cars regulations, the Low Carbon Fuel Standard (LCFS), CALGreen, the California Energy Code, SB 100, local Climate Action Plans (CAPs), the 2022 Scoping Plan, and applicable sections of general plans. The proposed Amendment is required to comply with these State and local plans and regulations, all of which are aimed at increasing energy efficiency and renewable energy development. The discussion below further examines consistency with adopted plans and policies related to energy conservation.

IMPACT ANALYSIS

2025, 2035, 2045, and 2050

The approved Plan PEIR concluded that implementation of the approved Plan's regional growth and land use changes would not conflict with or obstruct State or local plans for increasing energy efficiency and renewable energy, including the California Energy Code, SB 100, local CAPs, and applicable sections of local general plans. The proposed Amendment would not change anticipated growth or land use within the region, and therefore the impact conclusion would remain unchanged from the approved Plan PEIR.

The approved Plan PEIR also concluded that implementation of the approved Plan's transportation network improvements and programs would not conflict with or obstruct State and local plans for increasing energy efficiency, including the Warren-Alquist Act, the Requirements for In-Use Off-Road Diesel-Fueled Fleets, and Advanced Clean Cars regulations. The proposed Amendment would not introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment would remove the regional road usage charge, which, as discussed in the impact analysis for EN-1, would increase energy use from on-road gasoline and diesel vehicles during operations.

The Warren-Alquist Act established a State policy to reduce wasteful, uneconomical, and unnecessary uses of energy. As explained in the impact analysis for EN-1, the proposed Amendment would not result in wasteful, inefficient, or unnecessary use of energy and therefore would be consistent with the Warren-Alquist Act policies. In addition, off-road equipment with diesel engines of 25 horsepower or larger are regulated by CARB for purposes of emissions reductions under the Requirements for In-Use Off-Road Diesel-Fueled Fleets. These regulations require operators to limit idling during operation and to upgrade older equipment with modern

engines, which additionally provides benefits for the reduction of fuel consumption. On-road vehicle fuel consumption would be propelled by compliance with the Advanced Clean Cars regulations, which would increasingly limit the use of nonrenewable fuel sources by requiring vehicle manufacturers to produce an increasing number of ZEVs.

Implementation of the proposed Amendment would also not conflict with or obstruct State or local plans for increasing renewable energy, including the LCFS and local general plans and CAPs. The LCFS is designed to decrease the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduces petroleum dependency and encourages the use of cleaner low-carbon transportation fuels (e.g., hydrogen, electricity, biofuels). In addition, City and County policies determined in their general plans and CAPs to improve the region's electric vehicle (EV) infrastructure, which would continue to apply with implementation of the approved Plan and would remain unchanged with the proposed Amendment.

Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a less-than-significant impact related to conflicting with or obstructing a State or local plan for renewable energy or energy efficiency (EN-2). As discussed above, no new significant environmental effects or a substantial increase in the severity of previously identified significant effects would result due to the proposed Amendment. Therefore, the conclusion for the proposed Amendment during all horizon years (2025, 2035, 2045, and 2050) would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Exacerbation of Climate Change Effects

Consistent with the analysis and findings of the approved Plan PEIR, the proposed Amendment would not exacerbate climate change effects that would conflict with or obstruct a State or regional plan related to the increased use of renewable energy or energy efficiency.

4.3 GREENHOUSE GAS EMISSIONS

This section evaluates impacts of the proposed Amendment related to greenhouse gas (GHG) emissions.

4.3.1 EXISTING CONDITIONS

The existing conditions included in Section 4.8, *Greenhouse Gas Emissions*, of the approved Plan PEIR are consistent with this evaluation and have not materially changed since the preparation of the approved Plan PEIR, except for the updates included herein.

GREENHOUSE GAS INVENTORIES

A GHG inventory is a quantification of all GHG emissions and sinks[1] within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (e.g., for global and national entities) or on a small scale (e.g., for a particular building or person). Although some processes are difficult to evaluate, agencies and practitioners have developed tools to quantify emissions from many common sources.[2]

Within the San Diego region, on-road transportation – passenger cars and light-duty vehicles is the largest emission source (42 percent), followed by electricity consumption (20 percent), natural gas consumption (12 percent), industrial uses (8 percent), on-road transportation – heavy-duty trucks and vehicles (5 percent), other fuels (4 percent), off-road vehicles (2 percent), solid waste (2 percent), and other sectors representing 1 percent of total emissions or less (Appendix H of the approved Plan PEIR and Appendix C of this SEIR). Table 4.3-1 summarizes the 2016 GHG inventory for the San Diego region.

Table 4.3-1
Total Greenhouse Gas Emissions in the San Diego Region, 2016

Source	Annual Emissions ($MMTCO_2e$)	Percentage of Annual Emissions
Passenger Cars and Light-Duty Vehicles	10.9	42%
Electricity	5.3	20%
Natural Gas	3.1	12%
Industrial	2.1	8%
Heavy-Duty Trucks and Vehicles	1.3	5%
Other Fuels	1.1	4%
Off-Road Transportation	0.62	2%
Solid Waste	0.59	2%
Water	0.24	1%
Aviation	0.21	1%

[1]A GHG sink is a process, activity, or mechanism that removes a GHG from the atmosphere.

[2] Global, national, and State GHG emissions inventories have been updated since the preparation of the approved Plan PEIR, but the updates are not relevant to analyzing the proposed Amendment's GHG impacts and so are not included in this SEIR.

Source	Annual Emissions ($MMTCO_2e$)	Percentage of Annual Emissions
Rail	0.11	<1%
Wastewater	0.07	<1%
Agriculture	0.05	<1%
Marine Vessels	0.05	<1%
Soil Management	0.05	<1%
Total	**25.8**	**100%**

Source: Appendix H of the approved Plan PEIR and Appendix C of this SEIR.
$MMTCO_2e$ = million metric tons of carbon dioxide equivalent

4.3.2 REGULATORY SETTING

The regulatory setting in Section 4.8 of the approved Plan PEIR included relevant federal, State, regional, and local regulations. The regulatory setting included in Section 4.8 of the approved Plan PEIR is consistent with this evaluation and has not materially changed since the preparation of the approved Plan PEIR, except for the following updates.

FEDERAL LAWS, REGULATIONS, PLANS, AND POLICIES

Fuel Economy Standards

The National Highway Traffic Safety Administration (NHTSA) and EPA set the Corporate Average Fuel Economy Standards (CAFE) to improve the average fuel economy and reduce GHG emissions generated by cars and light-duty trucks. NHTSA and EPA had adopted a rule in 2019 for the current fuel efficiency standards for passenger cars and light trucks, which established new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 (Safer Affordable Fuel-Efficient [SAFE] Vehicles Rule). NHTSA and EPA had also issued a regulation revoking California's Clean Air Act waiver, which allows California to set its own emissions standards, asserting that the waiver was preempted by federal law (SAFE Rule Part One, 84 *Federal Register* 51310, September 27, 2019).

On December 21, 2021, the NHTSA published its CAFE Preemption rule, which finalizes its repeal of the SAFE Vehicles Rule Part One. NHTSA's 2021 rule thus reopens pathways for State and local fuel economy laws (NHTSA 2021).

SAFE Rule Part Two was finalized on March 31, 2020, and went into effect on June 29, 2020. Part Two of the SAFE Rule sets the CAFE standards to increase in stringency by 1.5 percent per year above model year 2020 levels for model years 2021–2026. These standards are lower than the previous CAFE standards which required that model years 2021–2026 increase in stringency by 5 percent per year. The current federal administration has stated its intent to revisit the current CAFE standards.

STATE LAWS, REGULATIONS, PLANS, AND POLICIES

Legislative GHG Reduction Targets

State law sets forth the following requirements for reducing statewide levels of GHG emissions by 2020, 2030, and 2045.

- **AB 1279, Health and Safety Code Section 38562.2.** On September 16, 2022, AB 1279 codified the State's 2045 GHG emissions target expressed under EO B-55-18. The bill establishes a State policy for California to achieve net zero GHG emissions (i.e., reach a balance between the GHGs emitted and removed from the atmosphere) no later than 2045 and to achieve and maintain net negative GHG emissions from then on. It also mandates an 85 percent reduction in statewide anthropogenic (human-made) GHG emissions (from 1990 levels) by 2045. AB 1279 recognizes that meeting these targets requires direct GHG emission reductions and removal of carbon dioxide (CO_2) from the atmosphere, as well as a nearly complete transition from fossil fuels. As such, the bill directs CARB to work with relevant State agencies to ensure Scoping Plan updates include measures that put California on a trajectory to achieve these targets. It also tasks CARB with implementing strategies that facilitate CO_2 removal solutions and carbon capture, utilization, and storage technologies.

State Agency GHG Reduction Plans and Strategies

- **California's 2022 Climate Change Scoping Plan.** Pursuant to AB 1279, CARB updated the 2017 Scoping Plan to address implementation of GHG reduction strategies to meet the 2045 reduction target. The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) was approved in December 2022. The Scoping Plan Scenario achieves the AB 1279 target of 85 percent below 1990 levels by 2045 and identifies a need to accelerate the 2030 target to 48 percent below 1990 levels. The plan builds upon GHG reduction measures of the previous Scoping Plans and includes additional measures to capture and store atmospheric carbon through the State's natural and working lands and using a variety of mechanical approaches. By incorporating GHG emission reduction and carbon capture methods, the 2022 Scoping Plan identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 (CARB 2022b). Appendix D of the Scoping Plan includes recommendations for local government actions to help the State meet AB 1279's GHG reduction targets.

Fuel Economy Standards

- **Advanced Clean Cars II.** In August 2022, CARB Board members voted to approve the Advanced Clean Cars II proposal, which will dramatically reduce emissions from passenger cars for model years 2026 through 2035. This requires an increasing proportion of new vehicles to be zero-emission vehicles, with the goal of 100 percent zero-emission vehicles for new vehicles sold by 2035 (CARB 2022c). CARB has neither incorporated the regulation into the EMFAC model nor provided off-model correction factors. Therefore, Advanced Clean Cars II had no effect on the emissions inventories analyzed in this SEIR.

Building Efficiency

- **California Building Energy Efficiency Standards.** The energy consumption of new residential and nonresidential buildings in California is regulated by the Building Energy Efficiency Standards (California Energy Code). CEC updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions. The 2019 California Energy Code was replaced by the 2022 standards, effective January 1, 2023. The 2022 California Energy Code establishes "electric-ready" requirements for new homes, expands solar photovoltaic (PV) and battery storage requirements, strengthens ventilation standards, and encourages electric heat pumps. The CEC estimates that over the next 30 years, the 2022 standards will reduce 10 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) (ACE Resources 2022).
- **California Green Building Standards Code.** California has adopted the Green Building Standards Code (CALGreen, 24 California Code of Regulations [CCR] Part 11), which identifies aggressive energy efficiency standards for new residential and nonresidential buildings that are continuously updated every few years.

The most recent update was the 2022 Building Energy Efficiency Standards, which were adopted in July 2022 and took effect on January 1, 2023. Future standards are expected to result in zero net energy for newly constructed commercial buildings. CalGreen requirements are complementary with the California Energy Code discussed above.

REGIONAL AND LOCAL LAWS, REGULATIONS, PLANS, AND POLICIES

SANDAG

ReCAP

The SANDAG Board of Directors (Board) accepted the Regional Climate Action Planning Framework (ReCAP) in 2018. Version 1.1 of the ReCAP was released in December 2020 (SANDAG 2020). ReCAP identifies best practices and guidance for preparing Climate Action Plans (CAPs) and monitoring implementation over time. ReCAP establishes a technical framework for regionally consistent climate action planning that preserves local policy flexibility for the unique needs and circumstances of each local jurisdiction.

Electric Vehicle Readiness Planning and Plug-in San Diego

SANDAG has provided a forum for local governments and other regional stakeholders to address barriers to deploying alternative fuel vehicles and siting charging and fueling stations. In 2021, SANDAG completed a regional readiness plan for plug-in electric vehicles (EVs) and charging stations titled the San Diego Regional Plan to Support Plug-in Electric Vehicle Readiness (SANDAG 2021). The plan is part of a statewide effort funded through the CEC to prepare local governments for the deployment of EVs. San Diego's Readiness Plan identifies barriers to the deployment of EV charging infrastructure and includes recommendations and resources for public agencies, property owners, consumers, and other stakeholders to overcome those barriers.

With additional funding from the CEC, SANDAG transitioned from readiness planning to implementation via the Plug-in San Diego initiative. The initiative is a combination of resource development, training, technical assistance, and outreach. The primary audience of the project includes member agencies, employers, and multi-family properties. The project is also developing a needs assessment to help document existing infrastructure and identify gaps, including access, in the current EV charging network. One of the novel aspects of the initiative is the availability of a technical expert (the "EV Expert") who is made available in person, via phone, and email to assist stakeholders.

Youth Opportunity Pass Program

Starting May 1, 2022, the Youth Opportunity Pass Program provides anyone aged 18 and under with a pass to ride transit for free in San Diego County. This includes unlimited rides on the bus, Trolley, COASTER, and SPRINTER at no cost through June 30, 2024. SANDAG is funding this pilot program, with support from the County of San Diego, as part of its Transit Equity Initiative, which is guided by the 2021 Regional Plan.

Local Plans to Reduce GHG Emissions

Most of SANDAG's member jurisdictions have adopted CAPs, GHG reduction plans, and/or sustainability plans that set goals and targets for the reduction of GHG emissions, and outline policies and/or measures to achieve those goals and targets. Table 4.3-2 summarizes and updates the status of local plans to reduce GHG emissions in the San Diego region (as of March 2023).

Table 4.3-2
Summary of Local Plans to Reduce GHG Emissions (as of March 2023)

Jurisdiction	Document Title	Adopted (year)	New Plan or Update In Progress?	CEQA Qualified Plan?[1]
Carlsbad	Climate Action Plan	2020	Yes[2]	Yes
Chula Vista	Climate Action Plan	2017	No	No
Coronado	Climate Action Plan	2022	No	Yes
Del Mar	Climate Action Plan	2016	No	No
El Cajon	El Cajon Sustainability Initiative: Policies to Reduce Greenhouse Gas Emissions	2020	No	No
Encinitas	Climate Action Plan	2020	No	Yes
Escondido	Climate Action Plan	2021	No	Yes
Imperial Beach	Resilient Imperial Beach: Climate Action Plan	2019	No	No
La Mesa	Climate Action Plan	2018	No	Yes
Lemon Grove	Climate Action Plan	2020	No	No
National City	Climate Action Plan	2011	No	Yes
Oceanside	Climate Action Plan	2019	No	No
Poway	None	N/A	No	N/A
San Diego (City)	Climate Action Plan	2022	Yes	Yes
San Diego (County)	Climate Action Plan	N/A	Yes	N/A
San Diego (Port)	Climate Action Plan	2013	No	Yes
San Diego County Regional Airport Authority	Sustainability Management Program	2020	No	No
San Marcos	Climate Action Plan	2020	No	Yes
Santee	Sustainable Santee Plan	2019	No	Yes
Solana Beach	Climate Action Plan	2017	No	No
Vista	Climate Action Plan	2021	No	Yes

Sources: City of Carlsbad 2020, City of Chula Vista 2017, City of Coronado 2021, City of Del Mar 2016, City of El Cajon 2020, City of Encinitas 2020, City of Escondido 2021, City of Imperial Beach 2019, City of La Mesa 2018, City of Lemon Grove 2020, National City 2011, City of Oceanside 2019, City of Poway 2009, City of San Diego 2015, Port of San Diego 2013, San Diego County Regional Airport Authority 2020, City of San Marcos 2020, City of Santee 2019, City of Solana Beach 2017, and City of Vista 2021.

[1] CEQA Qualified Plan = a plan for the reduction of GHG emissions that includes the elements listed in CEQA Guidelines Section 15183.5(b)(1) (as determined by the agency adopting the plan).

[2] As of late 2022, the City of Carlsbad is developing measures for a draft CAP update.

4.3.3 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines provides criteria for determining the significance of a project's environmental impacts in the form of Initial Study checklist questions. This SEIR uses the same significance criteria as the approved Plan PEIR that were based on the Appendix G checklist questions for GHGs. Therefore, for purposes of this SEIR, the implementation of the proposed Amendment would have a significant GHG impact if it would:

GHG-1	Directly or indirectly result in an increase in GHG emissions compared to existing conditions (2016).
GHG-2	Conflict with the SANDAG region's achievement of SB 375 GHG emissions reduction targets for 2035.
GHG-3	Conflict with or impede achievement of an at least 30% reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016).
GHG-4	Conflict with or impede the implementation of local plans adopted for the purpose of reducing GHG emissions.
GHG-5	Be inconsistent with the State's ability to achieve the 2030 reduction target of SB 32, the accelerated 2030 target of the 2022 Scoping Plan, and long-term reduction goals of Executive Orders S-3-05, B-55-18, and AB 1279.

4.3.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

GHG-1 DIRECTLY OR INDIRECTLY RESULT IN AN INCREASE IN GHG EMISSIONS COMPARED TO EXISTING CONDITIONS (2016)

ANALYSIS METHODOLOGY

As with the approved Plan PEIR, this analysis is based on the *2016 GHG Inventory and Projections for the San Diego Region* report prepared by SANDAG (Appendix H of the approved Plan PEIR), the updated Activity Based Model (ABM) traffic data associated with the proposed Amendment, and the updated EMFAC2017 emission rates associated with the repeal of the SAFE Vehicles Rule Part One. This report provides an estimate of 2016 GHG emissions for the San Diego region and GHG projections for the years 2025, 2035, and 2050. This analysis compares regional GHG emissions projections for 2025, 2035, and 2050 to 2016 baseline regional GHG emissions to determine if implementation of the proposed Amendment would directly or indirectly result in an increase in GHG emissions compared to existing conditions (2016).

IMPACT ANALYSIS

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment does remove the regional road usage charge. As discussed in Section 4.5, *Transportation*, of this SEIR, this modification would result in a slightly increased vehicle miles traveled (VMT) over what was identified in the approved Plan PEIR. In addition, in the interim between the preparation of the approved Plan PEIR and SEIR the SAFE Vehicles Rule Part One has been repealed. As a result, GHG emissions related to on-road vehicle gasoline and diesel during operations would change.

2025

Under implementation of the proposed Amendment, total GHG emissions in the San Diego region are projected to be approximately 22.2 $MMTCO_2e$ in 2025, or about 14 percent less than total GHG emissions in 2016 (Table 4.3-5).

Table 4.3-5
Total Greenhouse Gas Emissions in the San Diego Region, 2016 to 2025

GHG Emissions Category	2016 (Annual $MMTCO_2e$)[1]	2025 Proposed Amendment (Annual $MMTCO_2e$)[1]	Change from 2025 Approved Plan PEIR[2]
On-Road Transportation – Passenger Cars and Light-Duty Vehicles	10.9	8.2	0.4
Electricity	5.3	3.4	0.0
Natural Gas	3.1	3.3	0.0
Industrial	2.1	2.2	0.0
On-Road Transportation – Heavy-Duty Trucks and Vehicles[3]	1.3	1.4	-0.3
Other Fuels	1.1	1.4	0.0
Off-Road Transportation	0.6	0.7	0.0
Solid Waste	0.6	0.6	0.0
Water	0.2	0.3	0.0
Aviation	0.2	0.3	0.0
Rail	0.1	0.2	0.0
Wastewater	0.1	0.1	0.0
Agriculture	0.05	0.06	0.0
Marine Vessels	0.05	0.06	0.0
Soil Management	0.05	0.04	0.0
Total Annual Emission ($MMTCO_2e$)	**25.8**	**22.2**	**0.1 (0.5%)**
Change from 2016 to 2025	**-3.6 $MMTCO_2e$ (14%)**		

Source: Appendix H of the approved Plan PEIR and Appendix C of this SEIR.
[1] Emissions are estimated using global warming potential values from the Intergovernmental Panel on Climate Change's Fourth Assessment Report.
[2] As the SAFE Vehicles Rule Part One has been repealed, the proposed Amendment emissions are compared to the approved Plan emissions that exclude the EMFAC2017 SAFE Rule correction factors. The approved Plan emissions reflect the modeling corrections described in Chapter 2, *Project Description*, of this SEIR.
[3] The modeling corrections noted in Chapter 2 of this SEIR resulted in a change to the vehicle mix causing an increase in light-duty VMT and a reduction in heavy-duty VMT. This change affects all model years.

2025 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact GHG-1 in the year 2025 would be less than significant. As shown in Table 4.3-5, implementation of the proposed Amendment would not directly or indirectly result in an increase in GHG emissions compared to existing conditions because total annual regional emissions would be

approximately 14 percent lower in 2025 relative to 2016. Therefore, although the proposed Amendment increases the GHG emissions within the San Diego region by 0.1 $MMTCO_2e$ (0.5 percent), the conclusion for the proposed Amendment in the year 2025 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

2035

Under implementation of the proposed Amendment, total GHG emissions in the San Diego region are projected to be approximately 18.5 $MMTCO_2e$ in 2035, or about 28 percent less than GHG emissions in 2016 (Table 4.3-6).

Table 4.3-6
Total Greenhouse Gas Emissions in the San Diego Region, 2016 to 2035

GHG Emissions Category	2016 (Annual $MMTCO_2e$)[1]	2035 Proposed Amendment (Annual $MMTCO_2e$)[1]	Change from 2035 Approved Plan PEIR[2]
On-Road Transportation – Passenger Car and Light-Duty Vehicles	10.9	6.2	0.4
Electricity	5.3	1.3	0.0
Natural Gas	3.1	3.4	0.0
Industrial	2.1	2.4	0.0
On-Road Transportation – Heavy-Duty Trucks and Vehicles	1.3	1.4	-0.3
Other Fuels	1.1	1.5	0.0
Off-Road Transportation	0.6	0.8	0.0
Solid Waste	0.6	0.7	0.0
Water	0.2	0.2	0.0
Aviation	0.2	0.3	0.0
Rail	0.1	0.2	0.0
Wastewater	0.1	0.1	0.0
Agriculture	0.05	0.06	0.0
Marine Vessels	0.05	0.06	0.0
Soil Management	0.05	0.04	0.0
Total Annual Emission ($MMTCO_2e$)	**25.8**	**18.5**	**0.1 (0.5%)**
Change from 2016 to 2035	**-7.3 $MMTCO_2e$ (28%)**		

Source: Appendix H of the approved Plan PEIR and Appendix C of this SEIR.
[1] Emissions are estimated using global warming potential values from the Intergovernmental Panel on Climate Change's Fourth Assessment Report.
[2] As the SAFE Vehicles Rule Part One has been repealed, the proposed Amendment emissions are compared to the approved Plan emissions that exclude the EMFAC2017 SAFE Rule correction factors. The approved Plan emissions reflect the modeling corrections described in Chapter 2 of this SEIR.

2035 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact GHG-1 in the year 2035 would be less than significant. As shown in

Table 4.3-6, implementation of the proposed Amendment would not directly or indirectly result in an increase in GHG emissions compared to existing conditions because total annual regional emissions would be approximately 28 percent lower in 2035 relative to 2016. Therefore, although the proposed Amendment increases the GHG emissions within the San Diego region by 0.1 $MMTCO_2e$ (0.5 percent), the conclusion for the proposed Amendment in the year 2035 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

2050

Under implementation of the proposed Amendment, total GHG emissions in the San Diego region are projected to be approximately 17.8 $MMTCO_2e$ in 2050, or about 31 percent less than GHG emissions in 2016 (Table 4.3-7).

Table 4.3-7
Total Greenhouse Gas Emissions in the San Diego Region, 2016 to 2050

GHG Emissions Category	2016 (Annual $MMTCO_2e$)[1]	2050 Proposed Amendment (Annual $MMTCO_2e$)[1]	Change from 2050 Approved Plan PEIR[2]
On-Road Transportation – Passenger Car and Light-Duty Vehicles	10.9	6.0	0.4
Electricity	5.3	0.2	0.0
Natural Gas	3.1	3.6	0.0
Industrial	2.1	2.5	0.0
On-Road Transportation – Heavy-Duty Trucks and Vehicles	1.3	1.4	-0.3
Other Fuels	1.1	1.5	0.0
Off-Road Transportation	0.6	1.0	0.0
Solid Waste	0.6	0.7	0.0
Water	0.2	0.0	0.0
Aviation	0.2	0.4	0.0
Rail	0.1	0.2	0.0
Wastewater	0.07	0.08	0.0
Agriculture	0.05	0.06	0.0
Marine Vessels	0.05	0.08	0.0
Soil Management	0.05	0.04	0.0
Total Annual Emission ($MMTCO_2e$)	**25.8**	**17.8**	**0.1 (0.6%)**
Change from 2016 to 2050	**-8.0 $MMTCO_2e$ (31%)**		

Source: Appendix H of the approved Plan PEIR and Appendix C of this SEIR.
[1] Emissions are estimated using global warming potential values from the Intergovernmental Panel on Climate Change's Fourth Assessment Report.
[2] As the SAFE Vehicles Rule Part One has been repealed, the proposed Amendment emissions are compared to the approved Plan emissions that exclude the EMFAC2017 SAFE Rule correction factors. The approved Plan emissions reflect the modeling corrections described in Chapter 2 of this SEIR.

2050 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact GHG-1 in the year 2050 would be less than significant. As shown in Table 4.3-7, implementation of the proposed Amendment would not directly or indirectly result in an increase in GHG emissions compared to existing conditions because total annual regional emissions would be approximately 31 percent lower in 2050 relative to 2016. Therefore, although the proposed Amendment increases the GHG emissions within the San Diego region by 0.1 $MMTCO_2e$ (0.6 percent), the conclusion for the proposed Amendment in the year 2050 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Exacerbation of Climate Change Effects

As discussed above, the proposed Amendment will reduce the GHG emissions within the San Diego region when compared to the 2016 baseline. Therefore, when compared to the approved Plan, the 0.1 $MMTCO_2e$ increase associated with the proposed Amendment would not exacerbate any GHG emissions that occur due to climate change effects.

GHG-2 CONFLICT WITH THE SANDAG REGION'S ACHIEVEMENT OF SB 375 GHG EMISSIONS REDUCTIONS TARGETS FOR 2035

ANALYSIS METHODOLOGY

The analysis evaluates whether the proposed Amendment would conflict with the SB 375 GHG emission reduction target for 2035. SB 375 requires CARB to develop and update regional GHG emission reduction targets compared to 2005 emissions for passenger vehicles for 2020 and 2035. The updated targets established for SANDAG by CARB in 2018 are to reduce per capita CO_2 emissions 15 percent below 2005 levels by 2020, and to 19 percent below 2005 levels by 2035 (CARB 2018). CARB has not developed any post-2035 targets (CARB 2018). Because the proposed Amendment is anticipated to be adopted in 2023, its implementation is unrelated to SANDAG achieving the 2020 target, because 2020 is in the past. Therefore, conflict with the 2020 target is not addressed herein.

Because SB 375 does not establish 2050 GHG emissions reduction targets, this SEIR does not present a 2050 analysis of conflicts with SB 375 emissions reduction targets for that horizon year.

As with the approved Plan PEIR, the SB 375-related GHG emissions reductions in 2035 from implementation of the proposed Amendment were calculated by SANDAG using the CARB model EMFAC2014 and adjustment factors provided by CARB to account for differences in emissions rates between EMFAC2007 (used to set the 2005 baseline and original targets in 2010) and EMFAC2014. Off-model calculators were used to calculate emission reductions associated with strategies that are not accounted for in SANDAG travel demand modeling tools. Refer to Appendix I of the approved Plan PEIR for discussion of the CARB methodology that SANDAG is required to use when performing SB 375 calculations, including the reasons for using the EMFAC2014 model.

IMPACT ANALYSIS

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment does remove the regional road usage charge. As discussed in Section 4.5, *Transportation*, of this SEIR, this modification would result in a slightly increased VMT compared to what was identified in the approved Plan PEIR. In addition, in the interim between the preparation of the SEIR and this modification, the SAFE Vehicles Rule Part One was repealed. As a result, GHG emissions related to on-road vehicle gasoline and diesel during operations would change.

2035

CARB's target is for SANDAG to reduce per capita CO_2 emissions from passenger cars and light-duty trucks to 19 percent below 2005 levels by 2035. Table 4.3-8 summarizes the CO_2 per capita reductions from on-model and off-model strategies after accounting for the EMFAC adjustment factor and induced demand adjustment factor. As shown in Table 4.3-8, implementation of the proposed Amendment would reduce per capita CO_2 emissions from passenger cars and light-duty trucks to 18.6 percent below 2005 levels by 2035. Therefore, after rounding, implementation of regional growth and land use change and transportation network improvements and programs would not conflict with SB 375 GHG emission reduction targets. CARB's Final SCS Program and Evaluation Guidelines provide: "MPOs that rely on a combination of modeled and off-model methods to estimate per capita GHG emission reductions from its RTP/SCS should round to the nearest integer percent" (Final SCS Program and Evaluation Guidelines, Appendices, at p. 28)

Table 4.3-8
SB 375 GHG Reduction Targets and GHG Emissions Under the Proposed Amendment from Passenger Vehicles and Light-Duty Trucks, 2035

	Proposed Amendment Per Capita Reductions from 2005 Levels	Change from Approved Plan PEIR
Per Capita Reduction Under the Proposed Amendment (On-Model Results Only)	-17.7%	1.6
Per Capita Reduction Under the Proposed Amendment (Off-Model Results Only)	-3.0%	0
CARB Adjustment Factor for EMFAC 2007–2014[1]	+1.7%	0
Induced Demand Adjustment Factor[2]	+0.3%	0.1
Per Capita Reductions[3]	-18.6%	1.8
CARB Target	-19%	0

Source: Appendix I of the approved Plan PEIR and Appendix C of this SEIR.
[1] The GHG reductions for the proposed Amendment were calculated using the CARB model EMFAC 2014 and adjustment factors provided by CARB to account for differences in emissions rates between EMFAC 2007 (used to set the original targets in 2010) and EMFAC 2014.
[2] The induced demand adjustment factor methodology is described in Attachment 3 of Appendix I of the approved Plan PEIR.
[3] CARB's Final SCS Program and Evaluation Guidelines provide: "MPOs that rely on a combination of modeled and off-model methods to estimate per capita GHG emission reductions from its RTP/SCS should round to the nearest integer percent" (Final SCS Program and Evaluation Guidelines, Appendices, at p. 28).

2035 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR determined that implementation of the approved Plan would not conflict with SB 375 emission reduction targets for 2035, and impacts would be less than significant. As shown in Table 4.3-8, implementation of the proposed Amendment would not conflict with SB 375 emission reduction targets for 2035 because it would result in a 19 percent reduction in per capita CO_2 emissions from passenger cars and light-duty trucks from 2005 levels by 2035, which meets the 2035 target of a 19 percent reduction for the SANDAG region. Therefore, the conclusion for the proposed Amendment in the year 2035 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change effects in the San Diego region that could increase GHG emissions, as described in Section 4.8.1 of the approved Plan PEIR, the proposed Amendment would reduce GHG emissions within the San Diego region when compared to the 2016 baseline. Therefore, the proposed Amendment would not exacerbate any GHG emissions that occur due to climate change effects.

GHG-3 CONFLICT WITH OR IMPEDE ACHIEVEMENT OF AN AT LEAST 30% REDUCTION IN PER CAPITA GHG EMISSIONS FROM THE ENTIRE ON-ROAD TRANSPORTATION SECTOR BY 2035 COMPARED TO EXISTING CONDITIONS (2016)

ANALYSIS METHODOLOGY

The analysis evaluates whether the proposed Amendment would achieve at least a 30 percent reduction in per capita emissions from the entire on-road transportation sector by 2035 as compared to baseline conditions (2016). This target was included in SANDAG Board of Directors Resolution No. 2021-17, which was adopted on April 9, 2021. For purposes of this analysis, the entire on-road transportation sector includes the following sectors from the regional inventory:

- On-road transportation – passenger cars and light-duty trucks, and
- On-road transportation – heavy-duty trucks and vehicles.

As with the approved Plan PEIR, to perform this analysis, SANDAG has summed existing GHG emissions in the above sectors for 2016, and divided by the 2016 regional population to determine existing on-road transportation emissions per capita. SANDAG used the same method to determine on-road transportation emissions per capita in 2035. The per capita metrics for 2016 and 2035 are then compared to determine if the proposed Amendment would achieve the at least 30 percent reduction identified in Resolution No. 2021-17.

The GHG emissions used in this analysis were calculated using CARB's EMFAC2017 model.

IMPACT ANALYSIS

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment does remove the regional road usage charge. As discussed in Section 4.5 of this SEIR, this modification would result in a slightly increased VMT over what was identified in the approved Plan PEIR. In addition, in the interim between the preparation of the SEIR and this modification, the SAFE Vehicles Rule

Part One was repealed. As a result, GHG emissions related to on-road vehicle gasoline and diesel during operations would change.

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Per capita emissions from the entire on-road transportation sector were 3.71 metric tons of carbon dioxide equivalent ($MTCO_2$) per person per day in 2016. Under implementation of the proposed Amendment, GHG emissions from the on-road transportation sector would be reduced to 2.10 $MTCO_2$ per person per day in 2035, a 43 percent reduction from 2016 levels.

Table 4.3-9
Calculation to Estimate Per Capita GHG Emissions from the Entire On-Road Transportation Sector, 2035 Compared to 2016

Components Used in the Calculation	2016	2035 Proposed Amendment	Change from 2035 Approved Plan PEIR[1]
Total Emissions from the Entire On-Road Transportation Sector ($MMTCO_2$)	12.2	7.6	0.1
Total Population in the San Diego Region (Residents)	3,287,280	3,620,348	0
Per Capita Emissions ($MTCO_2$ /Capita)	3.71	2.10	0.03
Percent Reduction Under the Proposed Amendment, 2035 Compared to 2016	**-43%**		**1%**

Source of Total Emissions from the Entire On-Road Transportation Sector: Appendix H of the approved Plan PEIR and Appendix C of this SEIR.
[1] As the SAFE Vehicles Rule Part One has been repealed, the proposed Amendment emissions are compared to the approved Plan emissions that exclude the EMFAC2017 SAFE Rule correction factors. The approved Plan emissions reflect the modeling corrections described in Chapter 2 of this SEIR.

2035 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact GHG-3 in the year 2035 would be less than significant. As shown in Table 4.3-9, the GHG emissions reductions under the proposed Amendment would exceed the SANDAG Board Resolution target of a 30 percent reduction by 2035 by 13 percent. Therefore, implementation of the proposed Amendment would not conflict with or impede achievement of an at least 30 percent reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016). The conclusion for the proposed Amendment in the year 2035 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change effects in the San Diego region that could increase GHG emissions, as described in Section 4.3.1, *Existing Conditions,* the approved Plan as amended by the proposed Amendment would reduce GHG emissions within the San Diego region when compared to the 2016 baseline. Therefore, the proposed Amendment would not exacerbate any GHG emissions that occur due to climate change effects.

GHG-4 CONFLICT WITH OR IMPEDE THE IMPLEMENTATION OF LOCAL PLANS ADOPTED FOR THE PURPOSE OF REDUCING GHG EMISSIONS

ANALYSIS METHODOLOGY

Section 4.3.2, *Regulatory Setting*, describes adopted CAPs, GHG reduction plans, and/or sustainability plans relevant to the proposed Amendment. Most of SANDAG's member jurisdictions have adopted CAPs, GHG reduction plans, and/or sustainability plans that set goals and targets for the reduction of GHG emissions, and outline policies and/or measures to achieve those goals and targets. Generally, these local targets are developed in consideration of the State's long-term GHG reduction goals by legislatively significant benchmark years (e.g., 2030).

The proposed Amendment is generally evaluated against the goals, measures, and implementing actions of local CAPs and GHG reduction plans to determine any conflicts in this analysis. A detailed CAP consistency analysis by jurisdiction was provided in Appendix J of the approved Plan PEIR. The analysis of the proposed Amendment and local CAPs is provided for 2025, 2035, and 2050. Although no adopted local CAPs or GHG reduction plans have 2050 horizon years, the analysis addresses potential conflicts between the proposed Amendment and such adopted plans in 2050 because the effects of these plans would extend beyond their horizon years, including through 2050.

IMPACT ANALYSIS

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment does remove the regional road usage charge. As discussed in Section 4.5 of this SEIR, this modification would result in a slightly increased VMT over what was identified in the approved Plan PEIR. In addition, in the interim between the preparation of the SEIR and this modification, the SAFE Vehicles Rule Part One was repealed. As a result, GHG emissions related to on-road vehicle gasoline and diesel during operations would change.

2025, 2035, and 2050

As of March 2023, 19 of the 21 local jurisdictions in the San Diego region have an adopted CAP or similar plan to reduce GHG emissions. The County does not have an adopted CAP or plan to reduce GHG emissions but is in the process of preparing one. One city does not have an adopted plan and is not in the process of preparing one.

An analysis of whether the approved Plan would conflict with the policies, measures, and actions of adopted plans was provided in Appendix J of the approved Plan PEIR. The removal of the regional road usage charge would slightly increase the regional VMT; however, the proposed Amendment would not impede implementation of local plans to reduce GHG emissions. Typically, CAPs include various measures and actions to reduce GHG emissions by sector including, but not limited to, transportation, energy, solid waste, water and wastewater, and carbon sequestration. Common measures to reduce emissions from the transportation sector include the promotion of near-zero and zero-emission vehicles and associated infrastructure, the deployment of Transportation Demand Management (TDM) strategies such as iCommute and commuter benefits programs, and the development of Complete Streets that include pedestrian and bicycle programs, among others. A major objective of the proposed Amendment is to reduce GHG emissions from passenger cars and light-duty trucks. Therefore, many transportation network improvements and programs that would be implemented under the

approved Plan, and remain unchanged with the proposed Amendment, would complement these existing and future local efforts to reduce GHG emissions from the on-road transportation sector.

Other examples of local CAP measures that reduce GHG emissions include renovations to existing buildings to be more energy efficient, deployment of solar photovoltaic (PV) systems to existing and new residential and nonresidential buildings, additional waste diversion goals exceeding statewide requirements, capture and control of landfill emissions, improved water efficiency in existing and new residential and nonresidential development, and tree planting to increase carbon sequestration. The approved Plan PEIR determined that these implementing actions would be outside of the scope of the proposed Amendment and SANDAG's direct authority, and, therefore, their implementation would not be impeded or obstructed by implementation of the regional growth and land use changes and transportation network improvements and programs and would be unchanged with the proposed Amendment.

2025, 2035, and 2050 Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact GHG-4 in the years 2025, 2035, and 2050 is less than significant. As discussed above, implementation of the proposed Amendment would not conflict with or impede the implementation of adopted CAPs, GHG reduction plans, and/or sustainability plans. The conclusion for the proposed Amendment in the years 2025, 2035, and 2050 would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change effects in the San Diego region that could increase GHG emissions, the proposed Amendment would reduce GHG emissions within the San Diego region when compared to the 2016 baseline. Therefore, the proposed Amendment would not exacerbate any GHG emissions that occur due to climate change effects.

GHG-5 BE INCONSISTENT WITH THE STATE'S ABILITY TO ACHIEVE THE 2030 REDUCTION TARGET OF SB 32, THE ACCELERATED 2030 REDUCTION TARGET OF THE 2022 SCOPING PLAN, AND LONG-TERM REDUCTION GOALS OF EXECUTIVE ORDERS S-3-05, B-55-18, AND AB 1279

ANALYSIS METHODOLOGY

This analysis evaluates whether the proposed Amendment would be inconsistent with the State's ability to achieve the SB 32 target of reducing statewide GHG emissions to 40 percent below the 1990 levels by 2030 and the accelerated target of 48 percent below the 1990 levels by 2030 under the 2022 Scoping Plan Scenario, as well as whether the proposed Amendment is inconsistent with the State's ability to achieve the EO B-55-18 and AB 1279 goal of reducing California's GHG emissions to 85 percent below 1990 levels by 2045 or the EO S-3-05 goal of reducing California's GHG emissions to 80 percent below 1990 levels by 2050.

To perform this analysis, SANDAG identified estimated emissions reduction reference points for the region for 2030, 2045, and 2050, based on the target dates from SB 32, EO S-3-05 and EO B-55-18, and AB 1279. The GHG emissions results for 2030, 2045, and 2050 from the 2016 GHG inventory and projections prepared for Appendix C are then compared to the reference points. Note that there is no requirement that the SANDAG region's emissions be reduced by the same percentage ("equal share") as the statewide percentage in order for the State to achieve the goals of SB 32, EO S-3-05, EO-B-55-18, and AB 1279. For purposes of this SEIR, the

proposed Amendment's impacts nevertheless are considered significant if total emissions in the San Diego region exceed the estimated 2030, 2045, and 2050 GHG reduction reference points.

Because there is not an available 1990 emissions inventory for the San Diego region that is comparable to the regional inventory and projections prepared for the proposed Amendment, reference points were developed for this analysis to show the level of GHG reductions needed between 2016 (the baseline year of the inventory and proposed Amendment) and future years of 2030, 2045, and 2050 that would be equivalent to the level of reductions needed when measured against 1990.[3]

As discussed in the approved Plan PEIR, in 2016, total statewide emissions equaled 429 $MMTCO_2e$, which was 2 $MMTCO_2e$ (less than 1 percent) lower than the statewide 1990 emissions level of 431 $MMTCO_2e$. Because total statewide emissions in 2016 were essentially equal to the statewide 1990 level, for purposes of this analysis, total regional emissions in 2016 are assumed to be representative of total regional emissions in 1990. Therefore, to identify the reference point for 2030 a 40 percent reduction was applied to the total regional emissions in 2016, which results in a 2030 reference point of 15.6 $MMTCO_2e$. To identify the reference point for the 2022 Scoping Plan accelerated target a 48 percent reduction was applied to the total regional emissions in 2016, which results in a 2030 reference point of 13.4 $MMTCO_2e$. Similarly, to identify a reference point for 2050, an 80 percent reduction was applied to the total regional emissions in 2016, which results in a 2050 reference point of 5.2 $MMTCO_2e$. The reference point for 2045 is 3.9 $MMTCO_2e$ because AB 1279 sets a goal of reducing statewide anthropogenic GHG emissions by 85 percent below 1990 levels.

IMPACT ANALYSIS

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment does remove the regional road usage charge. As discussed in Section 4.5 of this SEIR, this modification would result in a slightly increased VMT over what was identified in the approved Plan PEIR. In addition, in the interim between the preparation of the SEIR and this modification, the SAFE Vehicles Rule Part One was repealed. As a result, GHG emissions related to on-road vehicle gasoline and diesel during operations would change.

2030

Total regional emissions in 2016 were estimated to be approximately 25.8 $MMTCO_2e$. Under implementation of the proposed Amendment, total GHG emissions for the San Diego region would be 20.4 $MMTCO_2e$ in 2030, which is above the SB 32 reference point of 15.6 $MMTCO_2e$ (Table 4.3-10) and the 2022 Scoping Plan reference point of 13.4 $MMTCO_2e$. Therefore, total regional emissions in 2030 under implementation of regional growth and land use change and transportation network improvements and programs would be inconsistent with the levels of reductions required by SB 32 and the 2022 Scoping Plan.

Because the total emissions in the San Diego region of 20.4 $MMTCO_2e$ in 2030 would exceed the regional 2030 SB 32 GHG reference point of 15.6 $MMTCO_2e$ (which is based on SB 32 targets for 2030) and the 2022 Scoping Plan reference point of 13.4 $MMTCO_2e$, the proposed Amendment's 2030 GHG emissions would be inconsistent

[3] The 2012 inventory report prepared for the 2015 Regional Plan included an estimated 1990 emissions level for the San Diego region, but it was prepared using data sources and methods that do not allow for a direct comparison with the GHG emissions projections provided in the 2016 GHG Inventory and Projections report prepared for the approved Plan.

with the State's ability to achieve the goals of SB 32 and the 2022 Scoping Plan. Therefore, this impact (GHG-5) in the year 2030 would be significant.

Table 4.3-10
Reference Point and GHG Emissions Under the Proposed Amendment, 2030

	Proposed Amendment Annual Emissions ($MMTCO_2e$)	Change from Approved Plan PEIR[2]
GHG Emissions in the San Diego Region in 2016	25.8	0.0
GHG Emissions in the San Diego Region in 2030[1]	20.4	0.1
2030 SB 32 Reference Point (40% Below 2016 Levels)	15.6	0.0
Accelerated 2030 Scoping Plan Reference Point (48% Below 2016 Levels)	13.4	N/A

Source: Appendix C of this SEIR.
[1] Emissions are estimated using global warming potential values from the Intergovernmental Panel on Climate Change's Fourth Assessment Report.
[2] As the SAFE Vehicles Rule Part One has been repealed, the proposed Amendment emissions are compared to the approved Plan emissions that exclude the EMFAC2017 SAFE Rule correction factors. The approved Plan emissions reflect the modeling corrections described in Chapter 2 of this SEIR.

2030 Conclusion

New Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact GHG-5 in the year 2030 would be significant and unavoidable. As shown in Table 4.3-10, the projected emissions in the San Diego region in 2030 would not meet the 2030 SB 32 reference point of 15.6 $MMTCO_2e$ or the 2022 Scoping Plan reference point of 13.4 $MMTCO_2e$ following implementation of the proposed Amendment. Therefore, this impact (GHG-5) is considered significant in the year 2030 because the proposed Amendment would not meet the 2022 Scoping Plan reference point of 13.4 $MMTCO_2e$. The 2022 Scoping Plan reference point was published after the approved Plan PEIR was adopted (November 2022); thus, this impact was not identified in the approved Plan PEIR. Therefore, this is a new significant impact.

2045 and 2050

Total regional emissions in 2016 were estimated to be 25.8 $MMTCO_2e$ in the approved Plan PEIR. Under implementation of the proposed Amendment, total GHG emissions for the San Diego region would be 17.6 $MMTCO_2e$ in 2045 and 17.8 $MMTCO_2e$ in 2050, which is above the 2045 reference point of 3.9 $MMTCO_2e$ and 2050 reference point of 5.2 $MMTCO_2e$ (Table 4.3-11). Therefore, total regional emissions in 2045 and 2050 under implementation of regional growth and land use change and transportation network improvements and programs would be inconsistent with the levels of reductions required by EO S-3-05, EO B-55-18, and AB 1279.

Table 4.3-11
Reference Points and GHG Emissions Under the Proposed Amendment, 2045 and 2050

	Proposed Amendment Annual Emissions ($MMTCO_2e$)	Change from Approved Plan PEIR[1]
GHG Emissions in the San Diego Region in 2016	25.8	0
GHG Emissions in the San Diego Region in 2045 with the Proposed Amendment[2]	17.6	0.1
2045 Reference Point (85% Below 1990 Levels per AB 1279)	3.9	3.9[2]
GHG Emissions in the San Diego Region in 2050 with the Proposed Amendment[3]	17.8	0.1
2050 Reference Point (80% Below 2016 Levels per EO S-3-05)	5.2	0

Source of GHG Emissions in the San Diego Region: Appendix C of this SEIR.
[1] As the SAFE Vehicles Rule Part One has been repealed, the proposed Amendment emissions are compared to the approved Plan emissions that exclude the EMFAC2017 SAFE Rule correction factors. The approved Plan emissions reflect the modeling corrections described in Chapter 2 of this SEIR.
[2] Emissions are estimated using global warming potential values from the Intergovernmental Panel on Climate Change's Fourth Assessment Report.
[3] AB 1279 and the 2022 Scoping Plan have established targets of reducing anthropogenic GHG emissions by 85 percent below 1990 levels by 2045, as well as to achieve carbon neutrality by 2045. The State proposes to achieve the carbon neutrality target through the use of carbon capture and sequestration.

As addressed under Impact GHG-2, the proposed Amendment would reduce per capita CO_2 emissions from passenger cars and light-duty trucks to meet the per capita target for 2035 established by SB 375. These reductions are achieved through a combination of land use planning and transportation network improvements and programs that reduce VMT and improve the efficiency of vehicle travel. In addition, the proposed Amendment would reduce per capita GHG emissions from the entire on-road transportation sector by 43 percent in 2035 relative to 2016 levels, as detailed under Impact GHG-3. The reductions from the entire on-road transportation sector account for the land use and transportation components of the proposed Amendment as well as the federal and State regulations improving vehicle efficiency and increasing use of zero-emission vehicles.

Despite these transportation-related reductions under proposed Amendment implementation, total regional GHG emissions would exceed the reference points for 2045 and 2050. Additional reductions would be needed in the transportation sector and all other GHG sectors to achieve the goals of EO B-55-18, EO S-3-05, and AB 1279. The other sectors include how energy is sourced, generated, and used; how solid waste is generated, managed, and disposed of; treatment, conveyance, and uses of water supply and wastewater; energy sources and feedstocks for industrial processes and activities; management of natural and working lands; and uses of high-global warming potential gases. Achieving GHG reductions from these sectors at the scale required to meet the goals of EO B-55-18, EO S-3-05, and AB 1279 would require major changes to government regulation, private sector activity, consumer behavior, and other facets of life throughout California and beyond.

2045 and 2050 Conclusion

New Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified that Impact GHG-5 in the years 2045 and 2050 would be significant. As shown in Table 4.3-11, the total regional GHG emissions in 2045 and 2050 would exceed the 2045 and 2050 reference points of 3.9 and 5.2 $MMTCO_2e$,

respectively (based on the goals of EO B-55-18, EO S-3-05, and AB 1279). Therefore, this impact (GHG-5) is considered significant in the year 2045 because the proposed Amendment would not meet the reduction goal of AB 1279 or the 2022 Scoping Plan. AB 1279 and the 2022 Scoping Plan were published after the approved Plan PEIR was adopted (September and November 2022, respectively); thus, this impact was not identified in the approved Plan PEIR. Therefore, this is a new significant impact.

Exacerbation of Climate Change Effects

Although there will be climate change effects in the San Diego region that could increase GHG emissions, as described in Section 4.3.1, the proposed Amendment would reduce GHG emissions within the San Diego region when compared to the 2016 baseline. Therefore, the proposed Amendment would not exacerbate any GHG emissions that occur due to climate change effects.

MITIGATION MEASURES

GHG-5 BE INCONSISTENT WITH THE STATE'S ABILITY TO ACHIEVE THE 2030 REDUCTION TARGET OF SB 32, THE ACCELERATED 2030 REDUCTION TARGET OF THE 2022 SCOPING PLAN, AND LONG-TERM REDUCTION GOALS OF EXECUTIVE ORDERS S-3-05, B-55-18, and AB 1279

The following mitigation measures identified in the approved Plan PEIR would still be applicable to the proposed Amendment and would help reduce regional GHG emissions by reducing VMT, increasing use of zero-emission fuels, sequestration of carbon from the atmosphere, and other measures; they would reduce inconsistency of the proposed Amendment's GHG emissions with the State's ability to achieve the SB 32, EO B-55-18, EO S-3-05, and AB 1279 GHG reduction goals. However, full implementation of the changes required to achieve these goals is beyond SANDAG's and local agencies' current jurisdiction and authority.

Program-Level Mitigation

- **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans**
- **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure**
- **GHG-5c. Implement Nature-Based Climate Solutions to Remove Carbon Dioxide from the Atmosphere**
- **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide**

Project-Level Mitigation

- **GHG-5e. Implement Measures to Reduce GHG Emissions from Transportation Projects**
- **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects**

The following additional mitigation measure is proposed to help reduce regional GHG emissions:

- **GHG-5g. Prepare/Develop a Regional Climate Action Plan.** SANDAG shall prepare a regional Priority Climate Action Plan by April 2024, and a Comprehensive Climate Action Plan by October 2025, that include measures to reduce GHG emissions and help achieve the 2045 targets established by AB 1279 and CARB's Final 2022 Scoping Plan Update.

As discussed in further detail in Sections 4.3, *Air Quality,* 4.16, *Transportation*, and Section 4.18, *Water Quality*, of the approved Plan PEIR, mitigation measures **AQ-3b**, **AQ-3c**, **AQ-4**, **TRA-2**, **WS-1a**, and **WS-1b** would also reduce emissions of GHGs by decreasing overall pollutant emissions from equipment, vehicles, and water consumption and would remain applicable to the proposed Amendment. Section 4.5, *Transportation*, of this SEIR, includes minor updates to mitigation measure **TRA-2.**

- **AQ-3b. Reduce Diesel Emissions During Construction from Off-Road Equipment**
- **AQ-3c. Reduce Diesel Emissions During Construction from On-Road Vehicles**
- **AQ-4. Reduce Exposure to Localized Particulate Emissions**
- **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**
- **WS-1a. Implement Water Conservation Measures for Transportation Network Improvements**
- **WS-1b. Implement Water Conservation Measures for Development Projects**

SIGNIFICANCE AFTER MITIGATION

Implementation of mitigation measures **GHG-5a through GHG-5g**, as well as mitigation measures **AQ-3b, AQ-3c, AQ-4, TRA-2, WS-1a,** and **WS-1b**, would substantially lessen the amount of proposed Amendment GHG emissions in 2030, 2045, and 2050. However, even full implementation of all identified mitigation measures would not be sufficient to reduce the proposed Amendment's GHG emissions to below the regional 2030, 2045, and 2050 reference points based on SB 32, EO B-55-18, EO S-3-05, and AB 1279. AB 1279 and the 2022 Scoping Plan were published after the approved Plan PEIR was adopted (September and December 2022, respectively); thus, the inability of the Plan to meet the updated 2030 and 2045 goals was not identified in the approved Plan PEIR. Therefore, this impact (GHG-5) remains significant and unavoidable.

4.4 NOISE AND VIBRATION

This section evaluates the noise and vibration impacts of the proposed Amendment and discusses any changes to the existing conditions and regulatory setting since the preparation of the approved Plan PEIR.

4.4.1 EXISTING CONDITIONS

The existing conditions included in Section 4.13, *Noise and Vibration*, of the approved Plan PEIR are consistent with this evaluation and have not materially changed since the preparation of the approved Plan PEIR.

4.4.2 REGULATORY SETTING

The regulatory setting in Section 4.13, *Noise and Vibration*, of the approved Plan PEIR included relevant federal, State, regional, and local regulations. The regulatory setting included in Section 4.13 of the approved Plan PEIR is consistent with this evaluation and has not materially changed since the preparation of the approved Plan PEIR.

4.4.3 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines provides criteria for evaluating the significance of a project's environmental impacts on noise, in the form of Initial Study checklist questions. This SEIR uses the same significance criteria specifically developed for the approved Plan PEIR that were based on the Appendix G checklist questions provided from the updates to the CEQA Guidelines (OPR 2018), with modifications. For the purposes of this SEIR, the proposed Amendment would have a significant noise impact if it would result in:

NOI-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or generate a substantial absolute increase in ambient noise.

NOI-2 Generation of excessive groundborne vibration or groundborne noise levels.

The approved Plan PEIR included one additional significance threshold for noise and vibration (NOI-3). However, as discussed in Chapter 1, *Introduction*, of this SEIR, it was determined that project modifications associated with the proposed Amendment would not alter the impact conclusion described in the approved Plan PEIR for NOI-3. Therefore, only NOI-1 and NOI-2 are discussed in the impact analysis that follows.

NOI-3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would expose people residing or working in the project area to excessive noise levels.

4.4.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

NOI-1 GENERATION OF A SUBSTANTIAL TEMPORARY OR PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE VICINITY OF THE PROJECT IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES; OR GENERATE A SUBSTANTIAL ABSOLUTE INCREASE IN AMBIENT NOISE

ANALYSIS METHODOLOGY

This section discusses the construction and operation noise impacts of forecasted regional growth and land use change, and planned transportation network improvements outlined in the approved Plan in comparison to the approved Plan as amended by the proposed Amendment. Impacts discussed in this section are based on applicable noise standards and guidelines from city and county general plans (i.e., noise elements) and noise ordinances, or federal or State agencies (e.g., the Federal Transit Administration and Caltrans) which are included in Section 4.13 of the approved Plan PEIR. Noise impacts (NOI-1) would be considered significant if changes associated with the proposed Amendment would result in a substantial increase in ambient noise levels above what was identified in the approved Plan PEIR and exceed the applicable established noise standards required based on the type of project (e.g., local development, transit, highway projects).

Consistent with the analysis in the approved Plan PEIR, local construction and operational noise standards, determined at the project level, may apply to regional growth and land use change, as well as local transportation network improvements. As outlined under *Regional and Local Laws, Regulations, Plans, and Policies* in Section 4.13 of the approved Plan PEIR, these local standards are typically supplied by the local noise element (noise/land use compatibility) for transportation noise, and the noise ordinance (municipal code) for non-transportation noise sources including construction. Specific types of projects such as federal oversight (e.g., Caltrans/Federal Highway Administration, Federal Transit Administration/Federal Railroad Administration) or projects that occur within certain jurisdictions may require adherence to multiple jurisdictional requirements, including federal, State, and/or local.

The approved Plan PEIR did not provide detailed quantitative analysis of potential impacts given the high-level (programmatic) nature of the approved Plan and the lack of specific project details. Consistent with the analysis in the approved Plan PEIR, the analysis of this proposed Amendment is qualitative.

IMPACT ANALYSIS

2025, 2035, and 2050

The proposed Amendment would not change land use or anticipated growth within the region from what was analyzed in the approved Plan PEIR, and no new noise-sensitive receptors would be anticipated. Additionally, no new transportation network or facility improvements are included in the proposed Amendment, and there would be no associated impact on construction and operational noise. Mitigation measure **NOI-1a** (**Implement Construction Noise Reduction Measures for Development Projects and Transportation Network Improvements**) would continue to be applicable to the approved Plan as amended by the proposed Amendment. Because no new construction is anticipated, construction impacts of land use, anticipated growth, and transportation network improvements as they relate to noise would remain unchanged from the approved Plan PEIR.

The proposed Amendment would remove the regional road usage charge as discussed in Section 4.5, *Transportation,* of this SEIR. Table 4.4-1 shows the relative increase in vehicle miles traveled (VMT) and the resulting increase in noise levels associated with the change.

Table 4.4-1
VMT and Noise Increase Associated with the Approved Plan vs the Proposed Amendment

Horizon Year[1]	Approved Plan (VMT)	Proposed Amendment (VMT)	Difference in VMT Between Approved Plan and Proposed Amendment	Predicted Increase in Noise Level Associated with VMT Increase (decibels)
2035	85,412,968	87,131,224	1,718,256	>0.1
2050	88,133,934	89,846,864	1,712,930	>0.1

[1] The regional road usage charge would not take effect until after the 2025 horizon year. Therefore, there would be no anticipated change associated with the regional road usage charge between the approved Plan and the proposed Amendment during the 2025 horizon year.

A doubling of the noise source, (i.e., twice as much traffic) would result in a 3 decibel (dB) increase (Harris 1979). The change associated with the removal of the regional road usage charge would result in an increase in operational VMT of approximately 2 percent, which would result in a predicted increase in operational noise of less than 0.1 dB. Therefore, the removal of the regional road usage charge would not result in impacts associated with the proposed Amendment that would be substantially more than the impacts identified in the approved Plan PEIR. Mitigation measures **NOI-1b** (**Implement Operational Noise Reduction Measures for Transportation Network Improvements**) and **NOI-1c** (**Implement Operational Noise Reduction Measures for Development Projects**) would still apply to the proposed Amendment due to the slight increase in operational noise from an increase in traffic volume.

Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a significant and unavoidable impact related to exceeding noise standards (NOI-1) because even with the incorporation of mitigation measures **NOI-1a** (**Implement Construction Noise Reduction Measures for Development Projects and Transportation Network Improvements**), **NOI-1b** (**Implement Operational Noise Reduction Measures for Transportation Network Improvements**), and **NOI-1c** (**Implement Operational Noise Reduction Measures for Development Projects**), it could not be guaranteed that all future project-level impacts would be mitigated to a less-than-significant level. As discussed above, no new significant environmental effects or a substantial increase in the severity of previously identified significant effects would result due to the proposed Amendment. Mitigation measures **NOI-1a, NOI-1b,** and **NOI-1c** identified in the approved Plan PEIR would remain applicable to the proposed Amendment. Therefore, the conclusion for the proposed Amendment during all horizon years (2025, 2035, 2050) would be unchanged from what was identified in the approved Plan PEIR, and would remain significant and unavoidable.

Exacerbation of Climate Change Effects

Consistent with the analysis and findings of the approved Plan PEIR, the proposed Amendment would not exacerbate climate change effects on generation of a substantial temporary or permanent increase in ambient noise levels.

NOI-2 GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS

ANALYSIS METHODOLOGY

This section discusses the construction and operational vibration impacts of forecasted regional growth and land use change, and planned transportation network improvements outlined in the approved Plan PEIR in comparison to the approved Plan as amended by the proposed Amendment. Impacts discussed in this section are based on applicable standards and guidelines.

The approved Plan PEIR did not provide detailed quantitative analyses of potential impacts given the high-level (programmatic) nature of the approved Plan and the lack of specific project details. Consistent with the analysis in the approved Plan PEIR, the analysis of this proposed Amendment is qualitative.

IMPACT ANALYSIS

2025, 2035, and 2050

The proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. Mitigation measures **NOI-2a** (**Implement Construction Groundborne Vibration and Noise Reduction Measures**) and **NOI-2b** (**Implement Groundborne Vibration and Noise-Reducing Measures for Rail Operations**) would continue to be applicable to the proposed Amendment. Because no new construction or changes to rail operations are anticipated, construction and rail operations impacts of land use, anticipated growth, and transportation network improvements as they relate to groundborne vibration and groundborne noise would remain unchanged from the approved Plan PEIR.

The proposed Amendment would remove the regional road usage charge, which would result in a minor increase in traffic volume. However, as previously discussed in Section 4.13 of the approved Plan PEIR, vehicles accessing the highway or local road system would not produce significant vibration at distances of more than 25 feet. Therefore, the removal of the regional road usage charge would not result in new or substantially more severe significant vibration impacts at nearby receptors.

Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a significant and unavoidable impact related to exceeding groundborne vibration criteria (NOI-2) because even with the incorporation of mitigation measures **NOI-2a** (**Implement Construction Groundborne Vibration and Noise Reduction Measures**) and **NOI-2b** (**Implement Groundborne Vibration and Noise-Reducing Measures for Rail Operations**), it could not be guaranteed that all future project-level impacts would be mitigated to a less-than-significant level. As discussed above, no new significant environmental effects or a substantial increase in the severity of previously identified

significant effects would result due to the proposed Amendment. Mitigation measures **NOI-2a** and **NOI-2b** would continue to be applicable to the proposed Amendment. Therefore, the conclusion for the proposed Amendment during all horizon years (2025, 2035, 2050) would be unchanged from what was identified in the approved Plan PEIR and would remain significant and unavoidable.

Exacerbation of Climate Change Effects

Consistent with the analysis and findings of the approved Plan PEIR, the proposed Amendment would not exacerbate climate change effects on generation of excessive groundborne vibration or noise levels.

4.5 TRANSPORTATION

This section evaluates the transportation impacts of the proposed Amendment.

4.5.1 EXISTING CONDITIONS

The existing conditions included in Section 4.16, *Transportation*, of the approved Plan PEIR are consistent with this evaluation and have not materially changed since the preparation of the approved Plan PEIR.

4.5.2 REGULATORY SETTING

The regulatory setting in Section 4.16.2 of the approved Plan PEIR included relevant federal, State, regional, and local regulations. The regulatory setting included in Section 4.16 of the approved Plan PEIR is consistent with the evaluation included herein and has not materially changed since the preparation of the approved Plan PEIR, with the exception of the adoption of the 2021 Regional Plan.

2021 REGIONAL PLAN

The 2021 Regional Plan is a 30-year plan that serves as both the long-range RTP and SCS for the San Diego region. The 2021 Regional Plan must comply with specific State and federal mandates, including an SCS, per SB 375 (Sustainable Communities and Climate Protection Act of 2008), that achieves greenhouse gas (GHG) emission reduction goals set by the California Air Resources Board (CARB); compliance with federal civil rights requirements (Title VI); and environmental justice considerations, air quality conformity, and a public participation process. The SANDAG Board of Directors adopted the Final 2021 Regional Plan on December 10, 2021. The following key policies that address the circulation system are included in the approved Plan:

- **Land Use and Regional Growth.** The 2021 Regional Plan vision for land use focuses on development and growth in Mobility Hub areas to preserve the region's open space and support transportation investments by reducing vehicle miles traveled (VMT). SANDAG will consider how land use programs, projects, and policies it supports address social equity in relation to regional access to affordable housing, proximity to jobs and transit, opportunities for residents to live where they work and play, convenient access to multi-modal transportation options, and other opportunities for work, commerce, and recreation.

  Land use is the foundation in determining what is built where and how transportation systems connect work, home, and recreation. Ensuring equitable development starts with considering equity in land use decisions and patterns. By coordinating equity, land use, and transportation, we can better understand where historically marginalized communities are located and how to better connect them with opportunities throughout the region, and enable residents to accomplish daily needs without traveling long distances, thereby contributing toward pollution exposure reduction. Because land use authority is reserved to local jurisdictions, SANDAG will leverage partnerships with cities and the county through the Smart Growth Incentive Program and other grants to provide funds for transportation-related improvements and planning efforts that support smart growth in Mobility Hubs to realize this vision.

- **Parking and Curb Management.** Proactively managing parking and curb space enables more people to access places within our communities using alternatives to driving. Effective parking-management policies contribute to the region's ability to meet the SB 375 GHG emissions–reduction target by applying parking pricing and reduced parking supply assumptions, which are included in the travel demand model (see Appendix D of the approved Plan, Sustainable Communities Strategy Documentation and Related Information). In addition, the 2021 Regional Plan addresses curb management by proposing strategies to

help balance competing and changing travel needs at the curb while remaining flexible to resident, employee, business, and visitor needs. While the authority to implement parking and curb policies remains with local jurisdictions, SANDAG plays a unique role of informing these policies by sharing resources and best practices and serving as the regional Mobility Data Clearinghouse.

- **Transportation Demand Management.** Transportation Demand Management (TDM) innovations have the potential to transform the way people travel within and between communities. Managing demands on the existing transportation system is a vital strategy for making the overall system more effective in reducing drive-alone commute trips. SANDAG will continue to administer and monitor the iCommute program by providing regional rideshare, employer outreach, and bike education and secure parking services to help reduce commute-related traffic congestion and VMT. Beyond commute trips, TDM programs are expanded to include grants and incentives that make it easier and safer to use active modes for short trips.

  SANDAG recognizes that all residents throughout the region deserve convenient, safe, and affordable commute options and will ensure equitable distribution of funding and incentive program assistance. Additionally, SANDAG commuter programs will design options for low-income or unbanked residents while ensuring marketing, outreach, and education efforts reach underrepresented populations in the region.

  Greater participation in TDM programs has great potential for pollution exposure reduction by reducing the number of single-occupant vehicle trips.

- **Vision Zero.** Traffic-related fatalities and serious injuries are a critical and preventable public health and equity issue in the region. Vision Zero is a national campaign to eliminate all traffic-related deaths and serious injuries by focusing on policies and the redesign of streets to create a transportation system that is safe for everyone. In adopting Vision Zero, SANDAG will work towards Zero by collecting and analyzing crash data to identify safety issues and recommend solutions, developing a regional safety policy, continuing to construct the regional bike network, working with local jurisdictions to conduct outreach for and build out their Complete Streets networks, and funding educational programs, including opportunities to collaborate with tribal nations.

  Statistics show that low-income communities and communities of color are disproportionately affected by traffic-related injuries and fatalities, which indicates that establishing an equitable and inclusive transportation system is a critical component of achieving Vision Zero. SANDAG will prioritize consideration of and outreach with marginalized communities to make transportation safe and convenient for every person in the region. Pollution exposure reduction can be achieved when people make greater use of facilities that may currently be perceived as—or actually be—dangerous.

- **Fix It First.** The 2021 Regional Plan envisions many improvements to the San Diego transportation system and network to set the region up for success as a world-class transportation system. To optimize investments in the region's transportation infrastructure, the 2021 Regional Plan and the 5 Big Moves focus on improving upon existing roads, rails, and sidewalks.

  The Fix It First strategy aims to repair existing roads and create a system for sustained maintenance in the future, creating a safe and efficient transportation network for all users. The Fix It First strategy can help reduce pollution exposure by maintaining infrastructure that facilitates use of efficient routes and does not neglect facilities that could force users to seek inefficient and longer routes. The Fix It First strategy can prioritize funding in disadvantaged communities and places that have not seen investment to maintain older facilities that are in various states of disrepair.

Special attention will be paid to the location of transportation maintenance investments relative to the location of social equity focus populations to ensure that they benefit from the transportation maintenance system. Along with maintenance project location, the frequency, treatment type, and quality will be monitored to ensure an equitable distribution of benefits.

- **Transportation System Management and Operations.** Transportation System Management and Operations (TSMO) employs a series of intelligent transportation system strategies designed to maximize the capacity and efficiency of the existing and future transportation system. TSMO includes the establishment of institutional and governance actions to help advance and facilitate cross-agency collaboration to ensure that existing and proposed transportation systems are not operated or managed as independent systems but as a multi-modal transportation system. These strategies will help SANDAG manage the complete corridor system in a coordinated way across jurisdictions and operators that include capital and technology investments.

  As SANDAG prepares for the design and deployment of TSMO, several steps can be undertaken to help address social equity considerations. Initial efforts are generally carried out during the technology planning process to ensure that the designs and identification of technological tools respond to the needs of the entire community (e.g., voice-activated multilingual applications, traveler information kiosks, and mobile apps).

  In addition, recognizing that communications infrastructure plays a pivotal role towards the implementation of Next OS, a near-term effort is the completion of a regional communications digital strategy in an effort to address the digital divide. The strategy will set forth a regional roadmap that will focus on identifying communications infrastructure improvements to bring affordable, reliable, and high-speed broadband internet access to underserved and rural populations.

  Better trip routing, traffic signal coordination, and overall system efficiency can reduce pollution exposure in disadvantaged communities and throughout the region. Incorporating modernized transportation technology in the region's established and new infrastructure will enable equitable benefits now and in the future.

- **Value Pricing.** The 2021 Regional Plan incorporates a variety of pricing strategies as tools to improve mobility by encouraging changes in travel behaviors while generating revenue to address our aging infrastructure and expand travel options. Specifically, the 2021 Regional Plan explores a network of managed lanes, a mileage-based road usage charge, a fee on the fares charged for rides provided by Transportation Network Companies, and further subsidization of transit fares. Pricing strategies such as these are in different phases of planning, design, pilot, and deployment in different regions and are also being explored at the State and federal level.

  SANDAG will rely on coordination with the other MPOs in California along with the State Department of Transportation to integrate the selection of technology, collection methods, and account management to ensure a consistent experience for travelers. Meanwhile, other elements of pricing strategies, such as the fee structure and distribution of revenue, should be specifically designed for the San Diego region's unique environment and priorities. Better managing the system can lead to pollution exposure reduction by reducing congestion and generating funds that can benefit other, cleaner travel options.

  For all different pricing mechanisms included in the 2021 Regional Plan, SANDAG will develop the fee structure and distribution of revenue strategy to ensure equitable outcomes. The Next OS can provide discounts to low-income, youth, and other vulnerable populations. Meanwhile, revenues can be prioritized to fund improved transportation options for low-income and historically underserved neighborhoods.

Additionally, shifting away from the regressive taxes and fees traditionally used to fund transportation can improve equity outcomes.

As described in Chapter 2, *Project Description*, the policies, programs and projects in the proposed Amendment are identical to those in the approved Plan, with the exception of the regional road usage charge being removed from the proposed Amendment.

4.5.3 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines provides criteria for determining the significance of a project's environmental impacts in the form of Initial Study checklist questions. Unless otherwise noted, the significance criteria specifically developed for the approved Plan PEIR and used in this SEIR are based on the CEQA Guidelines Appendix G checklist questions. Checklist questions for transportation are provided in Section XVII of CEQA Guidelines Appendix G. In some cases, SANDAG has combined checklist questions, edited their wording, or changed their location in the document to develop significance criteria that reflect the programmatic level of analysis in the approved Plan PEIR and this SEIR, and the unique characteristics of the proposed Amendment. Notably, Appendix G, Section XVII, question (d) regarding whether the approved Plan would result in inadequate emergency access is addressed under HAZ-4 in Section 4.9, *Hazards and Hazardous Materials,* of the approved Plan PEIR.

For purposes of this SEIR, implementation of the proposed Amendment would have a significant transportation impact if it would:

TRA-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

TRA-2 Conflict or be inconsistent with CEQA Guidelines Section 15064.3 by not achieving the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

The approved Plan PEIR included two additional significance thresholds for transportation (TRA-3 and TRA-4). However, as discussed in Chapter 1, *Introduction*, of this SEIR, it was determined that project modifications associated with the proposed Amendment would not alter the impact conclusions described in the approved Plan PEIR for these thresholds. Therefore, they are not analyzed in this SEIR.

TRA-3 Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.

TRA-4 Lead to a lack of parking supply that would cause significant secondary environmental impacts not already analyzed in other resource chapters of this EIR.

4.5.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

TRA-1 CONFLICT WITH A PROGRAM, PLAN, ORDINANCE, OR POLICY ADDRESSING THE CIRCULATION SYSTEM, INCLUDING TRANSIT, ROADWAY, BICYCLE, AND PEDESTRIAN FACILITIES

ANALYSIS METHODOLOGY

The emphasis of the analysis is on plan inconsistency and conflicts between the proposed Amendment's transportation network improvements and programs, and existing applicable regional programs, plans, ordinances, or policies addressing the circulation system; and on whether any inconsistencies would result in significant environmental effects compared to existing conditions. The proposed Amendment is considered consistent with the provisions of the identified regional plans if it meets the general intent of the applicable plans. Section 4.5.2, *Regulatory Setting*, above provides a brief overview of the relevant regional planning document (the 2021 Regional Plan) and its primary goals. However, the proposed Amendment consistency conclusions are based upon the planning documents as a whole.

Because the proposed Amendment identifies and proposes transportation network improvements at a regional level, plan consistency was reviewed against other regional plans and policies. Given the close relationship among forecasted regional growth, land use change, and planned transportation network improvements and programs on travel behavior, this section analyzes their combined effect, instead of undertaking separate analyses for regional growth and land use change and transportation network improvements and programs.

SB 375 requires RTPs to use "the most recent planning assumptions considering local general plans and other factors." Therefore, it can be assumed the proposed Amendment would generally be consistent with transportation programs, plans, ordinances, and policies of the individual jurisdictions in the region.

This analysis reviews the proposed Amendment against the 2021 Regional Plan, as described in detail in Section 4.5.2 above, to determine if there are any conflicts. As noted in Section 4.5.2, the policies, programs, and projects in the proposed Amendment are identical to the 2021 Regional Plan, with the exception that the regional road usage charge has been removed. Thus, the transportation-related infrastructure proposed in the proposed Amendment is identical to what is included in the 2021 Regional Plan. Therefore, it can be assumed that the proposed Amendment is consistent with all transportation infrastructure–related policies and improvements within the 2021 Regional Plan. Additionally, the consistency analysis with Riding to 2050 performed in Section 4.16.4, *Environmental Impacts and Mitigation Measures*, of the approved Plan PEIR also remains valid.

The removal of the regional road usage charge in the proposed Amendment will reduce the cost to operate a vehicle under future year conditions. This may incentivize some travelers to drive a personal vehicle instead of taking a different form of transportation, resulting in an increase in automobile traffic. Therefore, to determine if the proposed Amendment is consistent with the programs, plans, policies, and ordinances contained in the current regional planning documents, the relative indicators (demand, mode share, and trip length) for each mode of travel (transit, vehicular, pedestrian, and bicycle) were compared to Baseline Year 2016 conditions. This comparison was then used to identify whether, with removal of the regional road usage charge, the proposed Amendment would still be consistent with the policies outlined in the approved Plan's policies.

Please note that the information presented in Tables 4.5-1 through 4.5-3 has also been updated from the approved Plan PEIR to reflect model corrections to the SANDAG updated second generation Activity Based Model[1] (ABM2+).

IMPACT ANALYSIS

As noted in Chapter 2 of this SEIR the transportation network improvements and programs included in the proposed Amendment and the approved Plan are identical, with the only exception being the removal of the regional road usage charge in the proposed Amendment. Thus, this analysis only focuses on the change in transportation-related demand that would be associated with the removal of the regional road usage charge and identifying if the proposed Amendment will still be consistent with the policies contained in the approved Plan.

2025

Transportation Network Improvements and Programs

Table 4.5-1 outlines the transportation network demand, by mode, under proposed Amendment Year 2025 conditions. Additionally, for reference, the approved Plan Year 2025 conditions are provided in the table. Both the proposed Amendment and approved Plan conditions are compared to Baseline Year 2016 conditions to identify how the implementation of each plan would affect transportation demand throughout the San Diego region and identify the changes between the two plans.

[1] The SANDAG Series 14 Regional Growth Forecast is the long-range forecast of population, housing, and employment that was inputted into ABM2+ for the approved Plan. The SCS land use pattern is a subregional allocation of forecasted growth and development (population, housing, and jobs) based on the Series 14 Regional Growth Forecast. Data used to develop the SCS land use pattern are based on the most recent planning assumptions, considering local general plans and other factors, per SB 375 (Sustainable Communities and Climate Protection Act of 2008) (Government Code Section 65080[b][2][B]).

Table 4.5-1
Transportation Demand Analysis – Year 2025

Mode	Category	Baseline Year 2016	Year 2025 Proposed Amendment	Change Between Baseline and Proposed Amendment	Year 2025 Approved Plan	Change Between Baseline and Approved Plan
Transit	Average Daily Transit Trips	258,603	414,594	155,991	416,061	157,458
	Transit Mode Share[1]	1.7%	2.7%	1.0%	2.7%	1.0%
	Average Length of Transit Trip (miles)	9.01	9.51	0.50	9.57	0.56
	Population Within TPAs	764,847	1,457,584	692,737	1,456,876	692,029
	Employment Within TPAs	609,253	968,317	359,064	971,340	362,087
	Service Population Within TPAs	1,374,100	2,425,901	1,051,801	2,428,216	1,054,11
Vehicle	Average Daily Vehicular Trips	12,928,097	13,094,734	166,637	13,074,829	146,732
	HOV Trips	6,643,062	6,870,995	227,933	6,861,984	218,922
	Vehicular Mode Share[1]	87.2%	83.9%	-3.3%	83.9%	-3.3%
	Average Length of Vehicular Trip (miles)	6.90	6.74	-0.16	6.71	-0.19
	VMT per Capita (miles)	18.94	17.81	-1.13	17.66	-1.28
	VMT per Employee (miles)	18.91	17.11	-1.80	16.95	-1.96
	VMT per Service Population (miles)	17.02	16.38	-0.64	16.3	-0.72
Bicycle	Average Daily Bicycle Trips	113,370	169231	55,861	174,335	60,965
	Bicycle Mode Share[1]	0.8%	1.1%	0.3%	1.1%	0.3%
	Average Length of Bicycle Trip (miles)	2.86	3.38	0.52	3.39	0.53
Walking	Average Daily Walking Trips	1,174,224	1,493,256	319,032	1,494,939	320,715
	Walking Mode Share[1]	7.9%	9.6%	1.7%	9.6%	1.7%
	Average Length of Walking Trip (miles)	0.82	0.81	-0.01	0.81	-0.01

Source: ABM2+
[1]Mode share includes all trip types
HOV = high-occupancy vehicle; TPA = Transit Priority Area

As shown in Table 4.5-1, implementation of the proposed Amendment will increase transit ridership as well as the use of active transportation modes such as walking and biking, which is consistent with the effects of the approved Plan. The proposed Amendment will also decrease the vehicular mode share by 3.3 percentage points, which is also consistent with the effects of the approved Plan. The reduction in vehicular mode share will lead to a decrease in the VMT per service population of 0.64 mile, which is also similar to the approved Plan. Finally, the proposed Amendment will increase the total service population (residents and employees) located within a Transit Priority Area (TPA) by more than a million people, which is consistent with the approved Plan. As discussed below, these metrics show that the proposed Amendment is consistent with the circulation system policies outlined in the approved Plan (see Section 4.5.2) and, therefore, will not conflict with them:

- **Land Use and Regional Growth.** The proposed Amendment will increase transit ridership as well as the number of walking and biking trips within the region, showing that it will provide convenient access to multi-modal travel options, as prescribed by the policy. Additionally, the proposed Amendment will increase the total service population within TPAs, thus, increasing the proximity of jobs and residents to transit opportunities, as prescribed by the policy. Therefore, the proposed Amendment is consistent with portions of this policy that relate to the circulation system.
- **Parking and Curb Management.** The proposed Amendment includes the same policy language as well as the parking and curb management strategies that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Transportation Demand Management.** The proposed Amendment includes the same policy language and TDM strategies and programs that are included in the approved Plan. Additionally, as shown in Table 4.5-1 the proposed Amendment will reduce the vehicular mode share within the region by 3.3 percentage points, maintaining one of the intents of this policy by reducing the number of single-occupant vehicle trips within the region. Therefore, the proposed Amendment is consistent with this policy.
- **Vision Zero.** The proposed Amendment includes the same policy language and Vision Zero–based transportation network improvements, strategies, and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Fix It First.** The proposed Amendment includes the same policy language and Fix It First strategies and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Transportation System Management and Operations.** The proposed Amendment includes the same policy language and TSMO strategies and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Value Pricing.** The Value Pricing policy will be maintained in the proposed Amendment; however, the regional road usage charge is removed as one of the multiple pricing strategies identified within the policy. The proposed Amendment will maintain the managed lanes, fees charged to Transportation Network Companies, and transit subsidy programs included within the policy.

  The intent of the Value Pricing policy is to assist with the funding of the transportation network improvements and programs included in the plan and incentivize travelers to utilize non-vehicular modes of travel. As outlined in Attachment A of the proposed Amendment, the proposed Amendment will still have the ability to fund the transportation network improvements and programs without the inclusion of the regional road usage charge. Additionally, as shown in Table 4.5-1, the proposed Amendment will decrease the vehicular mode share by 3.3 percentage points, and increase the walking, biking, and transit mode shares. Therefore, the proposed Amendment will not conflict with the policy as it will be able to both

fund the proposed transportation network improvements and programs, and still incentivize travelers to utilize non-vehicular travel modes. Finally, the regional road usage charge was not to be implemented until Year 2035 conditions under the approved Plan; thus, its removal will not affect Year 2025 conditions.

2025 Conclusion

As noted in Chapter 2, *Project Description,* the transportation network improvements and programs included in the proposed Amendment and the approved Plan are identical, with the exception of the removal of the regional road usage charge in the proposed Amendment. Additionally, the policy language in both plans is also the same, with the exception of the Value Pricing policy. As outlined in Attachment A of the proposed Amendment, the proposed Amendment will still have the ability to fund the transportation network improvements and programs without the inclusion of the regional road usage charge. Additionally, as shown in Table 4.5-1, implementation of the proposed Amendment will decrease the vehicular mode share by 3.3 percentage points, and increase the walking, biking, and transit mode shares. Therefore, the proposed Amendment will not conflict with the Value Pricing policy as it will be able to both fund the proposed transportation network improvements and programs, and still incentivize travelers to utilize non-vehicular travel modes. Finally, the regional road usage charge was not envisioned to be implemented until Year 2035 conditions under the approved Plan; thus, its removal will not affect Year 2025 conditions. Therefore, implementation of the proposed Amendment, under Year 2025 conditions, would result in a less-than-significant impact.

2035

Transportation Network Improvements and Programs

Table 4.5-2 outlines the transportation network demand, by mode, under proposed Amendment Year 2035 conditions. Additionally, for reference, the approved Plan Year 2035 conditions are also provided in the table. Both the proposed Amendment and approved Plan conditions are compared to Baseline Year 2016 conditions to identify how the implementation of each plan will affect transportation demand throughout the San Diego region and identify the changes between the two plans.

Table 4.5-2
Transportation System Analysis – Year 2035

Mode	Category	Baseline Year 2016	Year 2035 Proposed Amendment	Change Between Baseline and Proposed Amendment	Year 2035 Approved Plan	Change Between Baseline and Approved Plan
Transit	Average Daily Transit Trips	258,603	779,115	520,512	805,642	547,039
	Transit Mode Share[1]	1.7%	4.8%	3.1%	5.0%	3.3%
	Average Length of Transit Trip (miles)	9.01	9.62	0.61	9.74	0.73
	Population Within TPAs	764,847	1,985,196	1,220,340	1,985,967	1,221,120
	Employment Within TPAs	609,253	1,325,044	715,791	1,323,929	714,676
	Service Population Within TPAs	1,374,100	3,310,240	1,936,140	3,309,896	1,935,796
Vehicle	Average Daily Vehicular Trips	12,928,097	13,031,544	103,447	12,874,363	-53,734
	HOV Trips	6,643,062	6,719,320	76,258	6,653,854	10,792
	Vehicular Mode Share[1]	87.2%	80.0%	-7.2%	79.5%	-7.7%
	Average Length of Vehicular Trip (miles)	6.90	6.76	-0.14	6.63	-0.27
	VMT per Capita (miles)	18.94	17.05	-1.89	16.58	-2.36
	VMT per Employee (miles)	18.91	15.73	-3.18	15.26	-3.65
	VMT per Service Population (miles)	17.02	15.85	-1.17	15.54	-1.48
Bicycle	Average Daily Bicycle Trips	113,370	209,069	95,699	215,216	101,846
	Bicycle Mode Share[1]	0.8%	1.3%	0.5%	1.3%	0.5%
	Average Length of Bicycle Trip (miles)	2.86	3.52	0.66	3.56	0.70
Walking	Average Daily Walking Trips	1,174,224	1,822,530	648,306	1,838,482	664,258
	Walking Mode Share[1]	7.9%	11.2%	3.3%	11.4%	3.5%
	Average Length of Walking Trip (miles)	0.82	0.78	-0.04	0.78	-0.04

Source: ABM2+
[1] Mode share includes all trip types
HOV = high-occupancy vehicle

As shown in Table 4.5-2, implementation of the proposed Amendment will increase transit ridership as well as the use of active transportation modes such as walking and biking, which is consistent with the effects of the approved Plan. The proposed Amendment will also decrease the vehicular mode share by 7.2 percentage points, which is also consistent with the effects of the approved Plan. The reduction in vehicular mode share will lead to a decrease in the VMT per service population of 1.17 miles, which is also similar to the approved Plan. Finally, the proposed Amendment will increase the total service population (residents and employees) located within a TPA by almost two million people, which is consistent with the approved Plan. As discussed below, these metrics show that the proposed Amendment is consistent with the circulation system policies outlined in the approved Plan (see Section 4.5.2) and, therefore, do not conflict with them:

- **Land Use and Regional Growth.** The proposed Amendment will increase transit ridership as well as the number of walking and biking trips within the region, showing that it will provide convenient access to multi-modal travel options, as prescribed by the policy. Additionally, the proposed Amendment will increase the total service population within TPAs, thus, increasing the proximity of jobs and residents to transit opportunities, as prescribed by the policy. Therefore, the proposed Amendment is consistent with portions of this policy that relate to the circulation system.
- **Parking and Curb Management**. The proposed Amendment includes the same policy language as well as the parking and curb management strategies that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Transportation Demand Management**. The proposed Amendment includes the same policy language and TDM strategies and programs that are included in the approved Plan. Additionally, as shown in Table 4.5-2, the proposed Amendment will reduce the vehicular mode share within the region by 7.2 percentage points, maintaining one of the intents of this policy by reducing the number of single-occupant vehicle trips within the region. Therefore, the proposed Amendment is consistent with this policy.
- **Vision Zero**. The proposed Amendment includes the same policy language and Vision Zero–based transportation network improvements, strategies, and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Fix It First**. The proposed Amendment includes the same policy language and Fix It First strategies and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Transportation System Management and Operations.** The proposed Amendment includes the same policy language and TSMO strategies and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Value Pricing.** The Value Pricing policy will be maintained in the proposed Amendment; however, the regional road usage charge is removed as one of the multiple pricing strategies identified within the policy. The proposed Amendment will maintain the managed lanes, fees charged to Transportation Network Companies, and transit subsidy programs included within the policy.

  The intent of the Value Pricing policy is to assist with the funding of the transportation network improvements and programs included in the plan and incentivize travelers to utilize non-vehicular modes of travel. As outlined in Attachment A of the proposed Amendment, the proposed Amendment will still have the ability to fund the transportation network improvements and programs without the inclusion of the regional road usage charge. Additionally, as shown in Table 4.5-2, the proposed Amendment will decrease the vehicular mode share by 7.2 percentage points, and increase the walking, biking, and transit mode shares. Therefore, the proposed Amendment will not conflict with the policy as it will be able to both

fund the proposed transportation network improvements and programs, and still incentivize travelers to utilize non-vehicular travel modes.

2035 Conclusion

As noted in Chapter 2, the transportation network improvements and programs included in the proposed Amendment and the approved Plan are identical, with the exception of the removal of the regional road usage charge in the proposed Amendment. Additionally, the policy language in both plans is also the same, with the exception of the Value Pricing policy. As outlined in Attachment A of the proposed Amendment, the proposed Amendment will still have the ability to fund the transportation network improvements and programs without the inclusion of the regional road usage charge. Additionally, as shown in Table 4.5-2, implementation of the proposed Amendment will decrease the vehicular mode share by 7.2 percentage points, and increase the walking, biking, and transit mode shares. Therefore, the proposed Amendment will not conflict with the Value Pricing policy as it will be able to both fund the proposed transportation network improvements and programs, and still incentivize travelers to utilize non-vehicular travel modes. Therefore, implementation of the proposed Amendment, under Year 2035 conditions, would result in a less-than-significant impact.

2050

Transportation Network Improvements and Programs

Table 4.5-3 outlines the transportation network demand, by mode, under proposed Amendment Year 2050 conditions. Additionally, for reference, the approved Plan Year 2050 conditions are also provided in the table. Both the proposed Amendment and approved Plan conditions are compared to Baseline Year 2016 conditions to identify how implementation of each plan will affect transportation demand throughout the San Diego region and identify the changes between the two plans.

Table 4.5-3
Transportation System Analysis – Year 2050

Mode	Category	Baseline Year 2016	Year 2050 Proposed Amendment	Change Between Baseline and Proposed Amendment	Year 2050 Approved Plan	Change Between Baseline and Approved Plan
Transit	Average Daily Transit Trips	258,603	903,367	644,764	944,876	686,273
	Transit Mode Share[1]	1.7%	5.3%	3.6%	5.6%	3.9%
	Average Length of Transit Trip (miles)	9.01	9.70	0.69	9.85	0.84
	Population Within TPAs	764,847	2,125,902	1,361,055	1,985,967	1,221,120
	Employment Within TPAs	609,253	1,470,178	860,925	1,323,929	714,676
	Service Population Within TPAs	1,374,100	3,596,080	2,221,980	3,309,896	1,935,796
Vehicle	Average Daily Vehicular Trips	12,928,097	13,128,391	200,294	12,975,633	47,536
	HOV Trips	6,643,062	6,946,033	302,971	6,883,015	239,953
	Vehicular Mode Share[1]	87.2%	77.6%	-9.6%	77.1%	-10.1%
	Average Length of Vehicular Trip (miles)	6.90	6.8	-0.10	6.67	-0.23
	VMT per Capita (miles)	18.94	16.45	-2.49	16.03	-2.91
	VMT per Employee (miles)	18.91	14.74	-4.17	15.26	-3.65
	VMT per Service Population (miles)	17.02	15.53	-1.49	15.54	-1.48
Bicycle	Average Daily Bicycle Trips	113,370	281517	168,147	289,930	176,560
	Bicycle Mode Share[1]	0.8%	1.7%	0.9%	1.7%	0.9%
	Average Length of Bicycle Trip (miles)	2.86	4.08	1.22	4.10	1.24
Walking	Average Daily Walking Trips	1,174,224	2103893	929,669	2,117,553	943,329
	Walking Mode Share[1]	7.9%	12.4%	4.5%	12.6%	4.7%
	Average Length of Walking Trip (miles)	0.82	0.78	-0.04	0.79	-0.03

Source: ABM2+
[1] Mode share includes all trip types
HOV = high-occupancy vehicle

As shown in Table 4.5-3, implementation of the proposed Amendment will increase transit ridership as well as the use of active transportation modes such as walking and biking, which is consistent with the effects of the approved Plan. The proposed Amendment will also decrease the vehicular mode share by 9.6 percentage points, which is also consistent with the effects of the approved Plan. The reduction in vehicular mode share will lead to a decrease in the VMT per service population of 1.49 miles, which is also similar to the approved Plan. Finally, the proposed Amendment will increase the total service population (residents and employees) located within a TPA by over two million people, which is consistent with the approved Plan. As discussed below, these metrics show that the proposed Amendment is consistent with the circulation system policies outlined in the approved Plan (see Section 4.5.2) and, therefore, do not conflict with them:

- **Land Use and Regional Growth**. The proposed Amendment will increase transit ridership as well as the number of walking and biking trips within the region, showing that it will provide convenient access to multi-modal travel options, as prescribed by the policy. Additionally, the proposed Amendment will increase the total service population within TPAs, thus, increasing the proximity of jobs and residents to transit opportunities, as prescribed by the policy. Therefore, the proposed Amendment is consistent with portions of this policy that relate to the circulation system.
- **Parking and Curb Management.** The proposed Amendment includes the same policy language as well as the parking and curb management strategies that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Transportation Demand Management.** The proposed Amendment includes the same policy language and TDM strategies and programs that are included in the approved Plan. Additionally, as shown in Table 4.5-3, the proposed Amendment will reduce the vehicular mode share within the region by 9.6 percentage points, maintaining one of the intents of this policy by reducing the number of single-occupant vehicle trips within the region. Therefore, the proposed Amendment is consistent with this policy.
- **Vision Zero.** The proposed Amendment includes the same policy language and Vision Zero–based transportation network improvements, strategies, and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Fix It First.** The proposed Amendment includes the same policy language and Fix It First strategies and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Transportation System Management and Operations.** The proposed Amendment includes the same policy language and TSMO strategies and programs that are included in the approved Plan. Therefore, the proposed Amendment is consistent with this policy.
- **Value Pricing.** The Value Pricing policy will be maintained in the proposed Amendment; however, the regional road usage charge is removed as one of the multiple pricing strategies identified within the policy. The proposed Amendment will maintain the managed lanes, fees charged to Transportation Network Companies, and transit subsidy programs included within the policy.

  The intent of the Value Pricing policy is to assist with the funding of the transportation network improvements and programs included in the plan and incentivize travelers to utilize non-vehicular modes of travel. As outlined in Attachment A of the proposed Amendment, the proposed Amendment will still have the ability to fund the transportation network improvements and programs without the inclusion of the regional road usage charge. Additionally, as shown in Table 4.5-3, the proposed Amendment will decrease the vehicular mode share by 9.6 percentage points, and increase the walking, biking, and transit mode shares. Therefore, the proposed Amendment will not conflict with the policy as it will be able to both

fund the proposed transportation network improvements and programs, and still incentivize travelers to utilize non-vehicular travel modes.

2050 Conclusion

As noted in Chapter 2, the transportation network improvements and programs included in the proposed Amendment and the approved Plan are identical, with the exception of the removal of the regional road usage charge in the proposed Amendment. Additionally, the policy language in both plans is also the same, with the exception of the Value Pricing policy. As outlined in Attachment A of the proposed Amendment, the proposed Amendment will still have the ability to fund the transportation network improvements and programs without the inclusion of the regional road usage charge. Additionally, as shown in Table 4.5-3, implementation of the proposed Amendment will decrease the vehicular mode share by 9.6 percentage points, and increase the walking, biking, and transit mode shares. Therefore, the proposed Amendment will not conflict with the Value Pricing policy as it will be able to both fund the proposed transportation network improvements and programs, and still incentivize travelers to utilize non-vehicular travel modes. Therefore, implementation of the proposed Amendment, under Year 2050 conditions, would result in a less-than-significant impact.

Exacerbation of Climate Change Effects

The proposed Amendment is not expected to exacerbate climate change effects regarding conflicts with an existing program, plan, ordinance, or policy addressing the circulation system, because climate change would not directly cause such conflicts.

Conclusion

No New or Substantially More Severe Significant Impacts in Comparison to the Approved Plan PEIR: The approved Plan PEIR did not identify any significant impacts related to a conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. Therefore, the conclusion for the proposed Amendment during all horizon years (2025, 2035, 2050) would be unchanged from what was identified in the approved Plan PEIR, and would remain less than significant.

TRA-2 CONFLICT OR BE INCONSISTENT WITH CEQA GUIDELINES SECTION 15064.3 BY NOT ACHIEVING THE SUBSTANTIAL VMT REDUCTIONS NEEDED TO HELP ACHIEVE STATEWIDE GHG REDUCTION GOALS

ANALYSIS METHODOLOGY

Section 15064.3(B) of the CEQA Guidelines criteria for analyzing and determining transportation impacts, states:

(b) Criteria for Analyzing Transportation Impacts.

(1) Land Use Projects. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area

> compared to existing conditions should be considered to have a less than significant transportation impact.
>
> (2) Transportation Projects. Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, a lead agency may tier from that analysis as provided in Section 15152.
>
> (3) Qualitative Analysis. If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered, a lead agency may analyze the project's vehicle miles traveled qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.
>
> (4) Methodology. A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

As noted above, VMT is an appropriate measure to identify transportation-related impacts under CEQA. The specific guidelines provided by CEQA Guidelines Section 15064.3(b)(1) and (2) are intended to be applied at the project level; as such, they are not directly applicable to the program-level transportation network improvements and the regional growth from land use changes that are included in the proposed Amendment. However, Section 15064.3(b)(4) does allow for lead agencies to determine the methodology for evaluating VMT, and CEQA Guidelines Section 15064(b) provides lead agencies with discretion to establish a threshold of significance.

In response to the implementation of SB 743 and CEQA Guidelines Section 15064.3(b), the State developed additional guidance on how VMT-related impacts can be evaluated as well as how to establish impact thresholds using the new VMT metric. Key guidance on transportation impacts and VMT is provided by the California Office of Planning and Research (OPR) VMT Technical Advisory (OPR 2018), and CARB's *2022 Scoping Plan for Achieving Carbon Neutrality* (CARB 2022). However, neither document provides guidance or thresholds in regard to assessing the significance of VMT impacts for RTPs at the regional level. The recommendations of both documents are discussed below:

OPR Technical Advisory on Evaluating Transportation Impacts in CEQA

The OPR Technical Advisory provides guidance on determining significance thresholds and assessing VMT. The guidance provided within the Technical Advisory is directed to specific projects by project type (i.e., residential, retail, office, etc.) and local plans (i.e., general plans) and includes recommendations for evaluating

transportation impacts. The Technical Advisory utilizes the findings of the 2017 Climate Change Scoping Plan[2] as substantial evidence to establish a VMT threshold for certain land use development projects, stating that:

> In summary, achieving 15 percent lower per capita (residential) or per employee (office) VMT than existing development is both generally achievable and is supported by evidence that connects this level of reduction to the State's emissions goals.

The OPR Technical Advisory does somewhat address VMT-related impacts associated with the development and implementation of general plans, noting:

> A general plan, area plan, or community plan may have a significant impact on transportation if proposed new residential, office, or retail land uses would in aggregate exceed the respective thresholds recommended above.

However, the Technical Advisory does not provide guidance on the VMT-related impacts that may be associated with regional plans, such as an RTP and SCS, as included in the proposed Amendment.

2022 Scoping Plan for achieving Carbon Neutrality

The *2022 Scoping Plan for Achieving Carbon Neutrality* (CARB 2022) was published after the approved Plan PEIR was adopted by SANDAG's Board (December 2021); therefore, CARB's currently recommended VMT reduction goals were not available for use as part of the Impact TRA-2 methodology in the approved Plan PEIR.[3] In November 2022, CARB published an update of CARB 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals (CARB 2019). The 2022 Scoping Plan establishes strategies for achieving the AB 1279 goals of an 85 percent reduction in anthropogenic GHG emissions and carbon neutrality by 2045. The 2022 Scoping Plan concludes that the State is not on track to meet the CARB 2017 VMT reduction goals; thus, CARB (2022) recommends that the State reduce VMT per capita generation by 30 percent, from the Year 2019 conditions, by Year 2045 to achieve its climate goals. CARB (2022) also sets an interim VMT per capita reduction goal of 25 percent by Year 2030 conditions compared to 2019. The 2022 Scoping Plan notes that it does not set regulatory limits on VMT and that the authority to reduce VMT largely lies with State, regional, and local transportation, land use, and housing agencies, along with the Legislature and its budgeting choices.

VMT Analysis Approach

This SEIR's VMT analysis was quantitative, consistent with CEQA Guidelines Section 15064.3. The ABM2+ was utilized to derive the VMT metrics analyzed under each analysis scenario. The ABM2+ is a travel demand forecasting model that incorporates census data and travel surveys to inform the algorithms of the model's projections. It uses a simulated population based on existing and projected demographics, to match residents to employment, and forecasts the daily travel on the regional transportation network. In addition, the model tracks the daily travel of individuals in the simulated population, including origins, destinations, travel distances, and mode choices. This allows the ABM2+ to project transportation metrics such as trip generation, trip assignment, and VMT at both a regional and local level.

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[2] In November 2022 CARB published an update to the Scoping Plan that increased the VMT per capita reduction goal from 14.3 percent, from which the OPR's recommended threshold of 15 percent was derived, to 30 percent by Year 2045.

[3] The approved Plan PEIR utilized the CARB 2017 VMT per capita reduction goal of 14.3 percent, which has since been superseded by the CARB 2022 VMT per capita reduction goals of 25 percent below Year 2019 levels by Year 2030 and 30 percent below Year 2019 level by Year 2045.

The ABM2+ has four forecast scenarios: Baseline Year 2016, which provides a forecast of the year the model inputs (land uses, mobility network, and socioeconomic data) are based on, the two interim years 2025 and 2035, and a horizon year of 2050. The Year 2025, 2035, and 2050 scenarios are derived based on the planned land uses and mobility improvements within the region, as well as population and employment projections. The different components of the proposed Amendment are projected to be implemented over 30 years with a buildout year projected in approximately 2050.

Because of the close relationship among forecasted regional growth and land use change and planned transportation network improvements and programs on travel behavior, this section analyzes their combined effect on per capita and total VMT, instead of separate analyses for regional growth and land use change and transportation network improvements and programs.

Significance Thresholds

VMT per Capita. The *2022 Scoping Plan for Achieving Carbon Neutrality* (CARB 2022) notes "we also know we are not on track to achieve the VMT reduction called for in the 2017 Scoping Plan and will need to double down to achieve the even more ambitious target called for in the Scoping Plan Scenario." As a response to this, the 2022 Scoping Plan includes a target to reduce the statewide VMT per capita to 25 percent below 2019 levels by 2030, as well as the overall target to reduce the statewide VMT per capita to 30 percent below 2019 levels by 2045. While these targets are not regulatory requirements, they are intended to inform future planning processes. Therefore, the updated VMT per capita reduction goals included in the 2022 Scoping Plan are used as a guide to determine whether the proposed Amendment would reach the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

CARB stresses that the VMT developed in its estimates "is not household-generated VMT, and the values are not directly comparable to the output from a local or regional travel demand model." ABM2+ derives VMT estimates based on household-generated VMT; as such, the results of the model may not directly align with the results of the 2022 Scoping Plan. However, ABM2+ is currently the best tool within the San Diego region for estimating baseline and future year VMT metrics, including total VMT and VMT per capita; therefore, the ABM2+ was used in the analysis of the 2022 Scoping Plan's VMT reduction goals.

ABM2+ does not include scenarios for Year 2019, 2030, and 2045 conditions, which are the timeframes in which the 2022 Scoping Plan's VMT reductions goals are set. Therefore, to project the VMT analysis metrics under these scenarios, the results from ABM2+ Year 2016, 2025, 2035, and 2050 scenarios were interpolated to derive the VMT metrics for the 2022 Scoping Plan's target years (Year 2019, 2030, and 2045).

Total VMT. Because there are no State-recommended total VMT significance thresholds for regional plans such as an RTP/SCS, a qualitative threshold is used: *would the proposed Amendment achieve the substantial VMT reductions needed to help achieve statewide GHG reduction goals?* If the Regional Plan would cause substantial increases in total VMT, then it would not achieve the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

Interim VMT per Capita Targets (for Informational Purposes). As noted above, the State's VMT per capita reduction goal is 25 percent below Year 2019 conditions by Year 2030 and 30 percent by Year 2045. The State did not establish any additional interim year targets. However, for informational purposes, and to further evaluate if the proposed Amendment would be on track to meet the State's VMT reduction goals, interim year VMT reduction goals were estimated for Year 2025 and Year 2035 conditions. The interim year targets were

derived based on a straight line interpretation of the full 25 and 30 percent reductions in VMT per capita that the region has to achieve by Year 2030 and Year 2045, respectively:

- **Year 2025**
  - Year 2030 – Year 2019 = 11 years
  - 25% total reduction / 11 Years = 2.27 percent reduction per year
  - 2.27 percent reduction per year × 6 years (Year 2025 – Year 2019) = 13.64 percent
- **Year 2035**
  - Year 2045 – Year 2030 = 15 years
  - 30% Year 2045 reduction goal – 25% Year 2030 reduction goal = 5% reduction over the 15 years
  - 5% / 15 years = 0.33% reduction per year between Year 2030 and Year 2045
  - 0.33% reduction per year × 5 years (Year 2035 – Year 2030) = 1.65%
  - 1.65% + 25% (Year 2030 target) = 26.65%
- **Year 2050**
  - It is assumed that the ultimate 30% reduction goal would be maintained beyond the target Year 2045.

The qualitative thresholds described above are unique to the proposed Amendment, due to its regional and comprehensive nature. These thresholds are not intended for application to other project types, in particular to individual land use projects for which State-recommended per capita VMT thresholds may be appropriate.

IMPACT ANALYSIS

As noted under the significance thresholds, the 2022 Scoping Plan utilizes Year 2019 conditions as the year in which the VMT reduction goals are measured against. Therefore, TRA-2 utilizes a starting year of 2019 instead of the analysis Base Year of 2016.

2025

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Table 4.5-4 summarizes the VMT projections and analyses developed under Year 2025 conditions. Total VMT and VMT per capita results are presented and compared between Starting Year – Year 2019 and proposed Amendment Year 2025 conditions to identify VMT-related impacts. The total Home-Based VMT as well as the population for the region are also provided, as they are used to calculate VMT per capita. Finally, to identify if the proposed Amendment will further exacerbate any of the impacts identified in the approved Plan PEIR, the approved Plan Year 2025 conditions are also provided and compared to Starting Year – Year 2019 conditions.

Table 4.5-4
VMT Analysis – Year 2025

Metric	Starting Year Year 2019	Year 2025 Proposed Amendment	Difference Between Starting Year Year 2019 and Year 2025 Proposed Amendment	% Change Between Starting Year Year 2019 and Year 2025 Proposed Amendment	Year 2025 Approved Plan	Difference Between Starting Year Year 2019 and Year 2025 Approved Plan	% Change Between Starting Year Year 2019 and Year 2025 Approved Plan
Total VMT (daily)[1]	84,074,414	84,939,833	865,419	1.03%	84,538,406	463,992	0.55%
VMT per Capita (miles)[1,2]	18.56	17.81	-0.75	-4.04%	17.66	-0.9	-4.85%
Home-Based VMT[3]	61,563,841	60,994,798	-569,043	-0.92%	60,470,401	-1,093,440	-1.78%
Population	3,318,374	3,424,145	105,771	3.19%	3,424,145	105,771	3.19%

Source: ABM2+
Note: Highlighted rows indicate metrics that are used to evaluate VMT-related impacts.
[1] The VMT calculations do not include the off-model VMT reduction in Attachment A of the proposed Amendment because they were not calculated for 2025. Therefore, the VMT figures may be slightly overstated in the analysis. However, the off-model VMT reductions are not anticipated to reduce the impacts to less-than-significant levels.
[2] VMT per Capita = Home-Based VMT / Population.
[3] Home-Based VMT is the total VMT within the region that is generated from trip tours that either start or end at home.

As shown in Table 4.5-4, implementation of the proposed Amendment, under Year 2025 conditions, would result in a 4.04 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 13.64 percent reduction in VMT per capita that is needed to maintain the pace needed to meet the State's Year 2030 VMT per capita reduction goal of 25 percent. This is generally consistent with the change in VMT per capita between Year 2025 and Year 2019 conditions under the approved Plan (4.85 percent reduction).

Implementation of the proposed Amendment, under Year 2025 conditions, would also result in an increase to the total daily VMT generated by the region of 865,419 (1.03 percent) compared to Starting Year – Year 2019 conditions. The increase is considered substantial because it does not help achieve statewide GHG reduction goals, and is therefore significant. VMT growth in Year 2025 is predominantly due to the population and employment growth within the region, notwithstanding that the SCS land use pattern and transportation network improvements and programs included in the proposed Amendment would help to reduce VMT growth. The increase in VMT associated with the proposed Amendment Year under 2025 conditions is around 400,000 miles per day (0.48 percent) more than the approved Plan.

Additionally, the proposed Amendment would not make any changes to the roadway network approved as part of the approved Plan. In Year 2025, the number of roadway lane miles within the region would increase by 241 miles. Some of the additional lane miles added to the network would be managed lanes (34 miles); however, these improvements would still increase the overall vehicular capacity of the region's roadway network, resulting in the potential for induced travel. It should be noted that the majority of transportation improvements included within the proposed Amendment, including expansion of transit services, new or expanded bicycle facilities, and pedestrian improvements, would decrease VMT within the region. As noted in OPR's Technical Advisory these types of multi-modal improvements are not anticipated to induce travel (OPR 2018). A detailed discussion of induced travel demand is provided in Appendix D of the approved Plan.

2025 Conclusion

As shown in Table 4.5-4, implementation of the proposed Amendment, under Year 2025 conditions, would result in a decrease in VMT per capita of 4.04 percent below Starting Year – Year 2019 conditions. This is less than the 13.64 percent reduction needed to maintain pace to meet the 25 percent VMT per capita reduction goal under Year 2030 conditions, and is therefore a significant impact. Implementation of the proposed Amendment would also result in an increase of 865,419 daily VMT generated within the San Diego region compared to Starting Year – Year 2019 conditions, which is considered a substantial increase. Therefore, this impact (TRA-2) is significant in the Year 2025 because the proposed Amendment would not achieve the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

These significance findings are consistent with those identified in the approved Plan PEIR. The changes under the proposed Amendment would not result in a new significant impact for this significance threshold, and would not result in a substantial increase in the severity of this significant impact.

2030

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Table 4.5-5 summarizes the VMT projections and analyses developed under Year 2030 conditions. Total VMT and VMT per capita results are presented and compared between Starting Year – Year 2019 and proposed Amendment Year 2030 conditions to identify VMT-related impacts. The total Home-Based VMT as well as the

population for the region are also provided, as they are used to calculate VMT per capita. Year 2030 conditions were not included in the approved Plan PEIR; therefore, a comparison between the two plans cannot be made for this horizon year.

Table 4.5-5
VMT Analysis – Year 2030

Metric	Starting Year Year 2019	Year 2030 Proposed Amendment	Difference Between Starting Year Year 2019 and Year 2030 Proposed Amendment	% Change Between Starting Year Year 2019 and Year 2030 Proposed Amendment
Total VMT (daily)[1]	84,074,414	86,035,529	1,961,115	2.33%
VMT per Capita (miles)[1,2]	18.56	17.43	-1.13	-6.09%
Home-Based VMT[3]	61,563,841	60,962,976	-600,865	-0.98%
Population	3,318,374	3,498,895	180,521	5.44%

Source: ABM2+
Note: Highlighted rows indicate metrics that are used to evaluate VMT-related impacts.
[1] The VMT calculations do not include the off-model VMT reduction in Attachment A of the proposed Amendment because they were not calculated for 2030 conditions. Therefore, the VMT figures may be slightly overstated in the analysis. However, the off-model VMT reductions are not anticipated to reduce the impacts to less-than-significant levels.
[2] VMT per Capita = Home-Based VMT / Population.
[3] Home-Based VMT is the total VMT within the region that is generated from trip tours that either start or end at home.

As shown in Table 4.5-5, implementation of the proposed Amendment, under Year 2030 conditions, would result in a 6.09 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 25 percent reduction needed to meet the State's Year 2030 VMT per capita reduction goal. Year 2030 conditions were not analyzed in the approved Plan PEIR; thus, a quantitative comparison of the change relative to the proposed Amendment cannot be made.

Implementation of the proposed Amendment, under Year 2030 conditions, would also result in an increase to the total daily VMT generated by the region of 1,961,115 (2.33 percent) compared to Starting Year – Year 2019 conditions. The increase is substantial because it does not help achieve statewide GHG reduction goals, and is therefore significant. VMT growth in Year 2030 is predominantly due to the population and employment growth within the region, notwithstanding that the SCS land use pattern and the transportation network improvements and programs included in the proposed Amendment would help to reduce VMT growth.

2030 Conclusion

As shown in Table 4.5-5, implementation of the proposed Amendment, under Year 2030 conditions, would result in a decrease in VMT per capita of 6.09 percent below Starting Year – Year 2019 conditions. This is less than the 25 percent reduction needed to achieve the State's Year 2030 interim VMT per capita reduction goal, and is therefore a significant impact. Implementation of the proposed Amendment would also result in an increase of 1,961,115 daily VMT generated within the San Diego region compared to Starting Year – Year 2019 conditions, which is considered a substantial increase. Therefore, this impact (TRA-2) is considered significant in the Year 2030 because the proposed Amendment would not achieve the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

Substantially More Severe Significant Impacts Were Identified in Comparison to the Approved Plan PEIR: Year 2030 conditions were not analyzed in the approved Plan PEIR; however, as the changes under the proposed Amendment were determined to result in a substantial increase in the severity of this significant impact under Horizon Year 2035 conditions, the same should be assumed for Horizon Year 2030 conditions, to be conservative. Thus, a substantial increase in the severity of the significant impact under Horizon Year 2030 conditions is identified under the proposed Amendment.

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Table 4.5-6 summarizes the VMT projections and analyses developed under Year 2035 conditions. Total VMT and VMT per capita results are presented and compared between Starting Year – Year 2019 and proposed Amendment Year 2035 conditions to identify VMT-related impacts. The total Home-Based VMT as well as the population for the region are also provided, as they are used to calculate VMT per capita. Finally, to identify if the proposed Amendment will further exacerbate any of the impacts identified in the approved Plan PEIR, the approved Plan Year 2035 conditions are also provided and compared to Starting Year – Year 2019 conditions.

Table 4.5-6
VMT Analysis – Year 2035

Metric	Starting Year Year 2019	Year 2035 Proposed Amendment	Difference Between Starting Year Year 2019 and Year 2035 Proposed Amendment	% Change Between Starting Year Year 2019 and Year 2035 Proposed Amendment	Year 2035 Approved Plan	Difference Between Starting Year Year 2019 and Year 2035 Approved Plan	% Change Between Starting Year Year 2019 and Year 2035 Approved Plan
Total VMT (daily)[1]	84,074,414	87,131,224	3,056,810	3.64%	85,412,968	1,338,554	1.59%
VMT per Capita (miles)[1,2]	18.56	17.05	-1.51	-8.14%	16.58	-1.98	-10.67%
Home-Based VMT[3]	61,563,841	60,931,154	-632,687	-1.03%	59,251,034	-2,312,807	-3.76%
Population	3,318,374	3,573,645	255,271	7.69%	3,573,645	255,271	7.69%

Source: ABM2+
Note: Highlighted rows indicate metrics that are used to evaluate VMT-related impacts.
[1] The VMT calculations do not include the off-model VMT reduction strategy reductions totaling 907,217 (1.0% of the Total VMT) in Attachment A of the proposed Amendment. Therefore, the VMT figures may be slightly overstated in the analysis. However, the off-model VMT reductions are not anticipated to reduce the impacts to less-than-significant levels.
[2] VMT per Capita = Home-Based VMT / Population.
[3] Home-Based VMT is the total VMT within the region that is generated from trip tours that either start or end at home.

As shown in Table 4.5-6, implementation of the proposed Amendment, under Year 2035 conditions, would result in an 8.14 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 26.64 percent reduction in VMT per capita that is needed to maintain the pace required to meet the State's Year 2045 VMT per capita reduction goal of 30 percent. This is slightly less than the change in VMT per capita between Year 2035 and Year 2019 conditions under the approved Plan (10.67 percent reduction). However, neither plan would meet the State's Year 2045 VMT per capita reduction goal.

Implementation of the proposed Amendment, under Year 2035 conditions, would also result in an increase to the total daily VMT generated by the region of 3,056,810 (3.64 percent) compared to Starting Year – Year 2019 conditions. The increase is considered substantial because it does not help achieve statewide GHG reduction goals, and is therefore significant. VMT growth in Year 2035 is predominantly due to the population and employment growth within the region, notwithstanding that the SCS land use pattern and the transportation network improvements and programs included in the proposed Amendment would help to reduce VMT growth. The increase in VMT associated with the proposed Amendment under Year 2035 conditions is around 1.7 million miles per day (2.01 percent) more than the approved Plan.

Additionally, the proposed Amendment would not make any changes to the roadway network approved as part of the approved Plan. In Year 2035, the number of roadway lane miles within the region would increase by 626 miles. Some of the additional lane miles added to the network would be managed lanes (449 miles); however, these improvements would still increase the overall vehicular capacity of the region's roadway network, resulting in the potential for induced travel. It should be noted that the majority of transportation improvements included within the proposed Amendment, including expansion of transit services, new or expanded bicycle facilities, and pedestrian improvements, would decrease VMT within the region. As noted in OPR's Technical Advisory these types of multi-modal improvements are not anticipated to induce travel (OPR 2018). A detailed discussion of induced travel demand is provided in Appendix D of the approved Plan.

2035 Conclusion

As shown in Table 4.5-6, implementation of the proposed Amendment, under Year 2035 conditions, would result in a decrease in VMT per capita of 8.14 percent below Starting Year – Year 2019 conditions. This is less than the 26.65 percent reduction needed to maintain pace to meet the 30 percent VMT per capita reduction goal under Year 2045 conditions, and is therefore a significant impact. Implementation of the proposed Amendment would also result in an increase of 3,056,810 daily VMT generated within the San Diego region compared to Starting Year – Year 2019 conditions, which is considered a substantial increase. Therefore, this impact (TRA-2) is considered significant in the Year 2035 because the proposed Amendment would not achieve the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

Substantially More Severe Significant Impacts Were Identified in Comparison to the Approved Plan PEIR: While the proposed Amendment will result in a higher VMT generation than the approved Plan, these significance findings are still consistent with those identified in the approved Plan PEIR. The changes under the proposed Amendment would not result in a new significant impact for this significance threshold. However, the changes under the proposed Amendment would result in a 2 percent increase in the total VMT generated within the region, as compared to the approved Plan. To be conservative, this increase is considered a substantial increase in the severity of this significant impact. Thus, a substantial increase in the severity of the significant impact under Horizon Year 2035 conditions is identified under the proposed Amendment.

2045

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Table 4.5-7 summarizes the VMT projections and analyses developed under Year 2045 conditions. Total VMT and VMT per capita results are presented and compared between Starting Year – Year 2019 and proposed Amendment Year 2045 conditions to identify VMT-related impacts. The total Home-Based VMT as well as the population for the region are also provided, as they are used to calculate VMT per capita. Year 2045 conditions were not included in the approved Plan PEIR; therefore, a comparison between the two plans cannot be made.

Table 4.5-7
VMT Analysis – Year 2045

Metric	Starting Year Year 2019	Year 2045 Proposed Amendment	Difference Between Starting Year Year 2019 and Year 2045 Proposed Amendment	% Change Between Starting Year Year 2019 and Year 2045 Proposed Amendment
Total VMT (daily)[1]	84,074,414	88,941,651	4,867,237	5.79%
VMT per Capita (miles)[1,2]	18.56	16.65	-1.91	-10.29%
Home-Based VMT[3]	61,563,841	60,884,213	-679,628	-1.10%
Population	3,318,374	3,657,464	339,090	10.22%

Source: ABM2+
Note: Highlighted rows indicate metrics that are used to evaluate VMT-related impacts.
[1] The VMT calculations do not include the off-model VMT reduction in Attachment A of the proposed Amendment because they were not calculated for Year 2045 conditions. Therefore, the VMT figures may be slightly overstated in the analysis.
[2] VMT per Capita = Home-Based VMT / Population.
[3] Home-Based VMT is the total VMT within the region that is generated from trip tours that either start or end at home.

As shown in Table 4.5-7, implementation of the proposed Amendment, under Year 2045 conditions, would result in a 10.29 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 30 percent reduction needed to meet the State's 2045 VMT per capita reduction goal. Year 2045 conditions were not analyzed in the approved Plan PEIR; thus, a quantitative comparison of the change relative to the proposed Amendment cannot be made.

Implementation of the proposed Amendment, under Year 2045 conditions would also result in an increase to the total daily VMT generated by the region of 4,867,237 (5.79 percent) compared to Starting Year – Year 2019 conditions. The increase is considered substantial because it does not help achieve statewide GHG reduction goals, and is therefore significant. VMT growth in Year 2045 is predominantly due to the population and employment growth within the region, notwithstanding that the SCS land use pattern and the transportation network improvements and programs included in the proposed Amendment would help to reduce VMT growth.

2045 Conclusion

As shown in Table 4.5-7, implementation of the proposed Amendment, under Year 2045 conditions, would result in a decrease in VMT per capita of 10.29 percent below Starting Year – Year 2019 conditions. This is less than the 30 percent reduction needed to achieve the State's Year 2045 VMT per capita reduction goal, and is therefore a significant impact. Implementation of the proposed Amendment would also result in an increase of

3,056,810 daily VMT generated within the San Diego region compared to Starting Year – Year 2019 conditions, which is considered a substantial increase. Therefore, this impact (TRA-2) is considered significant in the Year 2045 because the proposed Amendment would not achieve the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

Substantially More Severe Significant Impacts Were Identified in Comparison to the Approved Plan PEIR: Year 2045 conditions were not analyzed in the approved Plan PEIR; however, because the changes under the proposed Amendment were determined to result in a substantial increase in the severity of this significant impact under Horizon Year 2035 and Horizon Year 2050 conditions, the same is assumed for Horizon Year 2045 conditions. Thus, a substantial increase in the severity of the significant impact under Horizon Year 2045 conditions is identified under the proposed Amendment.

2050

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

Table 4.5-8 summarizes the VMT projections and analyses developed under Year 2050 conditions. Total VMT and VMT per capita results are presented and compared between Starting Year – Year 2019 and proposed Amendment Year 2050 conditions to identify VMT-related impacts. The total Home-Based VMT as well as the population for the region are also provided, as they are used to calculate VMT per capita. Finally, to identify if the proposed Amendment will further exacerbate any of the impacts identified in the approved Plan PEIR, the approved Plan Year 2050 conditions are also provided and compared to Starting Year – Year 2019 conditions.

Table 4.5-8
VMT Analysis – Year 2050

Metric	Starting Year Year 2019	Year 2050 Proposed Amendment	Difference Between Starting Year Year 2019 and Year 2050 Proposed Amendment	% Change Between Starting Year Year 2019 and Year 2050 Proposed Amendment	Year 2050 Approved Plan	Difference Between Starting Year Year 2019 and Year 2050 Approved Plan	% Change Between Starting Year Year 2019 and Year 2050 Approved Plan
Total VMT (daily)[1]	84,074,414	89,846,864	5,772,450	6.87%	88,133,934	4,059,520	4.83%
VMT per Capita (miles)[1,2]	18.56	16.45	-2.11	-11.37%	16.03	-2.53	-13.63%
Home-Based VMT[3]	61,563,841	60,860,743	-703,098	-1.14%	59,300,949	-2,262,892	-3.68%
Population	3,318,374	3,699,373	380,999	11.48%	3,699,373	380,999	11.48%

Source: ABM2+
Note: Highlighted rows indicate metrics that are used to evaluate VMT-related impacts.
[1] The VMT calculations do not include the off-model VMT reduction strategy reductions totaling 993,133 (1.1% of the Total VMT) in Attachment A of the proposed Amendment. Therefore, the VMT figures may be slightly overstated in the analysis.
[2] VMT per Capita = Home-Based VMT / Population
[3] Home-Based VMT is the total VMT within the region that is generated from trip tours that either start or end at home.

As shown in Table 4.5-8, implementation of the proposed Amendment, under Year 2050 conditions, would result in a 11.37 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 45 percent reduction in VMT per capita required to maintain the State's Year 2045 VMT per capita reduction goal of 30 percent. It is also less than the change in VMT per capita between Year 2050 and Year 2019 conditions under the approved Plan (13.63 percent reduction). However, neither plan would meet or maintain the State's Year 2045 VMT per capita reduction goal.

Implementation of the proposed Amendment, under Year 2050 conditions, would also result in an increase in the total daily VMT generated by the region of 5,772,450 (6.87 percent) compared to Starting Year – Year 2019 conditions. The increase is considered substantial because it does not help achieve statewide GHG reduction goals, and is therefore significant. VMT growth in Year 2050 is predominantly due to the population and employment growth within the region, notwithstanding that the SCS land use pattern and the transportation network improvements and programs included in the proposed Amendment would help to reduce VMT growth. The increase in VMT under Year 2050 conditions is around 1.7 million miles per day (1.94 percent) more than the approved Plan.

Additionally, the proposed Amendment would not make any changes to the roadway network approved as part of the approved Plan. In Year 2050, the number of roadway lane miles within the region would increase by 748 miles. Some of the additional lane miles added to the network would be managed lanes (705 miles); however, these improvements would still increase the overall vehicular capacity of the region's roadway network, resulting in the potential for induced travel. It should be noted that the majority of transportation improvements included within the proposed Amendment, including expansion of transit services, new or expanded bicycle facilities, and pedestrian improvements, would decrease VMT within the region. As noted in OPR's Technical Advisory these types of multi-modal improvements are not anticipated to induce travel (OPR 2018). A detailed discussion of induced travel demand is provided in Appendix D of the approved Plan. These proposed changes to the transportation network are unchanged from the approved Plan.

2050 Conclusion

As shown in Table 4.5-8, implementation of the proposed Amendment, under Year 2050 conditions, would result in a decrease in VMT per capita of 11.37 percent below Starting Year – Year 2019 conditions. This is less than the 30 percent reduction needed to achieve and maintain the State's ultimate VMT per capita reduction goal and is therefore a significant impact. Implementation of the proposed Amendment would also result in an increase of 5,772,450 daily VMT generated within the San Diego region compared to Starting Year – Year 2019 conditions, which is considered a substantial increase. Therefore, this impact (TRA-2) is considered significant in the Year 2050 because the proposed Amendment would not achieve the substantial VMT reductions needed to help achieve statewide GHG reduction goals.

Substantially More Severe Significant Impacts Were Identified in Comparison to the Approved Plan PEIR: While the proposed Amendment will result in a higher VMT generation than the approved Plan, these significance findings are consistent with those identified in the approved Plan PEIR. The changes under the proposed Amendment would not result in a new significant impact for this significance threshold. However, the changes under the proposed Amendment would result in a 2 percent increase in the total VMT generated within the region, as compared to the approved Plan. To be conservative, this increase is considered a substantial increase in the severity of this significant impact. Thus, a substantial increase in the severity of the significant impact under Horizon Year 2050 conditions is identified under the proposed Amendment.

Exacerbation of Climate Change Effects

The exacerbation of climate change effects analysis included in Section 4.16, *Transportation*, of the approved Plan PEIR is consistent with this evaluation and has not materially changed since the preparation of the approved Plan PEIR.

MITIGATION MEASURES

TRA-2 CONFLICT OR BE INCONSISTENT WITH CEQA GUIDELINES SECTION 15064.3 BY NOT ACHIEVING THE SUBSTANTIAL VMT REDUCTIONS NEEDED TO HELP ACHIEVE STATEWIDE GHG REDUCTION GOALS

Achieving further reductions in the total and per capita VMT generated within the region depends upon additional State policy actions and funding, as well as local jurisdictions' review and entitlement of individual land use development projects and Regional Arterial System (RAS) transportation projects. In addition, transportation sponsors other than SANDAG, such as Caltrans, must evaluate and potentially mitigate any induced VMT that may be associated with the implementation of enhancements to the freeway and State Highway system.

Therefore, mitigation measure **TRA-2** focuses on project-specific mitigation measures that can and should be implemented to further reduce the region's total VMT and VMT per capita. In addition, region-level alternatives would further reduce VMT (see Chapter 6, *Alternatives Analysis*). Alternative 3 would further reduce VMT through measures such as a more compact land use pattern, and policies to reduce transit fares, increase parking prices, and establish higher road user fees. Alternative 4 would further reduce VMT through measures such as policies to reduce transit fares, increase parking prices, and increase toll prices. Alternative 5 would further reduce VMT through measures such as a more compact land use pattern, and policies to reduce transit fares, increase parking prices, and increase toll prices.

2025, 2030, 2035, 2045, and 2050

The following mitigation measures identified in the approved Plan PEIR would still be applicable to the proposed Amendment as discussed in Section 4.3, *Greenhouse Gas Emissions,* and would further reduce both the total VMT and VMT per capita:

- **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans**
- **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide**
- **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects**

In addition, mitigation measure **TRA-2** for Impact TRA-2 from the approved Plan PEIR has been revised for the proposed Amendment and is still relevant and is still proposed as revised below:

TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects. During the project design and project-level CEQA review phases of transportation network improvements or land use development projects, SANDAG shall, and other transportation project sponsors, the County of San Diego, cities, and other local jurisdictions can and should implement project-level VMT reduction measures in addition to those included in the Regional Plan. VMT reducing measures include, but are not limited to, the following:

- **Require TDM Strategies.** SANDAG shall and other transportation project sponsors, the County of San Diego, cities, and other local jurisdictions can and should require all transportation network improvements or land use development projects, that are identified to have a significant VMT-related impact, to implement feasible TDM strategies to help offset their impacts. This mitigation measure will further reduce the proposed Amendment's VMT because the potential VMT reductions associated with four[4] TDM programs, which include pooled rides (private), vanpool, carshare, and the implementation of a regional TDM ordinance, were not incorporated into ABM2+[5]. Strategies such as free shuttles, parking facilities for carshare, and site design features to facilitate walking, biking, and transit can and should be used by land development projects to reduce VMT-related impacts. Additional project-level TDM measures not included in the proposed Amendment can and should also be used, including walking, school bus programs, school pool programs, subsidized transit passes, unbundled parking, preferential parking programs for carpools/vanpools, and bike sharing programs.
- **Reduce Parking Minimums.** The County of San Diego, cities, and other local jurisdictions can and should evaluate the feasibility of reducing their currently required parking minimums. Reducing the parking minimums for different land use types, where appropriate, can decrease project-level VMT by up to 13.7 percent (CAPCOA 2021).
- **Implement Additional Active Transportation Facilities Not Included in the Proposed Amendment.** To further reduce local VMT-related impacts and take advantage of the regional bike network, SANDAG shall and other transportation project sponsors, the County of San Diego, cities, and other local jurisdictions can and should implement additional active transportation facilities that provide connections from the regional bicycle network to local neighborhoods. The proposed Amendment includes funding for Complete Streets investments in Mobility Hub areas including implementation of bicycle and pedestrian facilities that provide local connections throughout Mobility Hub areas; however, the associated VMT reductions from this funding could not be modeled, so this mitigation measure would achieve further VMT reductions. Direct access to bicycle facilities can reduce project-related VMT by 0.8 percent, while incorporating new pedestrian facilities can reduce project VMT by up to 6.4 percent (CAPCOA 2021).
- **Road Diet and Traffic Calming.** The County of San Diego, cities, and other local jurisdictions can and should implement road diets[6] or other traffic calming measures within their local roadway network, where feasible, to further reduce VMT-related impacts that may be associated with land development projects or local transportation projects. Road diet and traffic calming measures would also be eligible for Complete Streets funding in Mobility Hub areas. The reduction of existing travel lanes in favor of multi-modal facilities or additional public space can help to calm and deter vehicular trips within an area or along a roadway segment. Traffic calming measures can reduce VMT by 0.5 percent (CAPCOA 2010)[7]. It should

[4] Five total measures are evaluated in the "Off-Model" calculations included in Attachment A of the proposed Amendment. However, EV Programs (Vehicle Incentive and Charger Program) only relates to reductions in GHG and does not help to reduce VMT specifically. See Attachment A of the proposed Amendment.

[5] These TDM strategies were calculated as part of the off-model strategies (Attachment A of the proposed Amendment). If implemented these strategies could reduce total VMT by 1.0 percent by 2035 and 2.2 percent by 2050 (Attachment A of the proposed Amendment).

[6] Road Diet = narrowing or eliminating travel lanes and/or shoulders to provide more space for pedestrians, bicyclists, transit, or public spaces.

[7] Road diet and traffic calming was not included as a VMT reduction measure in CAPCOA 2021. However, reducing the number of travel lanes, decreasing the roadway speed limit, and implementing or enhancing multi-modal facilities, which are common features in road diet and traffic calming projects, discourage the use of automobiles and incentive travelers to use other modes. Therefore, it is still considered to be an effective mitigation measure to reduce VMT within the region.

be noted that the proposed Amendment includes funding, through grants, for local jurisdictions to implement road diets.

SIGNIFICANCE AFTER MITIGATION

2025, 2030, 2035, 2045 and 2050

As outlined in Tables S-19 through S-22 in Attachment A of the proposed Amendment, there are TDM strategies included in the proposed Amendment that could not be incorporated into ABM2+ and were therefore not assumed in the transportation impact analysis. As noted within the appendix, these strategies could further reduce the total VMT generated within the region by a total of 1.1 percent by Year 2050. These reductions were calculated based on their influence on the total VMT generated within the region. As such, it is reasonable to assume that these strategies would have a similar effect on the region's VMT per capita, as the majority of trips within the region are home based. However, as noted in the mitigation section above, TDM strategies generally are required and implemented at the project level, by local agencies, to be most effective. The VMT reductions associated with these project-level TDM measures can vary greatly based on the project type, location, and size; therefore, an overall regionwide reduction cannot be estimated at the program level.

SANDAG cannot require local agencies implementing development projects, or other transportation project sponsors, to adopt the above mitigation measures, and it is ultimately the responsibility of the CEQA lead agency to determine and adopt mitigation. In addition, the State has indicated that additional State policy actions and funding would be required to close the VMT gap between what the MPOs could achieve through implementation of their SCSs and reductions needed to meet State goals.

As outlined in Tables 4.5-4 through 4.5-8, the regional VMT per capita is more than 1.1 percent higher than the threshold to meet, or keep pace with, the State's GHG reduction goals under each horizon year. Therefore, the full implementation of the proposed mitigation, under any horizon year, would not reduce the identified impact to a less-than-significant level for any horizon year (2025, 2030, 2035, 2045, or 2050). Additionally, the identified VMT reductions associated with the proposed mitigation measures would not significantly reduce the daily VMT generated within the San Diego region to a point where it would no longer be considered substantial. Therefore, this impact would remain significant and unavoidable under the proposed Amendment.

Conclusion

Substantially More Severe Significant Impacts Were Identified in Comparison to the Approved Plan PEIR: The approved Plan PEIR identified a significant and unavoidable impact as being inconsistent with CEQA Guidelines Section 15064.3 (TRA-2) because even with the incorporation of mitigation measure **TRA-2**, it could not be guaranteed that all future project-level impacts would be mitigated to less-than-significant levels. As discussed above, the changes included in the proposed Amendment will result in a 2 percent increase in the total VMT generated within the region (under Horizon Years 2035 and 2050), which is considered a substantial increase in the severity of previously identified significant effects. Year 2030 and Year 2045 conditions were not analyzed in the approved Plan PEIR; however, because implementation of the proposed Amendment was determined to result in a substantial increase in the severity of this significant impact under Horizon Year 2035 and Horizon Year 2050 conditions, the same should be assumed for Horizon Year 2030 and Horizon Year 2045 conditions. Therefore, the conclusions for the proposed Amendment during Horizon Years 2030, 2035, 2045, and 2050 would substantially increase from what was identified in the approved Plan PEIR.

5 CUMULATIVE IMPACT ANALYSIS

This chapter discusses the cumulative effects of past, present, and reasonably foreseeable future projects and the contribution of the proposed Amendment to these effects. The CEQA Guidelines define a cumulative impact as one in which two or more individual effects, when considered together, are considerable or can compound or increase other environmental impacts. Individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (CEQA Guidelines Section 15355).

5.1 CUMULATIVE IMPACT METHODOLOGY

CEQA Guidelines Section 15130 describes the requirements for the discussion of cumulative impacts in an EIR, and states that an EIR will discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. The discussion must reflect the severity of impacts and their likelihood of occurrence, but the discussion need not provide as much detail as is provided for the impacts attributable to the project alone. In addition, the CEQA Guidelines allow for a project's contribution to be rendered less than cumulatively considerable with implementation of appropriate mitigation.

According to Section 15130(b) of the CEQA Guidelines, cumulative impact analysis may be conducted using one of two methods: the List Method, which includes "a list of past, present, and probable activities producing related or cumulative impacts," or the Plan Method, which uses "a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact." For the purposes of this SEIR, a combination of both methods is used for the cumulative analysis, as described below and consistent with the approved Plan PEIR.

To analyze the cumulative effects of the proposed Amendment per CEQA requirements, the following approach for each resource topic was applied:

1. Summarize the impacts of the proposed Amendment on the resource.
2. Summarize projected impacts of related plans and impacts of probable future projects, as applicable to each resource section, within the geographic scope of the cumulative impact analysis.
3. Discuss combined impacts and conclude whether cumulative impacts are significant, then explain whether the proposed Amendment's incremental contribution to any significant cumulative impact is cumulatively considerable and therefore significant.
4. Where the incremental contribution to a significant cumulative impact is cumulatively considerable, identify mitigation measures that would reduce the incremental effects and determine whether they would make the impact less than significant. If none exist, conclude that the contribution to the cumulative impact remains significant and unavoidable.

5.1.1 CUMULATIVE PROJECTS

Several existing and probable future projects in the San Diego region are forecast to occur within the 2050 timeframe of the proposed Amendment and could contribute to significant cumulative impacts. Past projects

include those that have been recently completed but were not necessarily considered in the baseline for the proposed Amendment and have ongoing impacts with the potential to combine with the impacts of other projects. Present and probable future projects include those that are under construction, in a preconstruction phase, or show a level of assurance that the project will move forward, such as allocated funding or movement through the necessary planning process for project approval. These projects have independent utility from the proposed Amendment, and do not rely on it for their justification. Some of these projects span beyond the boundaries of the San Diego region, have uncertain funding, and/or have no preliminary designs. Refer to Section 5.1.1, *Cumulative Impacts*, of the Final approved Plan PEIR for the complete list and description of cumulative projects. Updates to the listed cumulative projects that have occurred since the adoption of the approved Plan PEIR are described below.

Navy Old Town Campus Revitalization

The U.S. Department of the Navy (Navy) prepared a Draft Environmental Impact Statement (EIS) to evaluate the potential environmental consequences of the proposed modernization of Naval Base Point Loma Old Town Campus (OTC), San Diego, California. OTC is home to the Naval Information Warfare Systems Command (NAVWAR) (Navy 2021). The Navy analyzed five alternatives, and identified Alternative 4—high density development with a transit center—as its preferred alternative. The approved Plan included the transit center as a potential location for the Central Mobility Hub; however, this location is no longer being considered. The exact location of the Central Mobility Hub is unknown at this time.

The proposed modernization of NAVWAR's facilities on OTC would include demolition, construction, and renovation of buildings, utilities, and infrastructure. Modernization would be accomplished in either of two ways:

1. Navy Redevelopment: a Navy-only project that would construct new or renovate existing NAVWAR facilities at OTC. No public-private or mixed-use development would occur on OTC under this scenario.
2. Public-Private Redevelopment: collaboration between the Navy, the private sector, and possibly other government agencies to finance and construct new NAVWAR facilities at OTC. Development would include new facilities for NAVWAR and a range of private mixed-use development (e.g., residential, office, retail, hotel). The developers of the mixed-use development would pay for construction of NAVWAR facilities in exchange for the opportunity to develop the remaining OTC land. Two of the action alternatives analyzed in the EIS include consolidation of a transit center to OTC.

The Navy is currently in the process of selecting the master developer for the project.

Port/Maritime

In November 2022, the Board of Port Commissioners of the San Diego Unified Port District approved the National City Balanced Plan Port Master Plan Amendment and certified the National City Bayfront Projects EIR. The Port Master Plan Amendment is pending approval by the California Coastal Commission.

5.1.2 REGIONAL PLANNING DOCUMENTS

Refer to the regulatory setting in Chapter 5, *Cumulative Impacts*, of the approved Plan PEIR, which includes relevant federal, State, and local regulations still applicable to the proposed Amendment. The regulatory setting included therein is consistent with this evaluation. Updates to the regulatory setting that have occurred since the release of the approved Plan PEIR are described below.

California Air Resources Board 2022 Scoping Plan for Achieving Carbon Neutrality

CARB updated the State Scoping Plan as is required every 5 years by AB 32. The 2022 Scoping Plan for Achieving Carbon Neutrality (CARB 2022) provides an update to California's strategic framework for achieving carbon neutrality and reducing anthropogenic GHG emissions by 85 percent below 1990 levels by 2045 or earlier as directed by AB 1279. The 2017 Scoping Plan was discussed in the approved Plan PEIR. The 2022 Scoping Plan was published after the approved Plan PEIR and was not incorporated into the approved Plan PEIR. For more information, see Sections 4.2, *Energy*, and 4.3, *Greenhouse Gas Emissions*, of this SEIR.

5.1.3 GROWTH PROJECTIONS

This analysis considers population projections gathered from a variety of sources, in addition to the projections contained in adopted plans, to understand and characterize the cumulative setting. Population projections include:

- SANDAG Series 14 Regional Growth Forecast used as the basis for the approved Plan.
- Southern California Association of Governments' (SCAG) 2020 RTP/SCS Growth Forecast (SCAG 2020a).
- California Department of Finance Population Projections (DOF 2019).
- California-Baja California Border Master Plan (Caltrans 2021).

Population projections from these sources are provided in Table 5-1 for the 2025, 2035, and 2050 horizon years.

Table 5-1
Growth Projections Considered in the Cumulative Impacts Analysis

	Population			
Region	**2016**	**2025**	**2035**	**2050**
SANDAG	3,309,510	3,470,848	3,620,348	3,746,073
SCAG Region	18,832,000	19,432,587	21,443,000	20,179,646
Northern Baja California, Mexico	3,484,150	4,169,240	5,357,122	5,617,774
State of California	39,254,339	40,808,001	42,718,403	44,049,015

Sources: SANDAG = SANDAG Series 14 Regional Growth Forecast (SANDAG 2021); SCAG = SCAG 2020-2045 RTP/SCS Demographics and Growth Forecast (for 2016, 2035) (SCAG 2020a), DOF 2021 for 2025 and 2050; Northern Baja = California-Baja California Border Master Plan (Caltrans 2021), SANDAG 2015; State of California = California Department of Finance (DOF 2019).
Note: Northern Baja California generally includes the municipalities of Tijuana, Tecate, Playas de Rosarito, parts of Mexicali, and Ensenada.

5.1.4 GEOGRAPHIC SCOPE

The geographic scope defines the area in which the impacts of the proposed Amendment are analyzed in combination with similar impacts of cumulative projects or impacts associated with approved planning documents to determine if cumulative impacts would occur. The topic-specific geographic scope for the air quality, energy, GHG, noise and vibration, and transportation cumulative impact analysis is presented in Table 5-2. The geographic scopes for the cumulative impact analysis for the proposed Amendment are the same as those presented in the approved Plan PEIR. The cumulative impact analysis section for each resource topic area explains why the specific geographic scope was selected.

Table 5-2
Topic Specific Geographic Scope of Cumulative Impacts

Cumulative Impact Topic	Geographic Scope
Air Quality	Southern California/Northern Baja California
Energy	Southern California/Northern Baja California
Greenhouse Gas Emissions	Global
Noise and Vibration	Southern California/Northern Baja California
Transportation	Southern California/Northern Baja California

Note: Southern California generally includes the areas encompassed by SANDAG and SCAG jurisdictions. SCAG represents six Southern California counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) over an area covering more than 38,000 square miles. Northern Baja California generally includes the municipalities of Tijuana, Tecate, Playas de Rosarito, parts of Mexicali, and Ensenada.

5.2 CUMULATIVE IMPACT ANALYSIS

5.2.1 AIR QUALITY

C-AQ-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS RELATED TO AIR QUALITY

Emissions of criteria air pollutants can travel substantial distances and are not confined by jurisdictional boundaries; rather, they are influenced by large-scale climatic and topographical features. Thus, the geographic scope considered for cumulative impacts on air quality is the Southern California and northern Baja region.

A projection approach to air quality is appropriate given the air pollutant emissions resulting from the future overall transportation network improvements, increases in population, and necessary planned regional development.

The plans considered and relied on for this cumulative analysis include the SCAG 2020–2045 RTP/SCS (SCAG 2020a) and its EIR (SCAG 2020b); the San Diego Air Pollution Control District (SDAPCD) 2022 Revision of the Regional Air Quality Strategy for San Diego County (2022 RAQS) (SDAPCD 2022); SDAPCD 2020 San Diego Ozone State Implementation Plan (2020 SIP) (SDAPCD 2020); SDAPCD 2016 Eight-Hour O_3 Attainment Plan (2016 SIP) (SDAPCD 2016); South Coast Air Quality Management District (SCAQMD) 2016 Air Quality Management Plan (AQMP) (SCAQMD 2016); Imperial County Air Pollution Control District (ICAPCD) 2017 State Implementation Plan (ICAPCD 2017) and Final 2009 8 Hour Ozone Modified Air Quality Management Plan (ICAPCD 2010); U.S. Environmental Protection Agency (EPA) Border 2025 Program (EPA 2021), 2021–2023 Border 2025 Action Plan (EPA 2022); 2034 Tijuana, Tecate, and Playas de Rosarito Metropolitan Strategic Plan (IMPLAN 2013); and California-Baja California Border Master Plan (Caltrans 2021).

Significant cumulative impacts related to air quality would occur if emissions would conflict with or obstruct implementation of the RAQS and/or SIP; result in a cumulatively considerable net increase in nonattainment or attainment criteria pollutants, including volatile organic compounds (VOC), nitrogen oxides (NO_X), particulate matter smaller than or equal to 10 microns in diameter (PM_{10}), particulate matter smaller than or equal to 2.5 microns in diameter ($PM_{2.5}$), and sulfur oxides (SO_X); result in construction-related emissions above regional mass emission thresholds; expose sensitive receptors to substantial PM_{10} and $PM_{2.5}$ concentrations; expose sensitive receptors to substantial toxic air contaminant (TAC) concentrations; expose sensitive

receptors to carbon monoxide hot spots; and result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Impacts of the Proposed Amendment

The approved Plan PEIR identified significant and unavoidable impacts related to construction-related emissions exceeding significance thresholds (Impact AQ-3); exposure of sensitive receptors to substantial respirable particulate matter (PM_{10}) concentrations in 2025, 2035, and 2050 (Impact AQ-4); and exposure of new sensitive receptors to substantial TAC concentrations in 2025, 2035, and 2050 (Impact AQ-5). Mitigation measures **AQ-2a, AQ-3a, AQ-3b, AQ-3c, AQ-4, AQ-5a,** and **AQ-5b,** as well as **GHG-5a, GHG-5b, GHG-5d,** and **GHG-5f,** and **TRA-2** identified in the approved Plan PEIR would apply to the proposed Amendment.

The proposed Amendment would remove the regional road usage charge, which would result in an approximately 2 percent increase in VMT for horizon years 2035 and 2050 compared to what was estimated for the approved Plan, as shown in Section 4.5, *Transportation,* of this SEIR. Compared to the approved Plan PEIR, the proposed Amendment would result in substantially more severe significant impacts in 2025, 2035, and 2050 for Impact AQ-4 and Impact AQ-5. Table 5-3 summarizes the air quality impacts for horizon years 2025, 2035, and 2050 (see Section 4.1, *Air Quality*, of this SEIR).

Table 5-3
Summary of Air Quality Impacts and Mitigation Measures

Impact	2025	2035	2050
AQ-1	Less than Significant	Less than Significant	Less than Significant
AQ-2	Less than Significant	Less than Significant	Significant Mitigation measures required: AQ-2a and AQ-2b; GHG-5a, GHG-5b, GHG-5d, GHG-5f, and GHG-5g; and TRA-2
AQ-4	Significant Mitigation measures required: AQ-2a and AQ-4; GHG-5a, GHG-5b, GHG-5d, GHG-5f, and GHG-5g; and TRA-2	Substantially More Severe Significant Impact in Comparison to the Approved Plan PEIR. Mitigation measures required: AQ-2a and AQ-4; GHG-5a, GHG-5b, GHG-5d, GHG-5f, and GHG-5g; and TRA-2	Substantially More Severe Significant Impact in Comparison to the Approved Plan PEIR. Mitigation measures required: AQ-2a and AQ-4; GHG-5a, GHG-5b, GHG-5d, GHG-5f, and GHG-5g; and TRA-2
AQ-5	Substantially More Severe Significant Impact in Comparison to the Approved Plan PEIR. Mitigation measures required: AQ-2a, AQ-4, AQ-5a, and AQ-5b; GHG-5a, GHG-5b, GHG-5d, GHG-5f, and GHG-5g; TRA-2	Substantially More Severe Significant Impact in Comparison to the Approved Plan PEIR. Mitigation measures required: AQ-2a, AQ-4, AQ-5a, and AQ-5b; GHG-5a, GHG-5b, GHG-5d, GHG-5f, and GHG-5g; TRA-2	Substantially More Severe Significant Impact in Comparison to the Approved Plan PEIR. Mitigation measures required: AQ-2a, AQ-4, AQ-5a, and AQ-5b; GHG-5a, GHG-5b, GHG-5d, GHG-5f, and GHG-5g; TRA-2
AQ-6	Less than Significant	Less than Significant	Less than Significant

As Chapter 1, *Introduction*, of this SEIR explains, the proposed Amendment would not alter the impact conclusions described in the approved Plan PEIR for Impacts AQ-3 and AQ-7; therefore, these impacts were not analyzed in this SEIR.

Impact Projections in Adopted Plans

The approved Plan PEIR identified adopted plans applicable to the cumulative impact analysis, including the 2016 RAQS, 2020 SIP, 2016 AQMP, and ICAPCD 8-Hour Ozone Modified AQMP; the U.S. Mexico Border Environmental Program: Border 2025; the 2034 Tijuana, Tecate, and Playas de Rosarito Metropolitan Strategic Plan; and the California-Baja California Border Master Plan. These plans demonstrate long-term trends towards air quality improvement, but also show that further significant pollution reduction is required for the region to meet various State and federal air quality requirements. See Chapter 5 of the adopted Plan PEIR for further information.

The 2022 RAQS was published on March 9, 2023, and supersedes the 2016 RAQS as the applicable RAQS for the proposed Amendment. The 2022 RAQS states that air quality progress is occurring within San Diego County, but that current State and federal ozone standards are not yet attained, and continued emission reduction efforts are needed. Total VOC and NO_X emissions are expected to continue decreasing through 2045 due to ongoing implementation of existing local stationary source rules, as well as State and federal mobile source regulations (SDAPCD 2022).

Cumulative Impacts and Impact Conclusions

2025

A cumulative impact in 2025 would result if the combined impacts of the proposed Amendment and impact projections from adopted plans within Southern California and the northern Baja California region were significant when considered together, even if not independently significant. As described in Section 4.1 of this SEIR, implementation of the proposed Amendment in Year 2025 would reduce the area of threshold exceedance for the annual PM10 California Ambient Air Quality Standards (CAAQS) in Escondido and eliminate exceedances of the 24-hour PM10 CAAQS in Chula Vista. Therefore, the proposed Amendment would result in a significant impact consistent with the approved Plan PEIR (Impact AQ-4). In addition, the proposed Amendment would increase the incremental area of threshold exceedance for new land uses, result in new cancer risk exceedances for new recreational land uses, and result in new chronic hazard exceedances for new recreational and school land uses. Therefore, because implementation of the proposed Amendment in Year 2025 would expose new receptors to substantial TAC emissions, this would result in substantially more severe significant impacts compared to the approved Plan PEIR (Impact AQ-5).

Many of the air quality plans note that air quality across the region has been improving due to implementation of various measures and stricter emission requirements. Nevertheless, given some uncertainty that air quality plans throughout Southern California and northern Baja would all be implemented successfully, and given that the proposed Amendment's direct impacts are significant, cumulative air quality impacts would also be significant due to PM_{10} emissions exceeding thresholds, the exposure of sensitive receptors to substantial PM_{10} concentrations, and exposure of sensitive receptors to TACs. Compared to the approved Plan PEIR, the proposed Amendment would result in more severe cumulative air quality impacts due to the exposure of new areas to exceedances of the annual PM10 thresholds and exposure of new receptors to substantial TAC emissions.

Because cumulative air quality impacts throughout Southern California and northern Baja by 2025 would be significant, and because the proposed Amendment's incremental air quality impacts are significant, the proposed Amendment's incremental air quality impacts are also cumulatively considerable in 2025 (Impact C-AQ-1).

2035

As described in Section 4.1 of this SEIR, implementation of the proposed Amendment in Year 2035 would not change the maximum incremental concentration for any of the PM10 standards and would reduce the area of threshold exceedance for 24-hour PM10 CAAQS in Escondido and eliminate the exceedances of the 24-hour PM10 CAAQS in Chula Vista. However, the proposed Amendment would increase the area of threshold exceedance for the annual PM10 CAAQS in Escondido and expose new areas to exceedances of the annual PM10 CAAQS. As a result, it was determined that the proposed Amendment would result in substantially more severe significant impacts compared to the approved Plan PEIR (Impact AQ-4). In addition, the proposed Amendment would increase the incremental area of threshold exceedance for new sources and new land uses and result in new chronic hazard exceedances for new recreational and school land uses. Therefore, because implementation of the proposed Amendment in Year 2035 would expose new receptors to substantial TAC emissions, this would result in substantially more severe significant impacts compared to the approved Plan PEIR (Impact AQ-5).

Because cumulative air quality impacts throughout Southern California and northern Baja by 2035 would be significant, and because the proposed Amendment's incremental air quality impacts are significant, the proposed Amendment's incremental air quality impacts are also cumulatively considerable in 2035 (Impact C-AQ-1).

2050

As described in Section 4.1 of this SEIR, implementation of the proposed Amendment in Year 2050 would not change the maximum incremental concentration for annual PM10 CAAQS and would decrease maximum incremental concentrations for the 24-hour PM10 CAAQS and 24-hour PM10 CAAQS. However, the proposed Amendment would increase the area of threshold exceedance for the annual PM10 CAAQS and would expose new areas to exceedances of the annual PM10 CAAQS, and therefore would result in substantially more severe significant impacts compared to the approved Plan PEIR (Impact AQ-4). In addition, the proposed Amendment would increase the incremental area of threshold exceedance for new sources and new land uses, result in new cancer risk exceedances for new recreational sources and land uses, result in new chronic hazard exceedances for schools exposed to new sources, and result in new chronic hazard exceedances for new recreational and school land uses. Therefore, because implementation of the proposed Amendment in Year 2050 would expose new receptors to substantial TAC emissions, this would result in substantially more severe significant impacts compared to the approved Plan PEIR (Impact AQ-5).

Because cumulative air quality impacts throughout Southern California and northern Baja by 2050 would be significant, and because the proposed Amendment's incremental air quality impacts are significant, the proposed Amendment's incremental air quality impacts are also cumulatively considerable in 2050 (Impact C-AQ-1).

Mitigation Measures

C-AQ-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS RELATED TO AIR QUALITY

Implementation of mitigation measures **AQ-2a** through **AQ-5b, GHG-5a**, **GHG-5b**, **GHG-5d**, **GHG-5e**, **GHG-5f**, and **TRA-2,** identified in the approved Plan PEIR, remain applicable and would reduce air quality impacts associated with the proposed Amendment. Section 4.3, *Greenhouse Gas Emissions*, of this SEIR includes an additional mitigation measure, **GHG-5g**, that would also reduce air quality impacts associated with the proposed Amendment.

Similar mitigation measures are specified in other regional plans, such as the SCAG 2020-2045 RTP/SCS EIR. However, that EIR concluded that even with implementation of mitigation measures, some direct air quality impacts would remain significant. Regional air quality planning documents provide short- and long-term strategies for reducing air pollution and control measures to be implemented by applicable jurisdictions and agencies to further reduce air pollutant emissions.

As described in Section 4.1 of this SEIR, mitigation measures **AQ-2a** through **AQ-5b,** as well as **GHG-5a**, **GHG-5b**, **GHG-5d**, **GHG-5e**, **GHG-5f,** and **GHG-5g**, and **TRA-2**, would not reduce the proposed Amendment's incremental impacts to less-than-significant levels. Therefore, the proposed Amendment's incremental contributions to cumulative air quality impacts in years 2025, 2035, and 2050 would remain cumulatively considerable post-mitigation.

5.2.2 ENERGY

C-EN-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS ON ENERGY

The area of geographic consideration for cumulative energy impacts is the Southern California and northern Baja region. The demand for energy is a common theme throughout the region. Land use change and the transportation system would influence the demand for future energy development or the location and need for new or additional energy infrastructure across the Southern California and northern Baja region. The provision of energy can be linked to jurisdictions, but often service providers and their infrastructure cover large areas. Thus, it is necessary to consider the Southern California and northern Baja region as a whole and the overall amount of development that would generate additional pressure and demand on energy use and generation facilities.

A hybrid approach (see Section 5.1 regarding the methodology for cumulative analysis) to the cumulative energy analysis allows for a discussion of regional impacts associated with general patterns of regional urbanization, growth, and land use changes that would create new or additional energy use, modify demand for the provision of energy, or dictate where new or expanded energy infrastructure is located. Discussion of specific projects also allows for consideration of individual large-scale existing and probable future projects with known impacts on energy resources.

Growth, land use change, and transportation system improvements occurring throughout the Southern California and northern Baja region would impact energy demand, development, and supply. Cumulative energy impacts would result if there were an increase in overall per capita energy consumption or inefficient, wasteful, or unnecessary energy use; or obstruction of state and local renewable energy and energy efficiency plans, regulations, and policies.

Consistent with the approved Plan PEIR, documents considered in the cumulative energy analysis include the California Energy Commission's (CEC) California Energy Demand 2018-2030 Revised Forecast (CEC 2018), County of San Diego Strategic Energy Plan 2015-2020 (County of San Diego 2015), and San Diego Gas & Electric Company 2012 Long-Term Procurement Plan (SDG&E 2012).

Impacts of the Proposed Amendment

The approved Plan PEIR identified less-than-significant impacts related to the inefficient, wasteful, or unnecessary consumption of energy in 2025, 2035, and 2050. As detailed in Section 4.2, *Energy,* of this SEIR, the proposed Amendment would not change land use, anticipated growth within the region, or proposed transportation facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment would remove the regional road usage charge, which would result in an increase in VMT as discussed in Section 4.5, *Transportation,* of this SEIR. As a result, energy use related to on-road vehicle gasoline and diesel during operations would increase compared to the approved Plan PEIR. However, consistent with the approved Plan PEIR, the proposed Amendment would not result in an increase in overall per capita energy consumption in 2025, 2035, or 2050, and the impact would be less than significant (Impact EN-1).

The approved Plan PEIR identified less-than-significant impacts related to compliance with State programs and local plans and policies aimed at reducing energy consumption and promoting renewable energy. As discussed in Section 4.2 of this SEIR, the proposed Amendment would not change land use, anticipated growth within the region, or proposed transportation facility improvements from what was analyzed in the approved Plan PEIR. The removal of the road usage charge would increase energy use from on-road gasoline and diesel vehicles during operations. The county and various cities within the SANDAG region, in accordance with State law, will require the implementation of a variety of energy efficiency and renewable energy measures to decrease fossil fuel energy consumption as a means to reduce GHG emissions. As detailed in Section 4.2 of this SEIR, the proposed Amendment would comply with the State's programs and local plans and policies aimed at reducing energy consumption and promoting renewable energy. Thus, this impact would be less than significant in 2025, 2035, and 2050 (Impact EN-2).

Impacts of Related Projects

Multiple energy projects in various stages of planning, permitting, and construction are ongoing in the Southern California and northern Baja region. Some of these include the Crimson Solar Project in Blythe, California; Palen-Nalep Solar, Victory Pass Solar, and Rice Solar energy projects in Riverside County; Carlsbad NRG and Pio Pico Energy Center in San Diego County; Clean Hydrogen Energy and Comino Solar project in Kern County; and Black Rock 5 & 6 Geothermal Power Project in Imperial County. All energy projects requiring CEC approval or licensing must go through the CEC permitting process, which is a certified regulatory program under CEQA. The CEC license/certification subsumes all requirements of State, local, or regional agencies otherwise required before new infrastructure is constructed.

The California High Speed Train (HST) environmental document states that, while the project would have a potentially significant effect related to long-term electric power consumption when viewed on a system-wide basis, it represents a more energy-efficient mode of transportation than travel by aircraft or car, such that the HST system would result in an overall reduction in total energy consumption. The HST EIR/EIS states that the HST system would reduce energy consumption overall and any localized energy impacts would be avoided through proper planning and design of power distribution systems and their relationship with the overall power grid (HSRA 2005).

Energy impacts were found to be less than significant for the City of San Diego Pure Water North City Project (City of San Diego 2018) and were not addressed in the Navy OTC Revitalization Draft EIS (Navy 2021).

Other land development and infrastructure projects throughout the region and State, such as petroleum pipeline transportation infrastructure, freight rail infrastructure, and energy generation and transmission corridors, would also result in impacts related to energy if these projects occur within the same time frame.

Impact Projections in Adopted Plans

The approved Plan PEIR identified adopted plans applicable to cumulative impact analysis. As discussed, the SCAG 2020-2045 RTP/SCS EIR identified that implementation of the RTP/SCS would contribute to a cumulatively considerable increase in non-renewable energy use that would be significant and unavoidable. The EIR also found that the plan would result in a significant and unavoidable impact related to the use of electricity, natural gas, gasoline, diesel, and other non-renewable energy types in the construction and expansion of the regional transportation system and forecasted development (SCAG 2020a).

The CEC California Energy Demand 2018-2030 Revised Forecast report shows the continued increase in demand for energy supplies in the state over the next 10 years (CEC 2018).

The County of San Diego Strategic Energy Plan's main priorities are to control utility costs, accelerate distributed generation employment, facilitate alternative fuel vehicle deployment, reduce the region's carbon footprint, expand choice for consumer energy supply, and increase the use of information technology to help reach objectives and inform the public (County of San Diego 2015).

SDG&E's 2012 Long-Term Procurement Plan addresses both demand- and supply-side resources and makes recommendations to achieve the appropriate balance between each of these resource types. The plan adds resources in the order of the State's priorities as follows: energy efficiency, demand response, renewable power, distributed generation, and clean and efficient fossil-fired generation (SDG&E 2012).

Cumulative Impacts and Impact Conclusions

2025, 2035, and 2050

As described in Section 4.2 of this SEIR, implementation of the proposed Amendment would not result in an increase in overall per capita energy consumption or use energy in an inefficient, wasteful, or unnecessary manner, or conflict with the State's programs and local plans and policies aimed at reducing energy consumption and promoting renewable energy. Therefore, cumulative energy impacts would not be significant, and the proposed Amendment would not result in cumulatively considerable impacts in 2025, 2035 or 2050. Impacts would be less than significant.

Mitigation Measures

No mitigation is required.

5.2.3 GREENHOUSE GAS EMISSIONS

C-GHG-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS RELATED TO GHG EMISSIONS

Climate change is a global problem and GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Thus, the area of geographic consideration for cumulative impacts of GHG emissions is global. Atmospheric concentrations of GHGs have been increasing since measurements began in the 1970s. As of 2022, the globally averaged annual mean concentration of atmospheric carbon dioxide (CO_2) is approximately 417 parts per million (ppm), methane (CH_4) is approximately 1,911 parts per billion (ppb), and nitrous oxide (N_2O) is approximately 335 ppb (NOAA 2022a, 2022b, 2022c).

The projection approach to GHG considers both forecasted GHG emissions on a global scale, as well as a State and local-level analysis of GHGs. In the SANDAG region, the transportation sector is the largest contributor of GHG emissions. Thus, this analysis takes into consideration the cumulative GHG impacts resulting from the overall future transportation improvements, future increases in population, and planned regional development tied to the proposed Amendment.

From the standpoint of CEQA, GHG impacts on climate change are inherently cumulative on a statewide level. Significant cumulative impacts would occur if the proposed Amendment were to directly or indirectly result in an increase in GHG emissions compared to existing project conditions; conflict with SB 375 GHG emission reduction targets for 2035, SANDAG Board of Directors Resolution No. 2021-17, or Local Climate Action Plans; or be inconsistent with the State's ability to achieve the SB 32 target of reducing statewide GHG emissions to 40 percent below 1990 levels by 2030, the accelerated target of 48 percent below 1990 levels by 2030 under the 2022 Scoping Plan Scenario, and whether the proposed Amendment is inconsistent with the State's ability to achieve the long-term reduction goals of EO S-3-05 and EO B-55-18, and AB 1279.

This cumulative impact assessment considers and relies on the impact analysis within this SEIR for the proposed Amendment, the 2016 GHG Inventory and Projections for the San Diego region (SANDAG 2021), SB 375, the SANDAG Board of Directors Resolution No. 2021-17, and CARB's 2022 Scoping Plan.

Impacts of the Proposed Amendment

The approved Plan PEIR identified a significant and unavoidable impact related to inconsistencies with the State's ability to achieve the 2030 reduction target of SB 32 and long-term reduction goals of EO S-3-05, EO B-55-18, and AB 1279 (Impact GHG-5). Mitigation measures **GHG-5a** through **GHG-5f**, as well as **AQ-3b, AQ-3c,** and **AQ-4,** revised **TRA-2, WS-1a,** and **WS-1b** identified in the approved Plan PEIR would remain applicable under the proposed Amendment. Section 4.5, *Transportation*, of this SEIR, includes minor updates to mitigation measure TRA-2. Additional mitigation measure **GHG-5g** is proposed in Section 4.3 of this SEIR to help further reduce regional GHG emissions. Nonetheless, as discussed in Section 4.3, implementation of the proposed Amendment would result in a significant impact because the proposed Amendment would not meet the 85 percent reduction in anthropogenic GHG emissions goal of AB 1279 or the 2022 Scoping Plan. Impacts would be significant and unavoidable (Impact GHG-5).

As previously discussed, the proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR. The proposed Amendment would not directly or indirectly result in an increase in GHG emissions compared to existing conditions. Implementation of the proposed Amendment would result in a 19 percent reduction in per capita CO_2 emissions from passenger cars and light-duty trucks from 2005 levels by 2035, which meets the 2035 target of a 19 percent reduction for the SANDAG region (Impact GHG-2). GHG emissions reductions under the proposed Amendment would exceed the SANDAG Board Resolution target of a 30 percent reduction by 2035 by 13 percent (Impact GHG-3).

Table 5-4 summarizes the GHG emissions impacts under the proposed Amendment for Horizon Years 2025, 2030, 2035, 2045, and 2050.

Table 5-4
Summary of GHG Emissions Impacts and Mitigation Measures

Impact	2025	2030	2035	2045	2050
GHG-1	Less than Significant	N/A	Less than Significant	N/A	Less than Significant
GHG-2	N/A	N/A	Less than Significant	N/A	N/A; SB 375 does not establish 2050 GHG emissions reduction target
GHG-3	N/A	N/A	Less than Significant	N/A	N/A
GHG-4	Less than Significant	N/A	Less than Significant	N/A	Less than Significant
GHG-5	N/A	Significant impact not identified in approved Plan PEIR; mitigation measures required: GHG-5a through GHG-5g, AQ-3b, AQ-3c, AQ-4, TRA-2, WS-1a, and WS-1b	N/A	Significant impact not identified in approved Plan PEIR; mitigation measures required: GHG-5a through GHG-5g, AQ-3b, AQ-3c, AQ-4, TRA-2, WS-1a, and WS-1b	Significant impact not identified in approved Plan PEIR; mitigation measures required: GHG-5a through GHG-5g, AQ-3b, AQ-3c, AQ-4, TRA-2, WS-1a, and WS-1b

N/A = not applicable.

Impact Projections in Adopted Plans

The approved Plan PEIR identified adopted plans applicable to the cumulative impact analysis. Section 4.8, *Greenhouse Gas Emissions,* of the approved Plan PEIR outlines the various federal, State, and local laws, regulations, and policies that are aimed at reducing GHG emissions. Reports such as the *Climate Change 2014 Synthesis Report* published by the United Nation's Intergovernmental Panel on Climate Change (IPCC) demonstrate that recent climate changes have had widespread impacts on human and natural systems and that cumulative emissions of CO_2 will largely determine global mean surface warming by the late 21st century and beyond.

The State of California has a comprehensive policy and regulation regimen related to GHG reduction, including SB 32, EO S-3-05, EO B-55-18, AB 1279 and the 2022 Scoping Plan. The State is currently on target for achieving GHG emission reductions compared to existing conditions. The 2022 Scoping Plan builds upon and includes additional GHG reduction measures from the previous State Scoping Plan to accelerate the 2030 target to 48 percent below 1990 levels. The 2022 Scoping Plan includes strategies for achieving carbon neutrality in the State by 2045, as well as achieving an 85 percent reduction in anthropogenic emissions by 2045 (CARB 2022). Nonetheless, future statewide cumulative GHG emissions are highly variable and unknown; thus, cumulative impacts related to GHG emissions remain significant. For more information, see Sections 4.2, *Energy*, and 4.3, *Greenhouse Gas Emissions*, of this SEIR.

Cumulative Impacts and Impact Conclusions

2025

A significant cumulative impact in 2025 would result if the combined impacts of the proposed Amendment and impact projections from adopted plans were significant when considered together, even if not independently significant. GHG emissions and impacts on global climate change are inherently cumulative as the quantity of GHGs that it takes to ultimately result in climate change is not precisely known; however, a single project would be unlikely to measurably contribute to a noticeable incremental change in the global average temperature. As described above, a wide variety of plans and regulations at all levels of government, including global, federal, state, and local, provide for regulation and reduction of GHG emissions. However, there is uncertainty about the ability of the nation and world to meet GHG reduction goals. Many of the proposed strategies and mitigation proposed in GHG reduction plans and policies are based on new and developing technology and can be highly dependent upon the global economy and other influencing factors.

As discussed in Section 4.3 of this SEIR, implementation of the proposed Amendment in 2025 would result in a less-than-significant impact. The proposed Amendment would not directly or indirectly result in an increase in GHG emissions compared to existing conditions because total annual regional emissions would be approximately 14 percent lower in 2025 relative to 2016. The proposed Amendment would not conflict with local climate action plans. However, uncertainty about the ability for GHG emissions to be reduced by national and international efforts means that global GHG emissions may not be reduced to 2016 levels. But because the proposed Amendment's GHG emissions decrease between 2016 and 2025, and would not conflict with local climate plans, there is no significant GHG cumulative impact in 2025, and the proposed Amendment's incremental contribution would not be cumulatively considerable.

2030

As described in Section 4.3 of this SEIR, implementation of the proposed Amendment in 2030 would result in a new significant impact because the proposed Amendment would not meet the SB 32 reference point of 13.4 million metric tons (MMT) of carbon dioxide equivalent (CO_2e) emissions, or the accelerated 2022 Scoping Plan reference point of 13.4 $MMTCO_2e$. Because cumulative GHG impacts on a global basis would be significant, and because the proposed Amendment would not meet the 2030 reference points, the proposed Amendment's incremental GHG impacts in 2030 would also be cumulatively considerable (Impact C-GHG-1).

2035

As described in Section 4.3, implementation of the proposed Amendment in 2035 would decrease emissions from 2016 levels. Moreover, the proposed Amendment would not conflict with SB 375 emission reduction targets for 2035 because it would result in a 19 percent reduction in per capita CO_2 emissions from passenger cars and light-duty trucks from 2005 levels by 2035, which meets the 2035 target of a 19 percent reduction for the SANDAG region. Because the proposed Amendment's GHG emissions would decrease between 2016 and 2035 and would not conflict with local climate plans, there is no significant GHG cumulative impact in 2035, and the proposed Amendment's incremental contribution would not be cumulatively considerable.

2045 and 2050

As described in Section 4.3 of this SEIR, implementation of the proposed Amendment in 2045 and 2050 would result in a new significant impact because the proposed Amendment would not meet the 85 percent reduction in anthropogenic emissions goal of AB 1279 or the 2022 Scoping Plan. Because cumulative GHG impacts on a

global basis would be significant, and because the proposed Amendment would not meet the 85 percent reduction in anthropogenic emissions goal of AB 1279 or the 2022 Scoping Plan, the proposed Amendment's incremental GHG impacts in 2045 and 2050 would also be cumulatively considerable (Impact C-GHG-1).

Mitigation Measures

C-GHG-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS RELATED TO GHG EMISSIONS

Implementation of mitigation measures **GHG-5a** through **GHG-5f, AQ-3b, AQ-3c, AQ-4, TRA-2, WS-1a,** and **WS-1b** identified in the approved Plan PEIR remain applicable and would reduce direct and indirect GHG emissions associated with the proposed Amendment. Section 4.3 of this SEIR includes an additional mitigation measure, **GHG-5g.** Section 4.5, *Transportation*, of this SEIR, includes updates to mitigation measure **TRA-2**. These mitigation measures include actions such as competitive grant funding for GHG-reducing projects; allocation of additional funding for electric vehicle-charging infrastructure and incentives; allocation of funding to habitat creation, restoration, or enhancement projects that remove carbon dioxide from the atmosphere; implementing a regional carbon offset program; achieving energy savings through a regional energy network; and measures to reduce GHG emissions from transportation and development projects. Additional mitigation measures that would reduce GHG emissions are presented in the air quality, energy, and water supply sections.

While SANDAG has the authority to implement mitigation measures **GHG-5a** through **GHG-5g**, **AQ-3b**, **AQ-3c**, **AQ-4**, **TRA-2**, **WS-1a**, and **WS-1b** and has committed to do so, it has no legal authority to require other transportation project sponsors or local jurisdictions to implement mitigation measures for specific projects for which they have responsibility and jurisdiction. Also, even full implementation of all identified mitigation measures would not be sufficient to reduce the proposed Amendment's GHG emissions below the regional 2030, 2045, and 2050 GHG reduction reference points based on SB 32, EO B-55-18, EO S-3-05, and AB 1279. Mitigation measures **GHG-5a** through **GHG-5g** would help reduce regional GHG emissions by reducing VMT, increasing use of alternative fuels, and other measures; and they would reduce inconsistency of the proposed Amendment's GHG emissions with the State's ability to achieve the SB 32, EO B-55-18, EO S-3-05, and AB 1279 GHG reduction goals. However, full implementation of changes required to achieve the SB 32 target or Executive Orders' goals is beyond SANDAG's or local agencies' current abilities. Because the proposed Amendment's 2030, 2045, and 2050 GHG emissions would remain inconsistent with the State's current ability to achieve the Executive Orders' GHG reduction goals, this impact (Impact GHG-5) remains cumulatively considerable post-mitigation.

5.2.4 NOISE AND VIBRATION

C-NOI-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS RELATED TO NOISE AND VIBRATION

The geographic scope for the noise and vibration cumulative analysis is the Southern California and northern Baja region. Transportation networks, including facilities such as the regional roadway/interstate networks, rail lines, and airports, are large contributors to environmental noise in the region. Development, growth, population increase, or land use change can cause an increase in ambient noise and vibration directly related to the type of development, increased use of transportation facilities, and the general introduction of new sources of noise and vibration.

This cumulative noise impact assessment considers the impact analysis presented in the SCAG 2020-2045 RTP/SCS and its EIR (SCAG 2020a, 2020b), California-Baja California Border Master Plan (Caltrans 2021), and the 2019 San Diego International Airport Development Plan EIR (SDCRAA 2019a).

Impacts of the Proposed Amendment

The approved Plan PEIR identified a significant and unavoidable impact related to exceeding noise standards during construction and operations. Mitigation measures **NOI-1a, NOI-1b**, and **NOI-c** identified in the approved Plan PEIR would remain applicable under the proposed Amendment. The analysis of the proposed Amendment shows no new significant environmental effect or substantial increase in the severity of previously identified significant effects would occur. As discussed in Section 4.4, *Noise and Vibration*, of this SEIR, the proposed Amendment would not change land use or anticipated growth within the region or introduce any new transportation network or facility improvements from what was analyzed in the approved Plan PEIR, and therefore would not introduce any additional associated impacts related to construction and operational noise. The proposed Amendment would remove the regional road usage charge and would result in an approximately 2 percent increase in VMT for horizon years 2035 and 2050 above what was estimated for the approved Plan, as discussed in Section 4.4 and Section 4.5, *Transportation,* of this SEIR, thereby resulting in an increase in operational noise of less than 0.1 decibel (dB). Therefore, the conclusion for the proposed Amendment would be unchanged from what was identified in the approved Plan PEIR and would remain significant and unavoidable in 2025, 2035, and 2050 (Impact NOI-1).

The approved Plan PEIR also identified a significant and unavoidable impact related to exceeding groundborne vibration criteria. Mitigation measures **NOI-2a** and **NOI-2b** identified in the approved Plan PEIR would remain applicable under the proposed Amendment. The analysis of the proposed Amendment shows that the removal of the regional road usage charge would not result in new or substantially more severe significant vibration impacts at nearby receptors. Therefore, the conclusion for the proposed Amendment would remain unchanged from what was identified in the approved Plan PEIR and would remain significant and unavoidable in 2025, 2035, and 2050 (Impact NOI-2).

As discussed in Chapter 1, *Introduction*, of this SEIR, the proposed Amendment would not alter the impact conclusion described in the approved Plan PEIR for Impact NOI-3; therefore, that impact was not analyzed further in this SEIR.

Impact of Related Projects

Other related regional projects, such as the HST, could have more localized construction and operational noise impacts, which would occur along the project alignment. Other land development and infrastructure projects throughout the region and State, such as petroleum pipeline transportation infrastructure, freight rail infrastructure, and energy generation and transmission corridors, would also result in impacts related to noise if these projects occur close to one another and concurrently. Construction-related noise is generally considered cumulatively considerable if the construction sites for two or more projects are located within 500 feet of each other and if construction activity occurs within similar time frames.

Both the Navy Old Town Campus Revitalization and City of San Diego Pure Water North City Project would result in significant noise-related impacts; however, impacts associated with noise would be significant and

mitigated to a level of less than significant, respectively. Because these projects would be located more than 500 feet from each other, their construction impacts would not be cumulatively considerable.[1]

Operational noise impacts would be associated with increases in traffic volumes and/or increases in noise levels from stationary sources. A doubling of traffic would result in a 3 dB increase in noise levels (Harris 1979). Traffic volumes are not expected to double associated with the proposed and cumulative projects within the region. However cumulative traffic could still result in an impact at noise-sensitive receptors within or surrounding the project areas. Additionally, the proposed and cumulative projects could expose noise-sensitive receptors to increased noise levels from stationary noise sources (e.g., heating, ventilation, and air conditioning systems) that exceed relevant standards. Therefore, related projects that would result in increases in regional traffic or increased stationary noise are considered to result in significant and cumulatively considerable impacts related to operational noise levels.

Impact Projections in Adopted Plans

The approved Plan PEIR identified adopted plans applicable to the cumulative impact analysis. As discussed, the SCAG 2020-2045 RTP/SCS EIR found that construction activities associated with the proposed transportation projects and development projects in the 2020-2045 RTP/SCS would temporarily generate substantial noise and vibration levels above ambient background levels, sometimes for extended durations, and would result in a significant impact. Additionally, noise-sensitive land uses could be exposed to operational noise in excess of normally acceptable noise levels and/or could experience substantial increases in noise as a result of the operation of expanded or new transportation facilities or increased transportation activity. The EIR also found that the 2020-2045 RTP/SCS would contribute to cumulative ambient noise and vibration levels in areas outside the region as a result of the operation of expanded or new transportation facilities (i.e., increased traffic resulting from new infrastructure and use of new and existing transit and rail facilities) (SCAG 2020b).

The California-Baja California Border Master Plan is a binational comprehensive approach to coordinate planning and delivery of projects at land Ports of Entry (POEs) and transportation infrastructure serving those POEs in the California-Baja California region. The Master Plan does not have an associated environmental analysis document; however, projects included in the Master Plan could have adverse noise impacts due to the expansion of existing, and development of new, transportation facilities that could generate noise and vibration in excess of the ambient condition (Caltrans 2021).

The 2019 San Diego International Airport Development Plan EIR (SDCRAA 2019a) considered potential aviation, surface transportation, construction, and cumulative noise impacts associated with the Airport Development Plan and its alternatives. The EIR found that the Airport Development Plan's cumulative noise impact would be cumulatively considerable in combination with aircraft and roadway noise exposure levels. Construction noise changes due to the Airport Development Plan were found to be less than significant.

[1] Noise attenuates at a rate of 6 dB per doubling of distance. Additionally, a noise level that is 10 dB or more below another reference noise level (i.e. one noise level at 60 A-weighted decibels [dBA] vs. one that is 50 dBA) would not appreciably increase the cumulative noise level. Therefore, two noise sources that are over 500 feet apart would attenuate to below a level at which noise would be cumulatively considerable.

Cumulative Impacts and Impact Conclusions

2025, 2035, 2050

A significant cumulative impact in 2025, 2035, and 2050 would result if the combination of impacts of the proposed Amendment and impact projections from adopted plans were significant when considered together, even if not independently significant. As described above, the proposed Amendment's impacts related to exposure to or generation of noise levels in excess of standards, substantial temporary and permanent increases in noise levels, and excessive groundborne vibration and groundborne noise in 2025, 2035, and 2050 would remain unchanged from what was identified in the approved Plan PEIR and would remain significant and unavoidable. In addition, significant noise impacts have been identified in other regional environmental analysis documents. The combination of the direct noise impacts from the approved Plan as amended by the proposed Amendment and other adopted plans that would affect the San Diego and northern Baja region would therefore result in significant cumulative noise impacts, based on exposure to or generation of noise levels in excess of standards, substantial temporary and permanent increases in noise levels, and excessive groundborne vibration and groundborne noise. Because cumulative noise impacts throughout the San Diego and northern Baja region in horizon years 2025, 2035, and 2050 would be significant, and because the proposed Amendment's incremental noise impacts are significant, the proposed Amendment would result in incremental noise impacts that are also cumulatively considerable. (Impact C-NOI-1).

Mitigation Measures

C-NOI-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS RELATED TO NOISE AND VIBRATION

Implementation of mitigation measures **NOI-1a, NOI-1b,** and **NOI-1c** identified in the approved Plan PEIR remain applicable and would reduce construction and operational noise and vibration impacts associated with the proposed Amendment. Mitigation measure **NOI-1a** calls for construction noise reduction measures to meet local noise standards and reduce temporary noise levels during construction, and mitigation measures **NOI-1b** and **NOI-1c** call for operational noise reduction measures for transportation network improvements and development projects, respectively, to be implemented to meet local standards and reduce permanent noise levels during operations. As outlined in Section 4.4 of this SEIR, mitigation measures would reduce noise impacts but would not guarantee reduction of all proposed Amendment noise impacts below a level of significance for all projects. Therefore, the proposed Amendment's incremental contributions to cumulative noise impacts in horizon years 2025, 2035, and 2050 would remain cumulatively considerable post-mitigation.

Mitigation measure **NOI-2a** calls for groundborne vibration and groundborne noise reduction measures to be implemented during construction activities, and mitigation measure **NOI-2b** requires groundborne vibration and groundborne noise-reducing measures for rail operations. As outlined in Section 4.4 of this SEIR, mitigation measures would reduce significant increases in groundborne vibration and groundborne noise for some projects; however, it cannot be guaranteed that all future project-level impacts can be mitigated to a less-than-significant level. Therefore, the proposed Amendment's incremental contributions to cumulative groundborne vibration and groundborne noise impacts in horizon years 2025, 2035, and 2050 would remain cumulatively considerable post-mitigation.

5.2.5 TRANSPORTATION

C-TRA-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS TO TRANSPORTATION

The geographic scope for the transportation cumulative analysis is the Southern California and northern Baja region. Urban development and transportation systems are not bound by jurisdictional boundaries as movement within, through, and beyond the region is necessary for commuters, personal travel, and goods movement. Thus, it is important to consider both the Southern California region as well as the connection with northern Baja California.[2]

A hybrid approach for the cumulative analysis of transportation allows for an overarching discussion of regional impacts associated with general patterns of regional urbanization, growth, and land use change and how the transportation network both influences, and is affected by, those regional development patterns. Discussion of specific existing and probable future projects will also allow for consideration of individual projects with known impacts on traffic and transportation.

Cumulative impacts related to transportation would occur if future operating conditions of the regional transportation system, including the SANDAG, SCAG, and northern Baja regions, conflict with a program, plan, ordinance or policy addressing the circulation system; conflict with CEQA Guidelines Section 15064.3 by not achieving the substantial VMT reductions needed to help achieve statewide GHG reduction goals; substantially increase hazards due to design features; or result in loss of parking that causes significant adverse environmental impacts not evaluated elsewhere in the SEIR.

This cumulative impact assessment relies on the impact analysis within this SEIR for the proposed Amendment; SCAG 2020-2045 RTP/SCS EIR (SCAG 2020a, SCAG 2020b); SCAG 2021 Federal Transportation Improvement Program (SCAG 2021); San Diego County Regional Airport Authority 2008 Airport Master Plan, San Diego International Airport and associated EIR (SDCRAA 2008); San Diego International Airport Aviation Activity Forecast (SDCRAA 2019b); Regional Aviation Strategic Plan Update (SDCRAA 2011); Border 2025 Program, 2021-2023 Border 2025 Action Plan (EPA 2021, EPA 2022); California-Baja California Border Master Plan (Caltrans 2021); and 2034 Tijuana, Tecate, and Playas de Rosarito Metropolitan Strategic Plan (IMPLAN 2013).

Impacts of the Proposed Amendment

The approved Plan PEIR identified a significant impact related to the inability of the approved Plan to achieve the substantial VMT reductions needed to meet statewide GHG reduction goals for horizon years 2025, 2035, and 2050. Mitigation measures **GHG-5a, GHG-5d, GHG-5f,** and **TRA-2** identified in the approved Plan PEIR would remain applicable under the proposed Amendment. Nonetheless, the proposed Amendment would remove the regional road usage charge, thereby resulting in an approximately 2 percent increase in VMT for horizon years 2035 and 2050 above what was estimated for the approved Plan PEIR. Therefore, as with the approved Plan PEIR, impacts under 2035 and 2050 conditions would remain significant under the proposed Amendment (Impact TRA-2). Year 2030 and 2045 conditions were not analyzed in the approved Plan PEIR; however, because implementation of the proposed Amendment was determined to result in a substantial

[2] It should be noted that the SANDAG model only tracks VMT that occurs within the San Diego region.

increase in the severity of this significant impact under 2035 and 2050 conditions, the same should be assumed for 2030 and 2045 conditions.

As previously stated, the proposed Amendment would not change land use or anticipated growth within the region; nor would it include additional transportation improvements from what was analyzed in the approved Plan PEIR. Therefore, implementation of the proposed Amendment would not conflict with a program, plan, ordinance, or policy addressing the circulation system in 2025, 2030, or 2050. The proposed Amendment would not result in hazardous design features because no transportation network improvements are proposed. Nor would the proposed Amendment result in loss of parking that causes significant adverse environmental impacts not evaluated elsewhere in the SEIR. These impacts would be less than significant in 2025, 2035, and 2050 (Impacts TRA-1, TRA-3, and TRA-4).

Impacts of Related Projects

As discussed in the approved Plan PEIR, related infrastructure improvement projects, such as the HST, the expansion of San Diego International Airport Terminals 1 and 2, and cross-border projects such as the State Route 11 (SR 11)/Otay Mesa East Port of Entry Project, would result in potentially significant transportation impacts. The environmental document for the HST project found that the project would have a system-wide positive effect, but localized traffic conditions around some HST system stations would experience a decrease in level of service and some added delays, and transit lines serving the station areas would experience increases in passengers during peak hours. The recirculated EIR for the Airport Development Plan concluded that implementation of that plan would result in significant and unavoidable traffic impacts (SDCRAA 2019a).

Recent cross-border and POE projects have been completed along the U.S./Mexico border including the San Diego-Tijuana Airport Cross Border Facility, which opened in 2015, and the San Ysidro Port of Entry Expansion Project, the last phase of which opened in December 2019. The State Route 11 (SR 11)/Otay Mesa East Port of Entry Project (OME POE) would create a new land POE connecting to a new four-lane toll road along SR 11. The OME POE project is intended to reduce border crossing congestion (Caltrans 2023).

Impact Projections in Adopted Plans

The approved Plan PEIR identified adopted plans applicable to the cumulative impact analysis. As discussed, the EIR prepared for the 2020-2045 SCAG RTP/SCS identified a significant and unavoidable impact regarding conflicts or inconsistencies with CEQA Guidelines Section 15064.3(b), as well as a significant cumulative impact resulting from implementation of the 2020-2045 SCAG RTP/SCS to a cumulatively considerable amount of transportation impacts in areas outside of the SCAG region (SCAG 2020b). The SCAG 2021 Federal Transportation Improvement Program is prepared to implement projects and programs listed in the RTP and is developed in compliance with State and federal requirements (SCAG 2021).

The 2008 Airport Master Plan, San Diego International Airport EIR identified that all traffic-related impacts related to implementation of the Airport Master Plan would be reduced to less than significant with mitigation. The EIR analyzed parking supply and did not identify significant parking impacts related to implementation of the plan or alternatives (SDCRAA 2008).

The San Diego County Regional Airport Authority (SDCRAA) Aviation Activity Forecast Update found that, by 2021 through 2035, the San Diego International Airport would not have capacity to handle forecasted growth in aircraft operations and relieve runway congestion. The RASP was prepared by SDCRAA to assess the long-

range capabilities of all public-use airports in the county with the goal of improving the performance of the regional airport system (SDCRAA 2011).

While there is no associated environmental documentation for the Border 2025 Program and Action Plan (EPA 2022) or the 2034 Tijuana, Tecate, and Playas de Rosarito Metropolitan Strategic Plan (IMPLAN 2013), they include actions to improve air quality through better traffic operations and opportunities, which would benefit regional border transportation issues.

The California-Baja California Border Master Plan concludes that cross-border travel demand would continue to increase and identifies the importance of improving the capacity and operations of the current infrastructure in the border region (Caltrans 2021).

Cumulative Impacts and Impact Conclusions

2025

As described in Section 4.5, *Transportation*, of this SEIR, implementation of the proposed Amendment in 2025 would result in a significant impact because of an approximately 1.03 percent increase in daily VMT within the San Diego region compared to Starting Year – Year 2019 conditions. Additionally, implementation of the proposed Amendment, under Year 2025 conditions, would result in a 4.04 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 13.64 percent reduction in VMT per capita necessary to maintain the pace needed to meet the State's 2030 VMT per capita reduction goal of 25 percent. Therefore, cumulative transportation impacts throughout the Southern California and northern Baja region by 2025 would be significant, and the proposed Amendment's contribution to VMT impacts would be cumulatively considerable in 2025 (Impact C-TRA-1).

2030

As described in Section 4.5 of this SEIR, implementation of the proposed Amendment in 2030 would result in a significant impact because of an approximately 2.33 percent increase in daily VMT within the San Diego region compared to Starting Year – Year 2019 conditions. Additionally, implementation of the proposed Amendment, under Year 2030 conditions, would result in a 6.09 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 25 percent reduction needed to meet the State's 2030 VMT per capita reduction goal. Therefore, cumulative transportation impacts throughout the Southern California and northern Baja region by 2030 would be significant, and the proposed Amendment's contribution to VMT impacts would be cumulatively considerable in 2030 (Impact C-TRA-1).

2035

As described in Section 4.5 of this SEIR, implementation of the proposed Amendment in 2035 would result in a significant impact because of a 3.64 percent increase in daily VMT compared to Starting Year – Year 2019 conditions. Additionally, implementation of the proposed Amendment, under Year 2035 conditions, would result in an 8.14 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 26.64 percent reduction in VMT per capita necessary to maintain the pace needed to meet the State's 2045 VMT per capita reduction goal of 30 percent. Therefore, cumulative transportation impacts throughout the Southern California and northern Baja region by 2035 would be significant, and the proposed Amendment's contribution to VMT impacts would be cumulatively considerable in 2035 (Impact C-TRA-1).

2045

As described in Section 4.5 of this SEIR, implementation of the proposed Amendment in 2045 would result in a significant impact because of an approximately 5.79 percent increase in daily VMT within the San Diego region compared to Starting Year – Year 2019 conditions. Additionally, implementation of the proposed Amendment, under Year 2030 conditions, would result in a 10.29 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 30 percent reduction needed to meet the State's 2045 VMT per capita reduction goal. Therefore, cumulative transportation impacts throughout the Southern California and northern Baja region by 2045 would be significant, and the proposed Amendment's contribution to VMT impacts would be cumulatively considerable in 2045 (Impact C-TRA-1).

2050

As described in Section 4.5 of this SEIR, implementation of the proposed Amendment in 2050 would result in a significant impact because of a 6.87 percent increase in daily VMT compared to Starting Year – Year 2019 conditions. Additionally, implementation of the proposed Amendment, under Year 2050 conditions, would result in an 11.37 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions. This is less than the 30 percent reduction in VMT per capita that is needed to maintain the State's 2045 VMT per capita reduction goal of 30 percent. Therefore, cumulative transportation impacts throughout the Southern California and northern Baja region by 2050 would be significant, and the proposed Amendment's contribution to VMT impacts would be cumulatively considerable in 2050 (Impact C-TRA-1).

Mitigation Measures

C-TRA-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS TO TRANSPORTATION

Implementation of mitigation measures **TRA-2, GHG-5a, GHG-5d,** and **GHG-5f** identified in the approved Plan PEIR remain applicable and would reduce transportation impacts associated with the proposed Amendment. As detailed in Section 4.5 of this SEIR, mitigation measure **TRA-2** would further reduce total VMT through implementation of transportation demand management strategies, reducing parking minimums, implementing additional active transportation facilities not identified in the proposed Amendment (i.e., Complete Street investments and bicycle and pedestrian facilities), and implementation of road diet and traffic calming measures. In addition, GHG mitigation measures **GHG-5a**, **GHG-5d**, and **GHG-5f** include VMT reduction measures that SANDAG or other agencies could implement.

However, these mitigation measures would not reduce this impact to a less-than-significant level. Based on the above analysis and lack of further feasible mitigation, the proposed Amendment's incremental contributions to cumulative transportation impacts in years 2025, 2030, 2035, 2045, and 2050 would remain significant and cumulatively considerable post-mitigation.

6 ALTERNATIVE ANALYSIS

6.1 RATIONALE FOR ALTERNATIVES SELECTION

CEQA requires the consideration of alternatives to the proposed Amendment and the analysis of impacts associated with those alternatives. By comparing the proposed Amendment to the alternatives, the advantages of each can be weighed and analyzed. Section 15126.6 of the CEQA Guidelines requires that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives."

Additionally, the CEQA Guidelines state the following:

- The specific alternative of "no project" shall also be evaluated along with its impact. If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. [Section 15126.6(e)(1)(2)]
- An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives that are infeasible. The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The EIR should briefly discuss the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts. [Section 15126.6(a)(c)]
- "Feasible" means capable of being accomplished within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors. [Section 15364]

CEQA requires identification of alternatives that would avoid or substantially lessen the significant impacts of the proposed Amendment. Based on the analysis in Chapter 4, *Environmental Impact Analysis Approach*, of this SEIR, the proposed Amendment would result in significant impacts for air quality, greenhouse gas (GHG), noise and vibration, and transportation. The range of alternatives analyzed in detail in the SEIR includes two alternatives (Alternatives 2 and 3) that were evaluated in the approved Plan PEIR in addition to a No Project Alternative (the approved Plan [Alternative 1]) and two additional alternatives (Alternatives 4 and 5) developed as part of the proposed Amendment. The remaining parts of this chapter provide the following:

- A description of alternatives considered in detail.
- A summary of the environmental impacts of each alternative and a comparison of each alternative's impacts to those of the proposed Amendment. The focus of this analysis is to determine if alternatives are capable of avoiding or substantially lessening the significant environmental effects of the proposed Amendment to a less- than-significant level.
- A discussion of the environmentally superior alternative.
- A discussion of alternatives considered but rejected from detailed analysis.

6.2 ALTERNATIVES CONSIDERED IN DETAIL

Aside from Alternative 1: No Project (the approved Plan), the alternatives analyzed in detail are considered potentially feasible for the purposes of a CEQA analysis of alternatives to the proposed Amendment, although some of elements of the alternatives may require major changes in legislation or policy, or in the availability of funding. The alternatives are described below. The primary focus of the alternatives descriptions is on the characteristics that differentiate them from the proposed Amendment.

Appendix E (*Alternatives Data,* an update of Appendix O in the approved Plan PEIR) provides the following information to support the analysis of the alternatives:

- Table E-1: Performance Measures for Alternatives Considered in Detail in this SEIR (including population, housing, and employment information)
- Table E-2: SB 375 GHG Reductions for Alternatives Considered in Detail in this SEIR
- Table E-3: EMFAC 2017 Onroad Output Summary for Alternatives Considered in Detail in this SEIR

6.2.1 ALTERNATIVE 1: NO PROJECT (THE APPROVED PLAN)

CEQA requires a No Project Alternative to be analyzed in the EIR. The No Project Alternative assumes that all of the plans and policies included in the approved Plan would be implemented, including the regional road usage charge, and is further described in Chapter 2, *Project Description*, of the approved Plan PEIR.

6.2.2 ALTERNATIVE 2: 2019 TRANSPORTATION NETWORK WITH NEW VALUE PRICING AND USER FEE POLICIES

Alternative 2 is the same as described in Chapter 6, *Alternatives Analysis*, of the approved Plan PEIR.

6.2.3 ALTERNATIVE 3: ALL GROWTH IN MOBILITY HUBS AND MORE PROGRESSIVE VALUE PRICING AND USER FEE POLICIES

Alternative 3 is the same as described in Chapter 6 of the approved Plan PEIR.

6.2.4 ALTERNATIVE 4: PROGRESSIVE PRICING AND NO REGIONAL ROAD USAGE CHARGE

Alternative 4 consists of the approved Plan transportation network and land use pattern included in the SCS, with more progressive toll pricing and parking costs than what is included in the approved Plan or Alternative 3. Alternative 4 does not include the regional road usage charge. Funding for Alternative 4 would be the same as described for the approved Plan.

6.2.5 ALTERNATIVE 5: ALL GROWTH IN MOBILITY HUBS, PROGRESSIVE PRICING, AND NO REGIONAL ROAD USAGE CHARGE

Alternative 5 consists of the approved Plan transportation network, a land use pattern focusing all regional growth in mobility hubs (as in Alternative 3), with more progressive toll pricing and parking costs than what is included in the approved Plan or Alternative 3 (as in Alternative 4). Alternative 5 does not include a regional road usage charge. Funding for Alternative 5 would be the same as described for the approved Plan.

Table 6-1 provides a comparison of the components of each of the alternatives considered in detail.

Table 6-1
Summary of Alternatives Considered in Detail

Components		Alternative 1: No Project	Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies	Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies	Alternative 4: Progressive Pricing and No Regional Road Usage Charge	Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge
Land Use Pattern		Approved Plan, SCS land use pattern	2019 Federal Regional Transportation Plan (2019 Federal RTP) land use pattern	Land use pattern focusing all regional growth in mobility hubs	Approved Plan, SCS land use pattern	Land use pattern focusing all regional growth in mobility hubs
Transportation Network		Approved Plan transportation network	2019 Federal RTP transportation network	Approved Plan transportation network	Approved Plan transportation network	Approved Plan transportation network
Value Pricing and User Fees Policies	*Toll Pricing*	Approved Plan	Approved Plan	Approved Plan	Increase toll pricing by 100% for all horizon years	Increase toll pricing by 100% for all horizon years
	Regional Road User Charge	Approved Plan	None	Increase regional road usage charge by 50% compared to the approved Plan	None	None
	Parking Costs	Approved Plan	2019 Federal RTP	Increase parking costs by 50% compared to the approved Plan	Increase parking costs by 100% compared to approved Plan	Increase parking costs by 100% compared to approved Plan
	Transit Costs	Approved Plan	2019 Federal RTP (No planned transit fare discounts)	Free transit by 2035	Free transit by 2035	Free transit by 2035
	Microtransit Costs	Approved Plan	N/A	Free Microtransit by 2035	Free Microtransit by 2035	Free Microtransit by 2035
	*Micro-Transponder **O**wnership*	Approved Plan	Approved Plan	Approved Plan	Approved Plan	Approved Plan

Components		Alternative 1: No Project	Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies	Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies	Alternative 4: Progressive Pricing and No Regional Road Usage Charge	Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge
	Telework Assumptions	Approved Plan	Approved Plan	Approved Plan	Approved Plan	Approved Plan
	Micromobility	Approved Plan	Approved Plan	Approved Plan	Approved Plan	Approved Plan
Funding		Approved Plan	2019 Federal RTP ($130 billion)	Approved Plan	Approved Plan	Approved Plan

Note: The SEIR includes updated results from the approved Plan PEIR for Alternatives 1, 2, and 3 with the model corrections described in Chapter 2, *Project Description*, of this SEIR.

6.2.6 BASIC PROJECT OBJECTIVES

Alternatives were developed as alternate means of achieving most of the basic project objectives for the approved Plan PEIR. Those objectives are found in Chapter 2, *Project Description*, of the approved Plan PEIR and set forth in Table 6-2 below.

The proposed Amendment has the additional objective of removing the regional road usage charge while continuing to meet State and federal planning requirements, regional GHG reduction targets, and federal air quality conformity standards.

Table 6-2 shows that all the action alternatives considered in detail in this SEIR partially or fully meet most of the basic project objectives. In this table, a "yes" indicates that an alternative can at least partially, if not fully, meet project objectives.

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Table 6-2
Ability of Alternatives Considered in Detail in this SEIR to Meet Basic Project Objectives

Project Objectives	Proposed Amendment	Alternatives Considered in Detail in this SEIR				
		Alternative 1: No Project (the approved Plan)	**Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies**	**Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies**	**Alternative 4: Progressive Pricing and No Regional Road Usage Charge**	**Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge**
1. Focus population and employment growth in mobility hubs and existing urban areas to protect sensitive habitat and natural resource areas.	Yes.	Yes, alternative includes mobility hubs.	No, alternative does not include mobility hubs.	Yes, alternative focuses all new growth in mobility hubs.	Yes, alternative includes the same mobility hubs.	Yes, alternative focuses all new growth in mobility hubs.
2. Provide transportation investments that support compact land development patterns and reduce sprawl.	Yes.	Yes, alternative includes transportation investments that would reduce sprawl.	Yes, alternative includes incentivizing investments in smart growth areas.	Yes, alternative includes transportation investments that would reduce sprawl.	Yes, alternative includes transportation investments that would reduce sprawl.	Yes, alternative includes transportation investments that would reduce sprawl.
3. Meet GHG emissions targets established for the San Diego region by the California Air Resources Board and the SANDAG Board of Directors.	Yes.	Yes, see Appendix E, Table E-2 for SB 375 target achievement.	No, see Appendix E, Table E-2.	Yes, see Appendix E, Table E-2 for SB 375 target achievement.	Yes, see Appendix E, Table E-2 for SB 375 target achievement.	Yes, see Appendix E, Table E-2 for SB 375 target achievement.
4. Provide transportation investments and land use patterns that promote social equity.	Yes.	Yes, alternative includes transportation investments and land use patterns that would promote social equity.	Yes, alternative includes transportation investments and land use patterns that would promote social equity.	Yes, alternative includes transportation investments and land use patterns that would promote social equity; the land use pattern for this alternative focuses growth in mobility hubs to maximize transit access to employment, educational, and recreational opportunities throughout the region.	Yes, alternative includes transportation investments and land use patterns that would promote social equity.	Yes, alternative includes transportation investments and land use patterns that would promote social equity; the land use pattern for this alternative focuses growth in mobility hubs to maximize transit access to employment, educational, and recreational opportunities throughout the region.
5. Provide transportation investments and land use patterns that reduce VMT and improve air quality.	Yes.	Yes, based on the modeling results identified in Appendix E, Tables E-1 and E-2, this alternative includes transportation investments and a land use pattern that would reduce VMT and improve air quality.	Yes, based on the modeling results identified in Appendix E, Tables E-1 and E-2, this alternative includes transportation investments and a land use pattern that would reduce VMT and improve air quality.	Yes, based on the modeling results identified in Appendix E, Tables E-1 and E-2, this alternative includes transportation investments and a land use pattern that would reduce VMT and improve air quality.	Yes, based on the modeling results identified in Appendix E, Tables E-1 and E-2, this alternative includes transportation investments and a land use pattern that would reduce VMT and improve air quality.	Yes, based on the modeling results identified in Appendix E, Tables E-1 and E-2, this alternative includes transportation investments and a land use pattern that would reduce VMT and improve air quality.
6. Provide multi-modal access to employment centers and key destinations for all communities.	Yes.	Yes, alternative includes transportation investments and a land use pattern that would provide multi-modal access to employment centers and key destinations.	Yes, alternative includes transportation improvements and land use pattern that would encourage growth within smart growth areas.	Yes, alternative includes transportation investments and a land use pattern that would provide multi-modal access to employment centers and key destinations.	Yes, alternative includes transportation investments and a land use pattern that would provide multi-modal access to employment centers and key destinations.	Yes, alternative includes transportation investments and a land use pattern that would provide multi-modal access to employment centers and key destinations.
7. Enhance the efficiency of the transportation network for moving people and goods through the deployment of new technologies.	Yes.	Yes, alternative includes transportation investments and a land use pattern that would move people and goods with new technologies.	Yes, the transportation network for this alternative is the same as the proposed Amendment.	Yes, alternative includes transportation investments and a land use pattern that would move people and goods with new technologies.	Yes, alternative includes transportation investments and a land use pattern that would move people and goods with new technologies.	Yes, alternative includes transportation investments and a land use pattern that would move people and goods with new technologies.
Proposed Amendment Objective. To amend the approved Plan by removing the regional road usage charge while continuing to meet State and federal planning requirements, regional GHG reduction targets, and federal air quality conformity standards.	Yes.	No, this alternative includes the regional road usage charge.	No, this alternative does not meet the region's GHG reduction target.	No, this alternative includes the regional road usage charge.	Yes.	Yes.

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6.3 ALTERNATIVES COMPARISON

Table 6-3 (at the end of this chapter) provides a list of impacts and their significance for Alternatives 1, 2, 3, 4, and 5 with a comparison of the impacts of each alternative to those of the proposed Amendment. Calculations for the alternatives analysis are provided in Appendix E of this SEIR.

6.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Based on the analysis of alternatives provided in Table 6-3, Alternative 5 is the environmentally superior alternative. Compared to the proposed Amendment's significant impacts, Alternative 5 would have decreased impacts for one or more significance criteria for the following environmental resources: air quality, energy, greenhouse gas emissions, noise and vibration, and transportation.

Alternative 5 would result in a 23.5 percent per capita GHG reduction in 2050, which is a greater reduction than the proposed Amendment (19.7 percent below 2005 in 2050) (see Appendix E, Table E-2). In addition, Alternative 5 would result in slightly lower VMT per capita (23.3) (home-based) compared to the proposed Amendment VMT per capita (24.3) in 2050 (see Appendix E, Table E-1). Alternative 5 would result in a total VMT increase of 3,298,516 miles per day in 2050 compared to 2025, which is approximately 33 percent lower than the proposed Amendment (total VMT increase of 4,907,031 miles per day in 2050). Alternative 5 would also result in a decrease in reactive organic gases (ROG), nitrous oxides (NO_X) carbon monoxide (CO), and fine and respirable particulate matter (PM2.5 and PM10), and sulfur oxide (SO_X) emissions compared to the proposed Amendment from on-road sources (see Appendix E, Table E-3).

Among the alternatives, Alternative 5 would achieve the greatest reductions of VMT, GHG emissions, and air quality emissions as compared to the proposed Amendment.

6.5 ALTERNATIVES CONSIDERED BUT REJECTED

Several alternatives that were either considered by SANDAG decisionmakers, raised by the public during the planning process for the approved Plan, or raised in public comments on the NOP for the approved Plan PEIR were rejected from detailed consideration. For further information on the alternatives considered but rejected for the approved Plan, see Section 6.5 of the approved Plan PEIR.

Public comments on the NOP for the proposed Amendment raised one alternative for consideration. This alternative was considered but rejected and is summarized below.

6.5.1 LA PLAYA PLAN

In a January 8, 2023, NOP comment letter, Katheryn Rhodes requested that the proposed Amendment include analysis of an alternative La Playa Plan (LPP) for a Full Tidelands Reclamation project. The letter presents the LPP alternative as an effective alternative to the proposed Amendment because it would significantly reduce GHG emissions impacts in the SANDAG region. The LPP alternative suggests several projects already included in the proposed Amendment (a central mobility hub, enhanced active transportation corridors, and improved fleet connectivity to San Diego International Airport [SDIA] facilities). Funding for the LPP would be subject to confirmation that SDIA is a Grandfathered Airport, which would allow normally restricted Federal Aviation Administration Airport revenue to be diverted towards airport transportation projects, including the proposed annexation of port tidelands.

Reasons for Rejection

The LPP alternative focuses on a limited geographical portion of the region. In addition, most of the major elements of the LPP alternative are already included in the proposed Amendment and/or Alternatives 3, 4, and 5 analyzed in this SEIR, such as a central mobility hub, enhanced active transportation corridors, and improved fleet connectivity to SDIA facilities.

The LPP alternative is an individual project in a limited geographical portion of the region rather than an alternative for the proposed Amendment as a whole, and CEQA does not require analysis of alternatives to individual components of a project (see *California Oak Foundation v. Regents of University of California* (2010) 188 Cal. App. 4th 227, 276–277). Because it is limited, this alternative would not avoid or substantially reduce any of the proposed Amendment's significant impacts. For these reasons, this alternative has been rejected from further consideration.

Table 6-3
Comparison of Alternatives 1, 2, 3, 4, and 5 to the Proposed Amendment

This table provides a list of impacts and their significance for Alternatives 1, 2, 3, 4, and 5 with a comparison of the impacts of each alternative to those of the proposed Amendment. Calculations for the alternatives analysis are provided in Appendix E of this SEIR. The designation "significant impact" in Table 6-3 refers to the level of significance of the impact identified for the proposed Amendment as analyzed in this SEIR. The thresholds of significance for each resource area are included in the respective resource sections in Chapter 4. Within the parentheses is the comparison of the alternative impact to the significance of the impact identified for the proposed Amendment (i.e., same, increased, decreased). The level of significance may be the same for the proposed Amendment and an alternative for a given threshold, but the impacts from an alternative may be increased or decreased to a degree without changing the significance determination.

Year	Alternative 1: No Project (the approved Plan)	Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies	Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies	Alternative 4: Progressive Pricing and No Regional Road Usage Charge	Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge
Air Quality					
2025	**Less-than-Significant Impact (same) –** Alternative 1 would result in a less-than-significant impact in 2025 for AQ-1. As with the proposed Amendment, this alternative would also be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 2 would result in a less-than-significant impact in 2025 for AQ-1. As with the proposed Amendment, this alternative would also be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 3 would result in a less-than-significant impact in 2025 for AQ-1. As with the proposed Amendment, this alternative would also be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2025 for AQ-1. As with the proposed Amendment, this alternative would also be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 5 would result in a less-than-significant impact in 2025 for AQ-1. As with the proposed Amendment, this alternative would also be consistent with the 2022 RAQS and the 2020 SIP.
	Less-than-Significant Impact (same) – Alternative 1 would result in a less-than-significant impact in 2025 for AQ-2. Alternative 1 would have the same emissions levels for 2025 as the proposed Amendment (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 1 would maintain similar levels of emissions, impacts would still be less than significant.	**Less-than-Significant Impact (increased) –** Alternative 2 would result in a less-than-significant impact in 2025 for AQ-2. Alternative 2 would cause an increase in emissions compared to the proposed Amendment (Appendix E, Table E-3). The proposed Amendment would result in less than significant impact, and while Alternative 2 would result in increased emissions compared to the proposed Amendment, impacts would still be less than significant.	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2025 for AQ-2. Alternative 3 would have lower emissions compared to the proposed (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 3 would lower emissions, impacts would still be less than significant.	**Less-than-Significant Impact (decreased) –** Alternative 4 would result in a less-than-significant impact in 2025 for AQ-2. Alternative 4 would have lower emissions compared to the proposed (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 4 would lower emissions, impacts would still be less than significant.	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in a less-than significant impact in 2025 for AQ-2. Alternative 5 would have lower emissions compared to the proposed Amendment (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 5 would lower emissions, impacts would still be less than significant.
	Significant Impact (same) – Alternative 1 would result in a significant impact in 2025 for AQ-4. Alternative 1 would result in similar PM10 and PM2.5 emissions compared to the proposed Amendment and would result in a similar significant impact (Appendix E, Table E-3).	**Significant Impact (increased) –** Alternative 2 would result in a significant impact in 2025 for AQ-4. Alternative 2 would result in higher PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Alternative 2 would have higher PM10 concentration impacts compared to the proposed Amendment and would also result in an increased significant impact.	**Significant Impact (decreased)** – Alternative 3 would result in a significant impact in 2025 for AQ-4. Alternative 3 would result in a small decrease of PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Alternative 3 would have slightly lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2025 for AQ-4. Alternative 4 would result in a small decrease of PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Alternative 4 would have slightly lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2025 for AQ-4. Alternative 5 would result in the greatest decrease of PM10 and PM2.5 emissions compared to the proposed Amendment and other alternatives (Appendix E, Table E-3). Alternative 5 would have lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2025 for AQ-5. As discussed in Section 4.1, individual receptors exposed to substantial TAC concentrations would differ compared to the proposed Amendment. Alternative 1 would have the same regional growth, land uses, and transportation network improvements as the proposed Amendment (Appendix E, Table E-1). However, Alternative 1 would result in greater VMT reduction per capita, thereby decreasing TACs from roadways. Overall, diesel exposure would be	**Significant Impact (increased) –** Alternative 2 would result in a significant impact in 2025 for AQ-5. Alternative 2 would result in similar population growth as the proposed Amendment but would not result in focused growth in Mobility Hubs and would not include the diesel commuter rail lines. However, Alternative 2 would result in higher per capita and overall VMT, which could increase TACs from roadways. Diesel exposure would also increase under Alternative 2 compared to the proposed Amendment (Appendix E, Table E-3). Overall,	**Significant Impact (same)** – Alternative 3 would result in a significant impact in 2025 for AQ-5. Alternative 3 would result in similar population growth as the proposed Amendment, but would focus all growth in the Mobility Hubs. The increase in population in the Mobility Hubs may increase the amount of people exposed to this increased cancer risk compared to the proposed Amendment. Alternative 3 would result in slightly lower per capita and overall VMT, which could slightly decrease TACs from roadways. Diesel exposure would also slightly decrease under	**Significant Impact (decreased) –** Alternative 4 would result in a significant impact in 2025 for AQ-5. Alternative 4 would result in similar population growth as the proposed Amendment. Alternative 4 would result in lower per capita and overall VMT, which could decrease TACs from roadways. While diesel exposure would slightly increase under Alternative 4 compared to the proposed Amendment, this would be offset by a decrease in roadway TACs due to decrease in VMT (Appendix E, Table E-3). Alternative 4 would have lower TACs compared to the	**Significant Impact (same) –** Alternative 5 would result in a significant impact in 2025 for AQ-5. Alternative 5 would result in similar population growth as the proposed Amendment but would focus all growth in the Mobility Hubs. The increase in population in the Mobility Hubs may increase the amount of people exposed to this increased cancer risk compared to the proposed Amendment. Alternative 5 would result in lower per capita and overall VMT, which could decrease TACs from roadways. Diesel exposure would slightly decrease under

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	similar under Alternative 1 as the proposed Amendment (Appendix E, Table E-3). Due to the decrease in roadway TACs from decreased on-road VMT, Alternative 1 would have lower TACs compared to the proposed Amendment but would still result in a significant impact.	while diesel exposure due to commuter rail lines would decrease, this would be offset by an increase in roadways TACs due to increased on-road fuel consumption (Appendix E, Table E-3). Alternative 2 would have higher TACs compared to the proposed Amendment and would result in a significant impact.	Alternative 3 compared to the proposed Amendment (Appendix E, Table E-3). While Alternative 3 would have slightly lower TACs compared to the proposed Amendment, it would have the potential for more people to be exposed in Mobility Hubs and would therefore result in a similar significant impact.	proposed Amendment but would still result in a significant impact.	Alternative 5 compared to the proposed Amendment (Appendix E, Table E-3). Alternative 5 would have lower TACs compared to the proposed Amendment but would have the potential for more people to be exposed in Mobility Hubs and would therefore result in a similar significant impact.
	Less-than-Significant Impact (same) – Alternative 1 would result in a less-than-significant impact in 2025 for AQ-6. Alternative 1 would result in similar winter CO emissions to the proposed Amendment (Appendix E, Table E-3). These CO emissions would be substantially less than the baseline (2016) conditions. Thus, exposure of sensitive receptors to CO concentrations would decrease under Alternative 1 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.	**Less-than-Significant Impact (increased) –** Alternative 2 would result in a less-than-significant impact in 2025 for AQ-6. Alternative 2 would result in higher winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). However, these CO emissions would be substantially less than the baseline (2016) conditions. Exposure of sensitive receptors to CO concentrations would increase under Alternative 2 compared to the proposed Amendment but would still result in a less-than-significant impact.	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2025 for AQ-6. Alternative 3 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Exposure of sensitive receptors to CO concentrations would decrease under Alternative 3 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.	**Less-than-Significant Impact (decreased) –** Alternative 4 would result in a less-than-significant impact in 2025 for AQ-6. Alternative 4 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Exposure of sensitive receptors to CO concentrations would decrease under Alternative 4 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in a less-than-significant impact in 2025 for AQ-6. Alternative 5 would result in the lowest winter CO emissions compared to the proposed Amendment and the other alternatives (Appendix E, Table E-3). Exposure of sensitive receptors to CO concentrations would decrease the most under Alternative 5 compared to the proposed Amendment and the other alternatives and would and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.
2035	**Less-than-Significant Impact (same) –** Alternative 1 would result in a less-than-significant impact in 2035 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 2 would result in a less-than-significant impact in 2035 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 3 would result in a less-than-significant impact in 2035 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2035 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 5 would result in a less-than-significant impact in 2035 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.
	Less-than-Significant Impact (decreased) – Alternative 1 would result in a less-than-significant impact in 2035 for AQ-2. Alternative 1 would have lower VMT and slightly lower on-road emissions compared to the proposed Amendment (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 1 would result in lower emissions than the proposed Amendment, impacts would still be less than significant.	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2035 for AQ-2. Alternative 2 would cause an increase in on-road emissions compared to the proposed Amendment (Appendix E, Table E-3). Therefore, Alternative 2 would result in increased emissions compared to the proposed Amendment, and impacts would be potentially significant.	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2035 for AQ-2. Alternative 3 would have lower VMT and emissions from on-road sources compared to the proposed Amendment (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 3 would result in lower emissions than the proposed Amendment, impacts would still be less than significant.	**Less-than-Significant Impact (decreased) –** Alternative 4 would result in a less-than-significant impact in 2035 for AQ-2. Alternative 4 would have lower VMT and emissions from on-road sources compared to the proposed Amendment (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 4 would result in lower emissions than the proposed Amendment, impacts would still be less than significant.	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in a less-than-significant impact in 2035 for AQ-2. Alternative 5 would have lower VMT and emissions from on-road sources compared to the proposed Amendment (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a less-than-significant impact and Alternative 5 would result in lower emissions than the proposed Amendment, impacts would still be less than significant.
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2035 for AQ-4. Alternative 1 would result in lower PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Additionally, as discussed in Section 4.1, areas exposed to exceedances of the annual PM10 CAAQS would differ compared to the proposed Amendment. Thus, Alternative 1 would have lower PM10 concentration	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2035 for AQ-4. Alternative 2 would result in higher PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, Alternative 2 would have higher PM10 concentration impacts compared to the proposed Amendment and would still result in a significant impact.	**Significant Impact (decreased) –** Alternative 3 would result in a significant impact in 2035 for AQ-4. Alternative 3 would result in lower PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, Alternative 3 would have lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2035 for AQ-4. Alternative 4 would result in a decrease of PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, Alternative 4 would have lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2035 for AQ-4. Alternative 5 would result in a decrease of PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, Alternative 5 would have lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.

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	impacts compared to the proposed Amendment but would still result in a significant impact.				
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2035 for AQ-5, exposing sensitive receptors to substantial TAC concentrations. As discussed in Section 4.1, individual receptors exposed to substantial TAC concentrations would differ compared to the proposed Amendment. Alternative 1 would have the same regional growth, land uses, and transportation network improvements as the proposed Amendment. Alternative 1 would result in lower per capita and overall VMT than the proposed Amendment, which would decrease TACs from roadways. However, diesel exposure would slightly increase compared to the proposed Amendment, thus increasing TACs. Overall, Alternative 1 would have lower TACs compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2035 for AQ-5, exposing sensitive receptors to substantial TAC concentrations. Alternative 2 would result in similar population growth as the proposed Amendment but would not result in focused growth in Mobility Hubs and would not include the diesel commuter rail lines. However, Alternative 2 would result in higher per capita and overall VMT, which could increase TACs from roadways. Diesel exposure would also increase under Alternative 2 compared to the proposed Amendment (Appendix E, Table E-3). Overall, Alternative 2 would have higher TACs compared to the proposed Amendment and would still result in a significant impact.	**Significant Impact (same) –** Alternative 3 would result in a significant impact in 2035 for AQ-5, exposing sensitive receptors to substantial TAC concentrations. Alternative 3 would result in similar population growth as the proposed Amendment but would focus all growth in the Mobility Hubs. The increase in population in the Mobility Hubs may increase the amount of people exposed to this increased cancer risk compared to the proposed Amendment. Moreover, Alternative 3 would result in lower per capita and overall VMT compared to the proposed Amendment, which could decrease TACs from roadways. Diesel exposure would also slightly decrease under Alternative 3 compared to the proposed Amendment (Appendix E, Table E-3). Alternative 3 would have slightly lower TACs compared to the proposed Amendment but would have the potential for more people to be exposed in Mobility Hubs and would therefore result in a similar significant impact.	**Significant Impact (decreased) –** Alternative 4 would result in a significant impact in 2035 for AQ-5, exposing sensitive receptors to substantial TAC concentrations. Alternative 4 would result in similar population growth as the proposed Amendment but would result in lower per capita and overall VMT compared to the proposed Amendment, as well as lower on-road emissions, including lower annual diesel emissions (Appendix E, Table E-3). Therefore, Alternative 4 would have lower TACs compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (same)** – Alternative 5 would result in a significant impact in 2035 for AQ-5, exposing sensitive receptors to substantial TAC concentrations. Alternative 5 would result in similar population growth as the proposed Amendment but would focus all growth in the Mobility Hubs. The increase in population in the Mobility Hubs may increase the amount of people exposed to this increased cancer risk compared to the proposed Amendment. The proposed would result in lower per capita and overall VMT compared to the proposed Amendment, as well as lower on-road emissions, including lower annual diesel emissions. Diesel exposure would also decrease under Alternative 5 compared to the proposed Amendment (Appendix E, Table E-3). Alternative 5 would have lower TACs compared to the proposed Amendment but would have the potential for more people to be exposed in Mobility Hubs and would therefore result in a similar significant impact.
	Less-than-Significant Impact (decreased) – Alternative 1 would result in a less-than-significant impact in 2035 for AQ-6. Alternative 1 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, exposure of sensitive receptors to CO concentrations would decrease under Alternative 1 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.	**Less-than-Significant Impact (increased)** – Alternative 2 would result in a less-than-significant impact in 2035 for AQ-6. Alternative 2 would result in higher winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). However, these CO emissions would be substantially less than the baseline (2016) conditions. Thus, exposure of sensitive receptors to CO concentrations would increase under Alternative 2 as under the proposed Amendment but still result in a less-than-significant impact.	**Less-than-Significant Impact (decreased)** – Alternative 3 would result in a less-than-significant impact in 2035 for AQ-6. Alternative 3 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, exposure of sensitive receptors to CO concentrations would decrease under Alternative 3 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.	**Less-than-Significant Impact (decreased) –** Alternative 4 would result in a less-than-significant impact in 2035 for AQ-6. Alternative 4 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, exposure of sensitive receptors to CO concentrations would decrease under Alternative 4 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.	**Less-than-Significant Impact (decreased)** – Alternative 5 would result in a less-than-significant impact in 2035 for AQ-6. Alternative 5 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, exposure of sensitive receptors to CO concentrations would decrease under Alternative 5 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.
2050	**Less-than-Significant Impact (same)** – Alternative 1 would result in a less-than-significant impact in 2050 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same)** – Alternative 2 would result in a less-than-significant impact in 2050 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 3 would result in a less-than-significant impact in 2050 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2050 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.	**Less-than-Significant Impact (same)** – Alternative 5 would result in a less-than-significant impact in 2050 for AQ-1. As with the proposed Amendment, this alternative would be consistent with the 2022 RAQS and the 2020 SIP.
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2050 for AQ-2. Alternative 1 would have lower VMT and emissions from on-road sources (with the	**Significant Impact (increased) –** Alternative 2 would result in a significant impact in 2050 for AQ-2. Alternative 2 would result in higher emissions from on-road sources compared to	**Significant Impact (decreased) –** Alternative 3 would result in a significant impact in 2050 for AQ-2. Alternative 3 would have lower VMT and emissions from on-road sources, but	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2050 for AQ-2. Alternative 4 would have lower VMT and emissions from on-road sources	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2050 for AQ-2. Alternative 5 would have lower VMT and emissions from on-road

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	exception of a 1.02-thousand-gallons-per-day increase in annual diesel in 2050) and would result in less on-road emissions than the proposed Amendment (Appendix E, Table E-3). The proposed Amendment would result in a significant impact for AQ-2, and while Alternative 1 would result in slightly lower on-road emissions when compared to the proposed Amendment, impacts would still be significant.	the proposed Amendment (Appendix E, Table E-3). Therefore, because the proposed Amendment would result in a significant impact and Alternative 2 would result in increased emissions when compared to the proposed Amendment, impacts would still be significant.	similar emissions from commuter rail compared to the proposed Amendment (Appendix E, Table E-3). The proposed Amendment would result in a significant impact for AQ-2, and while Alternative 3 would lower on-road emissions compared to the proposed Amendment, impacts would still be significant.	compared to the proposed Amendment (Appendix E, Table E-3). The proposed Amendment would result in a significant impact for AQ-2, and while Alternative 4 would result in decreased emissions compared to the proposed Amendment, impacts would still be significant.	sources, but similar emissions from commuter rail compared to the proposed Amendment (Appendix E, Table E-3). The proposed Amendment would result in a significant impact for AQ-2, and while Alternative 5 would result in decreased emissions compared to the proposed Amendment, impacts would still be significant.
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2050 for AQ-4. Alternative 1 would result in lower PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Additionally, as discussed in Section 4.1, areas exposed to exceedances of the annual PM10 CAAQS would differ compared to the proposed Amendment. Thus, Alternative 1 would have lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2050 for AQ-4. Alternative 2 would result in higher PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, Alternative 2 would have higher PM10 concentrations compared to the proposed Amendment and would still result in a significant impact.	**Significant Impact (decreased) –** Alternative 3 would result in a significant impact in 2050 for AQ-4. Alternative 3 would result in lower PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, Alternative 3 would have lower PM10 concentration impacts compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2050 for AQ-4. Alternative 4 would result in lower PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus Alternative 4 would have lower PM10 concentration compared to the proposed Amendment but would still result in a similar significant impact.	**Significant Impact (decreased)** – Alternative 5 would result in a significant impact in 2050 for AQ-4. Alternative 5 would result in a lower PM10 and PM2.5 emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus, Alternative 5 would have lower PM10 concentration impacts compared to the proposed Amendment but would still result in a similar significant impact.
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2050 for AQ-5 and would expose sensitive receptors to substantial TAC concentrations. As discussed in Section 4.1, individual receptors exposed to substantial TAC concentrations would differ compared to the proposed Amendment. Alternative 1 would have the same regional growth, land uses, and transportation network improvements as the proposed Amendment. Alternative 1 would result in lower per capita and overall VMT than the proposed Amendment, which would decrease TACs from roadways. However, annual diesel exposure would slightly increase compared to the proposed Amendment, thus increasing TACs. Overall, Alternative 1 would have lower TACs compared to the proposed Amendment but would still result in a significant impact.	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2050 for AQ-5 and would expose sensitive receptors to substantial TAC concentrations. Alternative 2 would result in similar population growth as the proposed Amendment but would not result in focused growth in Mobility Hubs and would not include the diesel commuter rail lines. However, Alternative 2 would result in higher per capita and overall VMT, which could increase TACs from roadways. Diesel exposure would also increase under Alternative 2 compared to the proposed Amendment (Appendix E, Table E-3). Overall, Alternative 2 would have higher TACs compared to the proposed Amendment and would result in a significant impact.	**Significant Impact (same) –** Alternative 3 would result in a significant impact in 2050 for AQ-5 and would expose sensitive receptors to substantial TAC concentrations. Alternative 3 would result in similar population growth as the proposed Amendment, but would focus all growth in the Mobility Hubs. The increase in population in the Mobility Hubs may increase the amount of people exposed to this increased cancer risk compared to the proposed Amendment. Moreover, Alternative 3 would result in lower per capita and overall VMT compared to the proposed Amendment, which could decrease TACs from roadways. Diesel exposure would slightly increase under Alternative 3 compared to the proposed Amendment (Appendix E, Table E-3). Overall, Alternative 3 would have similar TACs compared to the proposed Amendment and would result in a similar significant impact.	**Significant Impact (decreased) –** Alternative 4 would result in a significant impact in 2050 for AQ-5 and would expose sensitive receptors to substantial TAC concentrations. Alternative 4 would result in similar population growth as the proposed Amendment but would result in lower per capita and overall VMT compared to the proposed Amendment, as well as lower on-road emissions, including lower annual diesel emissions. Therefore, Alternative 4 would have lower TACs compared to the proposed Amendment but would still result in a similar significant impact.	**Significant Impact (same) –** Alternative 5 would result in a significant impact in 2050 for AQ-5 and would expose sensitive receptors to substantial TAC concentrations. Alternative 5 would result in similar population growth as the proposed Amendment but would focus all growth in Mobility Hubs. The increase in population in the Mobility Hubs may increase the amount of people exposed to this increased cancer risk compared to the proposed Amendment. Moreover, Alternative 5 would result in lower per capita and overall VMT compared to the proposed Amendment, as well as lower on-road emissions, including lower annual diesel emissions. Alternative 5 would have lower TACs compared to the proposed Amendment but would have the potential for more people to be exposed in Mobility Hubs and would therefore result in a similar significant impact.
	Less-than-Significant Impact (decreased) – Alternative 1 would result in a less-than-significant impact in 2050 for AQ-6. Alternative 1 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus,	**Less-than-Significant Impact (increased) –** Alternative 2 would result in a less-than-significant impact in 2050 for AQ-6. Alternative 2 would result in higher winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3).	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2050 for AQ-6. Alternative 3 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus,	**Less-than-Significant Impact (decreased)** – Alternative 4 would result in a less-than-significant impact in 2050 for AQ-6. Alternative 4 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus,	**Less-than-Significant Impact (decreased)** – Alternative 5 would result in a less-than-significant impact in 2050 for AQ-6. Alternative 5 would result in lower winter CO emissions compared to the proposed Amendment (Appendix E, Table E-3). Thus,

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	exposure of sensitive receptors to CO concentrations would decrease under Alternative 1 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact	However, these CO emissions would be substantially less than the baseline (2016) conditions. Thus, exposure of sensitive receptors to CO concentrations would increase under Alternative 2 as under the proposed Amendment but would still result in a less-than-significant impact.	exposure of sensitive receptors to CO concentrations would decrease under Alternative 3 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact.	exposure of sensitive receptors to CO concentrations would decrease under Alternative 4 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact	exposure of sensitive receptors to CO concentrations would decrease under Alternative 5 as under the proposed Amendment and be substantially below the baseline (2016) conditions. This would be a less-than-significant impact
Energy					
2025	**Less-than-Significant Impact (same) –** Alternative 1 would result in a less-than-significant impact in 2025 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 1, which would have the same land use pattern as the proposed Amendment. Thus, Alternative 1 would have similar impacts as the proposed Amendment.	**Less-than-Significant Impact (increased) –** Alternative 2 would result in a less-than-significant impact in 2025 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 2; however, land use would not include as much multi-family development as under the proposed Amendment. Thus, Alternative 2 would result in increased impacts.	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2025 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 3; however, land use would include more dense development including multi-family development than under the proposed Amendment. Thus, Alternative 3 would result in decreased impacts.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2025 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 4, which would have the same land use pattern as the proposed Amendment. Thus, Alternative 4 would have similar impacts as the proposed Amendment.	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in a less-than-significant impact in 2025 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 5; however, land use would include more dense development including multi-family development than under the proposed Amendment. Thus, Alternative 5 would result in decreased impacts.
	Less-than-Significant Impact (same) – Alternative 1 would result in a less-than-significant impact in 2025 (EN-2). Alternative 1 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 2 would result in a less-than-significant impact in 2025 (EN-2). Alternative 2 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 3 would result in a less-than-significant impact in 2025 (EN-2). Alternative 3 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2025 (EN-2). Alternative 4 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 5 would result in a less-than-significant impact in 2025 (EN-2). Alternative 5 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.
2035	**Less-than-Significant Impact (same) –** Alternative 1 would result in a less-than-significant impact in 2035 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 1, which would have the same land use pattern as the proposed Amendment. Thus, Alternative 1 would have similar impacts as the proposed Amendment.	**Less-than-Significant Impact (increased) –** Alternative 2 would result in a less-than-significant impact in 2035 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 2; however, land use would not include as much multi-family development as under the proposed Amendment. Thus, Alternative 2 would result in increased impacts.	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2035 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 3; however, land use would include more dense development including multi-family development than under the proposed Amendment. Thus, Alternative 3 would result in decreased impacts.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2035 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 4, which would have the same land use pattern as the proposed Amendment. Thus, Alternative 4 would have similar impacts as the proposed Amendment.	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in a less-than-significant impact in 2035 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 5; however, land use would include more dense development including multi-family development than under the proposed Amendment. Thus, Alternative 5 would result in decreased impacts.
	Less-than-Significant Impact (same) – Alternative 1 would result in a less-than-significant impact in 2035 (EN-2). Alternative 1 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 2 would result in a less-than-significant impact in 2035 (EN-2). Alternative 2 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 3 would result in a less-than-significant impact in 2035 (EN-2). Alternative 3 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2035 (EN-2). Alternative 4 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 5 would result in a less-than-significant impact in 2035 (EN-2). Alternative 5 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.
2050	**Less-than-Significant Impact (same) –** Alternative 1 would result in a less-than-significant impact in 2050 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 1, which would have the same land use pattern as the proposed Amendment.	**Less-than-Significant Impact (increased) –** Alternative 2 would result in a less-than-significant impact in 2050 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 2; however, land use would not include as much multi-family development as under the proposed Amendment. Thus,	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2050 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 3; however, land use would include more dense development including multi-family development than under the	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2050 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 4, which would have the same land use pattern as the proposed Amendment.	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in a less-than-significant impact in 2050 (EN-1). Existing State and regional regulations and programs to reduce energy use would continue to apply to Alternative 5; however, land use would include more dense development including multi-family development than under the

Year	Alternative 1: No Project (the approved Plan)	Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies	Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies	Alternative 4: Progressive Pricing and No Regional Road Usage Charge	Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge
	Thus, Alternative 1 would have similar impacts as the proposed Amendment.	Alternative 2 would result in increased impacts.	proposed Amendment. Thus, Alternative 3 would result in decreased impacts.	Thus, Alternative 4 would have similar impacts as the proposed Amendment.	proposed Amendment. Thus Alternative 5 would result in decreased impacts.
	Less-than-Significant Impact (same) – Alternative 1 would result in a less-than-significant impact in 2050 (EN-2). Alternative 1 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 2 would result in a less-than-significant impact in 2050 (EN-2). Alternative 2 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 3 would result in a less-than-significant impact in 2050 (EN-2). Alternative 3 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2050 (EN-2). Alternative 4 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.	**Less-than-Significant Impact (same) –** Alternative 5 would result in a less-than-significant impact in 2050 (EN-2). Alternative 5 would be consistent with adopted plans to address energy; thus, it would result in the same less-than-significant impact as the proposed Amendment.
Greenhouse Gas Emissions					
2025	**Less-than-Significant Impact (same) –** Alternative 1 would result in less-than-significant impacts in 2025 (GHG-1 and GHG-4). Alternative 1 would have the same regional growth, land uses, and transportation network improvements as the proposed Amendment and would result in similar GHG emissions and similar impacts (Appendix E, Table E-3).	**Less-than-Significant Impact (increased) –** Alternative 2 would result in less-than-significant impacts in 2025 (GHG-1 and GHG-4). Alternative 2 would result in higher GHG emissions than the proposed Amendment due to a less compact land use pattern and fewer transit-oriented transportation network improvements and would result in increased impacts (Appendix E, Table E-3).	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in less-than-significant impacts in 2025 (GHG-1 and GHG-4). Alternative 3 would result in lower GHG emissions than the proposed Amendment due to more compact development and more progressive value pricing and user fee policies, and would result in decreased impacts (Appendix E, Table E-3).	**Less-than-Significant Impact (decreased) –** Alternative 4 would result in less-than-significant impacts in 2025 (GHG-1 and GHG-4). Alternative 4 would result in lower GHG emissions than the proposed Amendment due to more progressive pricing policies and would result in decreased impacts (Appendix E, Table E-3).	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in less-than-significant impacts in 2025 (GHG-1 and GHG-4). Alternative 5 would result in lower GHG emissions than the proposed Amendment due to more compact development and more progressive pricing policies and would result in decreased impacts (Appendix E, Table E-3).
	Significant Impact (same) – Alternative 1 would result in a significant impact in 2030 (GHG-5). Alternative 1 would result in lower GHG emissions compared to the proposed Amendment but would not meet the reduction target reference point for 2030 and would result in similar impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2030 (GHG-5). Alternative 2 would result in higher GHG emissions that would not meet the reduction target reference point for 2030 and would result in increased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased) –** Alternative 3 would result in a significant impact in 2030 (GHG-5). Alternative 3 would result in lower GHG emissions compared to the proposed Amendment but would not meet the reduction target reference point for 2030 and would result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2030 (GHG-5). Alternative 4 would result in lower GHG emissions compared to the proposed Amendment but would not meet the reduction target reference point for 2030 and would result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2030 (GHG-5). Alternative 5 would result in lower GHG emissions compared to the proposed Amendment but would not meet the reduction target reference point for 2030 and would result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).
2035	**Less-than-Significant Impact (decreased) –** Alternative 1 would result in less-than-significant impacts in 2035 (GHG-1, GHG-3, and GHG-4). Alternative 1 would have the same regional growth, land uses, and transportation network improvements as the proposed Amendment; however, Alternative 1 would result in lower GHG emissions due to the inclusion of the regional road usage charge and would result in decreased impacts (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (increased) –** Alternative 2 would result in less-than-significant impacts in 2035 (GHG-1, GHG-3, and GHG-4). Alternative 2 would result in higher GHG emissions than the proposed Amendment due to a less compact land use pattern and fewer transit-oriented transportation network improvements. However, Alternative 2 emissions in 2035 would still be below existing levels (GHG-1), would achieve at least a 30% reduction per capita relative to existing levels (GHG-3), and would not conflict with or impede the implementation of local plans (GHG-4) (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in less-than-significant impacts in 2035 (GHG-1, GHG-3, and GHG-4). Alternative 3 would result in lower GHG emissions than the proposed Amendment due to more compact development around mobility hubs and more progressive value pricing and user fee policies, and would result in decreased impacts (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (decreased) –** Alternative 4 would result in less-than-significant impacts in 2035 (GHG-1, GHG-3, and GHG-4). Alternative 4 would result in lower GHG emissions than the proposed Amendment due to more progressive pricing policies and would result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in less-than-significant impacts in 2035 (GHG-1, GHG-3, and GHG-4). Alternative 5 would result in lower GHG emissions than the proposed Amendment due to more compact development and more progressive pricing policies and would result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).
	Less-than-Significant Impact (decreased) – Alternative 1 would result in a less-than-significant impact in 2035 for GHG-2 and would result in a decreased impact compared to the proposed Amendment. Alternative 1 would result in a 20.0% per capita GHG reduction, which would exceed the 2035	**Significant Impact (increased) –** Alternative 2 would result in a significant impact in 2035 for GHG-2 and would result in an increased impact compared to the proposed Amendment. Alternative 2 would result in a 11.8% per capita GHG reduction, which would not meet the 2035 reduction goal of 19%	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in a less-than-significant impact in 2035 for GHG-2 and would result in a decreased impact compared to the proposed Amendment. Alternative 3 would result in a 22.7% per capita GHG reduction, which would exceed the 2035	**Less-than-Significant Impact (decreased) –** Alternative 4 would result in a less-than-significant impact in 2035 for GHG-2 and would result in a decreased impact compared to the proposed Amendment. Alternative 4 would result in a 22.1% per capita GHG reduction, which would exceed the 2035	**Less-than-Significant Impact (decreased) –** Alternative 5 would result in a less-than-significant impact in 2035 for GHG-2 and would result in a decreased impact compared to the proposed Amendment. Alternative 5 would result in a 22.0% per capita GHG reduction, which would exceed the 2035

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	reduction goal of 19% below 2005 levels and would result in a greater reduction than the proposed Amendment (19.0% below 2005) (Appendix E, Table E-2).	below 2005 levels and would result in less reductions than the proposed Amendment (19.0% below 2005) (Appendix E, Table E-2).	reduction goal of 19% below 2005 levels and would result in a greater reduction than the proposed Amendment (19.0% below 2005) (Appendix E, Table E-2).	reduction goal of 19% below 2005 levels and would result in a greater reduction than the proposed Amendment (19.0% below 2005) (Appendix E, Table E-2).	reduction goal of 19% below 2005 levels and would result in a greater reduction than the proposed Amendment (19.0% below 2005) (Appendix E, Table E-2).
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2035 (GHG-5). Alternative 1 would result in lower GHG emissions compared to the proposed Amendment due to the inclusion of the regional road usage charge but would not meet the reduction target reference points for 2030 and 2045 and would therefore result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2035 (GHG-5). Alternative 2 would result in higher GHG emissions that would not meet the reduction target reference points for 2030 and 2045 and would therefore result in increased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased) –** Alternative 3 would result in a significant impact in 2035 (GHG-5). Alternative 3 would result in lower GHG emissions compared to the proposed Amendment but would not meet the reduction target reference points for 2030 and 2045 and would therefore result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2035 (GHG-5). Alternative 4 would result in lower GHG emissions compared to the proposed Amendment but would not meet the reduction target reference points for 2030 and 2045 and would therefore result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2035 (GHG-5). Alternative 5 would result in lower GHG emissions compared to the proposed Amendment but would not meet the reduction target reference points for 2030 and 2045 and would therefore result in decreased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).
2050	**Less-than-Significant Impact (decreased) –** Alternative 1 would result in less-than-significant impacts in 2050 (GHG-1 and GHG-4). Alternative 1 would have the same regional growth, land uses, and transportation network improvements as the proposed Amendment, but the inclusion of the regional road usage charge would result in lower GHG emissions than the proposed Amendment and would result in decreased impacts (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (increased) –** Alternative 2 would result in less-than-significant impacts in 2050 (GHG-1 and GHG-4). Alternative 2 would result in higher GHG emissions than the proposed Amendment and would result in increased impacts (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (decreased) –** Alternative 3 would result in less-than-significant impacts in 2050 (GHG-1 and GHG-4). Alternative 3 would result in lower GHG emissions than the proposed Amendment due to more compact development, and would result in decreased impacts (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (decreased)** – Alternative 4 would result in less-than-significant impacts in 2050 (GHG-1 and GHG-4). Alternative 4 would result in lower GHG emissions than the proposed Amendment due to more progressive pricing and would result in decreased impacts (Appendix E, Tables E-2 and E-3).	**Less-than-Significant Impact (decreased)** – Alternative 5 would result in less-than-significant impacts in 2050 (GHG-1 and GHG-4). Alternative 5 would result in lower GHG emissions than the proposed Amendment due to more compact development, and would result in decreased impacts (Appendix E, Tables E-2 and E-3).
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2050 (GHG-5). Alternative 1 would result in lower GHG emissions compared to the proposed Amendment, but still would not meet the reduction target reference points for 2045 and 2050 (Appendix E, Tables E-2 and E-3).	**Significant Impact (increased) –** Alternative 2 would result in a significant impact in 2050 (GHG-5). Alternative 2 would result in higher GHG emissions that would not meet the reduction target reference points for 2045 and 2050 and would result in increased impacts compared to the proposed Amendment (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased)** – Alternative 3 would result in a significant impact in 2050 (GHG-5). Alternative 3 would result in lower GHG emissions compared to the proposed Amendment, but still would not meet the reduction target reference points for 2045 and 2050 (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased) –** Alternative 4 would result in a significant impact in 2050 (GHG-5). Alternative 4 would result in lower GHG emissions compared to the proposed Amendment, but still would not meet the reduction target reference points for 2045 and 2050 (Appendix E, Tables E-2 and E-3).	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2050 (GHG-5). Alternative 5 would result in lower GHG emissions compared to the proposed Amendment, but still would not meet the reduction target reference points for 2045 and 2050 (Appendix E, Tables E-2 and E-3).
Noise and Vibration					
2025	**Significant Impact (same) –** Alternative 1 would result in significant impacts in 2025 (NOI-1 and NOI-2). Alternative 1 would have the same land use patterns as the proposed Amendment, and therefore expose similar sensitive receptors to high noise levels. Thus, Alternative 1 would result in noise and vibration impacts similar to the proposed Amendment.	**Significant Impact (increased) –** Alternative 2 would result in significant impacts in 2025 (NOI-1 and NOI-2). Land use patterns would result in less compact development compared to the proposed Amendment, which could expose more sensitive receptors to high noise levels. Additionally, regional growth and transportation network improvements would occur under this alternative by 2025 resulting in increased noise and vibration impacts compared to the proposed Amendment.	**Significant Impact (decreased)** – Alternative 3 would result in significant impacts in 2025 (NOI-1 and NOI-2). Land use patterns under Alternative 3 would result in more compact development, which could result in exposure of fewer sensitive receptors to high noise levels compared to the proposed Amendment. Additionally, regional growth and transportation network improvements would occur under this alternative by 2025 resulting in decreased noise and vibration impacts compared to the proposed Amendment.	**Significant Impact (same) –** Alternative 4 would result in significant impacts in 2025 (NOI-1 and NOI-2). Alternative 4 would have the same land use patterns as the proposed Amendment, and therefore would expose similar sensitive receptors to high noise levels. Additionally, regional growth and transportation network improvements would occur under this alternative by 2025 resulting in noise and vibration impacts similar to the proposed Amendment.	**Significant Impact (decreased) –** Alternative 5 would result in significant impacts in 2025 (NOI-1 and NOI-2). Land use patterns under Alternative 5 would result in more compact development, which could result in exposure of fewer sensitive receptors to high noise levels compared to the proposed Amendment. Additionally, regional growth and transportation network improvements would occur under this alternative by 2025 resulting in decreased noise and vibration impacts compared to the proposed Amendment.

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2035	**Significant Impact (decreased)** – Alternative 1 would result in significant impacts in 2035 (NOI-1 and NOI-2). Alternative 1 would have similar land use patterns as the proposed Amendment and therefore would expose similar sensitive receptors to high noise levels. However, Alternative 1 would result in a lower VMT compared to the proposed Amendment due to the inclusion of the regional road usage charge and would therefore result in decreased noise impacts compared to the proposed Amendment (Appendix E, Table E-1).	**Significant Impact (increased) –** Alternative 2 would result in significant impacts in 2035 (NOI-1 and NOI-2). Land use patterns would be less compact than with the proposed Amendment, which could expose more sensitive receptors to high noise levels. Additionally, regional growth and transportation network improvements would occur under this alternative by 2035, resulting in increased noise and vibration impacts compared to the proposed Amendment.	**Significant Impact (decreased)** – Alternative 3 would result in significant impacts in 2035 (NOI-1 and NOI-2). Land use patterns would be more compact than with the proposed Amendment, which could result in the exposure of fewer sensitive receptors to high noise levels than the proposed Amendment. In addition, regional growth and transportation network improvements would occur under this alternative by 2035, resulting in decreased noise and vibration impacts compared to the proposed Amendment.	**Significant Impact (decreased) –** Alternative 4 would result in significant impacts in 2035 (NOI-1 and NOI-2). Alternative 4 would have similar land use patterns as the proposed Amendment and therefore would expose similar sensitive receptors to high noise levels. However, Alternative 4 would result in a lower VMT compared to the proposed Amendment due to the inclusion of the regional road usage charge and would therefore result in decreased noise impacts compared to the proposed Amendment (Appendix E, Table E-1).	**Significant Impact (decreased) –** Alternative 5 would result in significant impacts in 2035 (NOI-1 and NOI-2). Land use patterns would be more compact than the proposed Amendment, which could result in the exposure of fewer sensitive receptors to high noise levels than the proposed Amendment. In addition, regional growth and transportation network improvements would occur under this alternative by 2035, resulting in decreased noise and vibration impacts compared to the proposed Amendment.
2050	**Significant Impact (same)** – Alternative 1 would result in significant impacts in 2050 (NOI-1 and NOI-2). Alternative 1 would have similar land use patterns as the proposed Amendment and therefore would expose similar sensitive receptors to high noise levels. However, Alternative 1 would result in a lower VMT compared to the proposed Amendment due to the inclusion of the regional road usage charge and would therefore result in decreased noise impacts compared to the proposed Amendment (Appendix E, Table E-1).	**Significant Impact (increased)** – Alternative 2 would result in significant impacts in 2050 (NOI-1 and NOI-2). Land use patterns would be less compact than with the proposed Amendment, which could expose more sensitive receptors to high noise levels. Additionally, regional growth and transportation network improvements would occur under this alternative by 2050, resulting in increased noise and vibration impacts compared to the proposed Amendment.	**Significant Impact (decreased) –** Alternative 3 would result in significant impacts in 2050 (NOI-1 and NOI-2). Land use patterns would be more compact than with the proposed Amendment, which could result in the exposure of fewer sensitive receptors to high noise levels than the proposed Amendment. In addition, regional growth and transportation network improvements would occur under this alternative by 2050, resulting in decreased noise and vibration impacts compared to the proposed Amendment	**Significant Impact (decreased**) – Alternative 4 would result in significant impacts in 2050 (NOI-1 and NOI-2). Alternative 4 would have similar land use patterns as the proposed Amendment and therefore would expose similar sensitive receptors to high noise levels. However, Alternative 4 would result in a lower VMT compared to the proposed Amendment due to the inclusion of the regional road usage charge and would therefore result in decreased noise impacts compared to the proposed Amendment (Appendix E, Table E-1)	**Significant Impact (decreased) –** Alternative 5 would result in significant impacts in 2050 (NOI-1 and NOI-2). Land use patterns would be more compact than with the proposed Amendment, which could result in the exposure of fewer sensitive receptors to high noise levels than the proposed Amendment. In addition, regional growth and transportation network improvements would occur under this alternative by 2050, resulting in decreased noise and vibration impacts compared to the proposed Amendment
Transportation					
2025	**Less-than-Significant Impact (same)** – Alternative 1 would result in a less-than-significant impact in 2025 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same)** – Alternative 2 would result in a less-than-significant impacts in 2025 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same)** – Alternative 3 would result in a less-than-significant impact in 2025 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2025 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same) –** Alternative 5 would result in a less-than-significant impact in 2025 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.
	Significant Impact (same) – Alternative 1 would result in a significant impact in 2025 (TRA-2). Alternative 1 would result in a VMT per capita of 24.81 (home based) in 2025, which would be similar to proposed Amendment VMT per capita (Appendix E, Table E-1). Additionally, Alternative 1 would result in an increase in total VMT of 1,212,162 miles compared to Baseline Year 2016 conditions, which is the same increase as for the proposed Amendment. Alternative 1 would result in similar impacts because it would achieve similar VMT reduction as the proposed Amendment.	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2025 (TRA-2). Alternative 2 would result in VMT per capita of 25.4 (home-based) in 2025, which would be greater than the proposed Amendment VMT per capita of 24.81 (Appendix E, Table E-1). Additionally, Alternative 2 would result in an increase in total VMT of 3,287,993 miles per day in year 2025, as compared to Baseline Year 2016 conditions. This increase would be greater than the 1,212,162 mile increase for the proposed Amendment. Alternative 2 would result in increased impacts because it would not achieve as much VMT reduction as the proposed Amendment.	**Significant Impact (decreased) –** Alternative 3 would result in a significant impact in 2025 (TRA-2). Alternative 3 would result in a slightly decreased VMT per capita of 24.5 (home-based) compared to the proposed Amendment VMT per capita of 24.81 (Appendix E, Table E-1). Alternative 3 would result in an overall increase in total VMT of 214,988 miles per day in year 2025, as compared to Baseline Year 2016 conditions. This increase in total VMT is 997,174 miles lower than the projected VMT increase under the proposed Amendment. Alternative 3 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2025 (TRA-2). Alternative 4 would result in a slightly decreased VMT per capita of 24.3 (home-based) compared to the proposed Amendment VMT per capita of 24.81 (Appendix E, Table E-1). Alternative 4 would result in an overall decrease in total VMT of 495,110 miles per day in year 2025, as compared to Baseline Year 2016 conditions. This reduction in total VMT is 1,707,272 miles lower than the projected VMT increase under the proposed Amendment. Alternative 4 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2025 (TRA-2). Alternative 5 would result in a slightly decreased VMT per capita of 24.3 (home-based) compared to the proposed Amendment VMT per capita of 24.81 (Appendix E, Table E-1). Alternative 5 would result in an overall decrease in total VMT of 657,199 miles per day in year 2025, as compared to Baseline Year 2016 conditions. This reduction in total VMT is 1,869,361 miles lower than the projected VMT increase under the proposed Amendment. Alternative 5 would result in decreased impacts because it would achieve the highest VMT reduction compared to the

Year	Alternative 1: No Project (the approved Plan)	Alternative 2: 2019 Transportation Network with New Value Pricing and User Fee Policies	Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies	Alternative 4: Progressive Pricing and No Regional Road Usage Charge	Alternative 5: All Growth in Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge
					proposed Amendment and the other alternatives.
2035	**Less-than-Significant Impact (same) –** Alternative 1 would result in a less-than-significant impact in 2035 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same)** – Alternative 2 would result in a less-than-significant impact in 2035 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same)** – Alternative 3 would result in a less-than-significant impact in 2035 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2025 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same)** – Alternative 5 would result in a less-than-significant impact in 2025 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2035 (TRA-2). Alternative 1 would result in a slightly decreased VMT per capita of 24.03 (home based) in 2035, compared to the proposed Amendment VMT per capita of 24.38 (Appendix E, Table E-1). Additionally, Alternative 1 would result in an increase in total VMT of 2,141,053 miles per day in year 2035, as compared to Baseline Year 2016 conditions, which is 1,262,500 miles fewer than the proposed Amendment. Alternative 1 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (increased) –** Alternative 2 would result in a significant impact in 2035 (TRA-2). Alternative 2 would result in VMT per capita of 26.0 (home-based) in 2035, which would be greater than the proposed Amendment VMT per capita of 24.38 (Appendix E, Table E-1). Alternative 2 would result in an increase in total VMT of 9,106,582 miles per day in year 2035, as compared to Baseline Year 2016 conditions. This increase would be 5,703,029 miles greater than the proposed Amendment. Alternative 2 would result in increased impacts because it would not achieve as much VMT reduction as the proposed Amendment.	**Significant Impact (decreased)** – Alternative 3 would result in a significant impact in 2035 (TRA-2). Alternative 3 would result in a slightly decreased VMT per capita of 23.4 (home-based) in 2035 compared to the proposed Amendment VMT per capita of 24.38 (Appendix E, Table E-1). Alternative 3 would result in an overall decrease in total VMT of 261,481 miles per day in year 2035, as compared to Baseline Year 2016 conditions. This is 3,665,034 miles lower than the projected VMT increase under the proposed Amendment. Alternative 3 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (decreased)** – Alternative 4 would result in a significant impact in 2035 (TRA-2). Alternative 4 would result in a slightly decreased VMT per capita of 23.6 (home-based) in 2035 compared to the proposed Amendment VMT per capita of 24.38 (Appendix E, Table E-1). Alternative 4 would result in an overall increase in total VMT of 545,259 miles per day in year 2035, as compared to Baseline Year 2016 conditions. This increase in total VMT is 2,858,294 miles lower than the projected VMT increase under the proposed Amendment. Alternative 4 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2035 (TRA-2). Alternative 5 would result in a slightly decreased VMT per capita of 23.6 (home-based) in 2035 compared to the proposed Amendment VMT per capita of 24.38 (Appendix E, Table E-1). Alternative 5 would result in an overall increase in total VMT of 643,035 miles per day in year 2035, as compared to Baseline Year 2016 conditions. This increase in total VMT is 2,760,518 miles lower than the projected VMT increase under the proposed Amendment. Alternative 5 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.
2050	**Less-than-Significant Impact (same) –** Alternative 1 would result in a less-than-significant impact in 2050 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same)** – Alternative 2 would result in a less-than-significant impact in 2050 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same)** – Alternative 3 would result in a less-than-significant impact in 2050 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same) –** Alternative 4 would result in a less-than-significant impact in 2050 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.	**Less-than-Significant Impact (same) –** Alternative 5 would result in a less-than-significant impact in 2050 for TRA-1. The impact of this alternative is the same as the proposed Amendment impact because this alternative would be consistent with adopted plans and programs.
	Significant Impact (decreased) – Alternative 1 would result in a significant impact in 2050 (TRA-2). Alternative 1 would result in a slightly decreased VMT per capita of 23.99 (home-based) in 2050, compared to the proposed Amendment VMT per capita of 24.29 (see Appendix E, Table E-1). Alternative 1 would result in an increase in total VMT of 5,008,108 miles per day in year 2050, as compared to Baseline Year 2016 conditions, which is 1,111,085 miles fewer than the proposed Amendment. Alternative 1 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (increased)** – Alternative 2 would result in a significant impact in 2050 (TRA-2). Alternative 2 would result in VMT per capita of 26.5 (home-based) in 2050, which would be greater than the proposed Amendment VMT per capita of 24.29 (Appendix E, Table E-1). Alternative 2 would result in an increase in total VMT of 14,218,978 miles per day in year 2050, as compared to Baseline Year 2016 conditions. This increase would be 8,099,785 miles greater than the proposed Amendment. Alternative 2 would result in increased impacts because it would not achieve as much VMT reduction as the proposed Amendment.	**Significant Impact (decreased) –** Alternative 3 would result in a significant impact in 2050 (TRA-2). Alternative 3 would result in a slightly decreased VMT per capita of 23.3 (home-based) compared to the proposed Amendment VMT per capita of 24.29 (Appendix E, Table E-1). Alternative 3 would result in an overall increase in total VMT of 2,331,061 miles per day in year 2050, as compared to Baseline Year 2016 conditions. This is 3,788,132 miles lower than the projected VMT increased under the proposed Amendment. Alternative 3 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (decreased) –** Alternative 4 would result in a significant impact in 2050 (TRA-2). Alternative 4 would result in a slightly decreased VMT per capita of 23.4 (home-based) in 2050 compared to the proposed Amendment VMT per capita of 24.29 (Appendix E, Table E-1). Alternative 4 would result in an overall increase in total VMT of 2,842,913 miles per day in year 2050, as compared to Baseline Year 2016 conditions. This increase in total VMT is 3,276,280 miles lower than the projected VMT increased under the proposed Amendment. Alternative 4 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.	**Significant Impact (decreased) –** Alternative 5 would result in a significant impact in 2050 (TRA-2). Alternative 4 would result in a slightly decreased VMT per capita of 23.3 (home-based) in 2050 compared to the proposed Amendment VMT per capita of 24.29 (Appendix E, Table E-1). Alternative 5 would result in an overall increase in total VMT of 2,641,317 miles per day in year 2050, as compared to Baseline Year 2016 conditions. This increase in total VMT is 3,477,876 miles lower than the projected VMT increased under the proposed Amendment. Alternative 5 would result in decreased impacts because it would achieve a higher VMT reduction than the proposed Amendment.

7 OTHER CONSIDERATIONS REQUIRED BY CEQA

This chapter addresses the following other considerations required by CEQA based on the impact analysis in Chapter 4 and the alternatives analysis in Chapter 6: growth inducement, significant irreversible impacts, and significant and unavoidable impacts.

7.1 GROWTH INDUCEMENT

7.1.1 BACKGROUND

A project is defined as growth inducing when it: directly or indirectly fosters economic growth, population growth, or additional housing; removes obstacles to growth; or encourages or facilitates other activities that would significantly affect the environment (CEQA Guidelines Section 15126.2). Growth inducement would be caused by the provision or extension of utilities and public services. For example, the following are examples of growth-inducing activities: the development of water, wastewater, fire, or other services in previously underserved areas; the extension of transportation routes into undeveloped areas; and the establishment of major new employment opportunities.

7.1.2 ECONOMIC GROWTH, POPULATION GROWTH, ADDITIONAL HOUSING

As described in the approved Plan PEIR, from 2016 to 2050, regional population is forecasted to increase by over 436,000 people (13 percent), adding over 280,000 housing units and over 439,000 jobs. The approved Plan's objectives included focusing population and employment growth in existing urbanized areas to protect sensitive habitat and natural resource areas, and providing transportation investments that support compact land development patterns. The approved Plan PEIR determined construction of additional housing and planned transportation network improvements as part of the approved Plan would remove obstacles to growth in some areas of the region, which would support additional housing, population, and economic growth. The proposed Amendment does not include any transportation network changes or new construction and would not support additional housing, population, and economic growth beyond what was identified in the approved Plan PEIR. As discussed in Chapter 2, *Project Description*, the proposed Amendment includes changes to the financial strategies in the approved Plan that would result in a decrease in revenue. However, there would still be sufficient revenue to fund the planned transportation improvements included in the approved Plan, and no changes to those projects would result.

7.2 SIGNIFICANT IRREVERSIBLE IMPACTS

Section 15126.2(d) of the CEQA Guidelines requires a discussion of any significant irreversible environmental change that would be caused by the proposed project. The proposed Amendment does not include any new transportation network improvements, land use changes, or construction beyond what was identified in the approved Plan PEIR. As detailed in Section 4.2, *Energy,* and in Table 4.2-1 of this SEIR, implementation of the proposed Amendment and removal of the regional road usage charge would increase vehicle miles traveled, which would result in an increased and irreversible consumption of nonrenewable energy resources in the form of on-road vehicle gasoline and diesel fuel. However, as determined in Section 4.2, the proposed Amendment would not result in wasteful, inefficient, or unnecessary use of energy because per capita energy use would still decrease between 2016 and each horizon year, and energy impacts would be less than significant.

7.3 SIGNIFICANT AND UNAVOIDABLE IMPACTS

Section 15126.2(c) of the CEQA Guidelines requires that an EIR describe any significant impacts that cannot be avoided even with the implementation of feasible mitigation measures. Significant and unavoidable impacts from the implementation of the proposed Amendment were identified in Sections 4.1, *Air Quality*, 4.3, *Greenhouse Gas Emissions*, 4.4, *Noise and Vibration*, and 4.5, *Transportation* and are presented in Table 7-1 below.

It was also determined through the analysis in Chapter 5, *Cumulative Impacts*, that implementation of the proposed Amendment would result in significant and unavoidable cumulative impacts related to air quality, greenhouse gas emissions, noise and vibration, and transportation.

Table 7-1
Significant and Unavoidable Impacts

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
4.1 Air Quality				
AQ-2 Result in a cumulatively considerable net increase in nonattainment criteria pollutants, including VOC, NO_X, PM10, PM2.5, and SO_X Significant impact in 2050 consistent with the approved Plan PEIR.	**AQ-2a. Secure Incentive Funding** **AQ-2b. Purchase Zero Emission Trains** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects** **GHG-5g. Prepare/Develop a Regional Climate Action Plan** **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**	Not Applicable	Not Applicable	Significant and Unavoidable
AQ-4 Expose sensitive receptors to substantial PM10 and PM2.5 concentrations Significant impact in 2025 consistent with the approved Plan PEIR. Substantially more severe significant impact in 2035 and 2050 compared to the approved Plan PEIR.	**AQ-2a. Secure Incentive Funding** **AQ-4. Reduce Exposure to Localized Particulate and/or TAC Emissions** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
	GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects **GHG-5g. Prepare/Develop a Regional Climate Action Plan** **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects**			
AQ-5 Expose sensitive receptors to substantial TAC concentrations Substantially more severe significant impact in 2025, 2035, and 2050 compared to the approved Plan PEIR.	**AQ-2a. Secure Incentive Funding** **AQ-4. Reduce Exposure to Localized Particulate and/or TAC Emissions** **AQ-5a. Reduce Exposure to Localized Toxic Air Contaminant Emissions** **AQ-5b. Reduce Exposure to Localized Toxic Air Contaminant Emissions during Railway Design** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects** **GHG-5g. Prepare/Develop a Regional Climate Action Plan** **TRA-2 Achieve Further VMT Reductions for Transportation and Development Projects**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable
4.2 Energy				
Not applicable	Not applicable	Not Applicable	Not Applicable	Not Applicable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
4.3 Greenhouse Gas Emissions				
GHG-5 Be inconsistent with the State's ability to achieve the 2030 reduction target of SB 32, the accelerated 2030 reduction target of the 2022 Scoping Plan and long-term reduction goals of Executive Orders S-3-05, B-55-18, and AB 1279 New significant impact in 2030, 2045, and 2050 compared to the approved Plan PEIR.	**GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5b. Establish New Funding Programs for Zero-Emissions Vehicles and Infrastructure** **GHG-5c. Implement Nature-Based Climate Solutions to Remove Carbon Dioxide from the Atmosphere** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5e. Implement Measures to Reduce GHG Emissions from Transportation Projects** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects** **GHG-5g. Prepare/Develop a Regional Climate Action Plan** **AQ-3b. Reduce Diesel Emissions During Construction from Off-Road Equipment** **AQ-3c. Reduce Diesel Emissions from On-Road Vehicles** **AQ-4. Reduce Exposure to Localized Particulate and/or TAC Emissions** **TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects** **WS-1a. Implement Water Conservation Measures for Transportation Network Improvements** **WS-1b. Implement Water Conservation Measures for Development Projects**	Significant and Unavoidable (in 2030)	Significant and Unavoidable (in 2045)	Significant and Unavoidable

Impacts of the Proposed Amendment in 2025, 2035, and 2050	Mitigation Measures	Level of Significance After Mitigation		
		2025	2035	2050
4.4 Noise and Vibration				
NOI-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or generate a substantial absolute increase in ambient noise Significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	**NOI-1a. Implement Construction Noise Reduction Measures for Development Projects and Transportation Network Improvements** **NOI-1b. Implement Operational Noise Reduction Measures for Transportation Network Improvements** **NOI-1c. Implement Operational Noise Reduction Measures for Development Projects**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable
NOI-2 Generation of excessive groundborne vibration or groundborne noise levels Significant impact in 2025, 2035, and 2050 consistent with the approved Plan PEIR.	**NOI-2a. Implement Construction Groundborne Vibration and Noise Reduction Measures** **NOI-2b. Implement Groundborne Vibration and Noise-Reducing Measures for Rail Operations**	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable
4.5 Transportation				
TRA-2 Conflict or be inconsistent with CEQA Guidelines Section 15064.3 by not achieving the substantial VMT reductions needed to help achieve statewide GHG reduction goals Significant impact in 2025 consistent with the approved Plan PEIR. Substantially more severe significant impact in 2030, 2035, 2045, and 2050 compared to the approved Plan PEIR.	**TRA-2. Achieve Further VMT Reductions for Transportation and Development Projects** **GHG-5a. Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions and for Updates to CAPs or GHG Reduction Plans** **GHG-5d. Develop and Implement Regional Digital Equity Strategy and Action Plan to Advance Smart Cities and Close the Digital Divide** **GHG-5f. Implement Measures to Reduce GHG Emissions from Development Projects**	Significant and Unavoidable	Significant and Unavoidable (and in 2030)	Significant and Unavoidable (and in 2045)

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9 PREPARERS OF THE ENVIRONMENTAL DOCUMENT

9.1 SANDAG

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Kirsten Uchitel	Project Manager
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Cundo Arellano	Associate Researcher and Modeler
Bryce Burdge	Data Scientist
Grace Chung	Principal Researcher
Nimish Dharmadhikari	Associate Researcher and Modeler
Susan Freedman	Senior Regional Planner
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Brad Stein	GIS Specialist
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Kenneth Cherry	Technical Editor
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9.3 INTERSECTING METRICS

Stephen Cook	Transportation Specialist

9.4 TERRY A. HAYES ASSOCIATES

Allyson Dong	Senior Planner
Blaire Frei	Planner

Appendix A
Notice of Preparation

Appendix A-1
NOP

Notice of Preparation and Public Scoping Meeting

Date: December 9, 2022

To: Office of Planning and Research, Responsible and Trustee Agencies, Clerk of the County of San Diego, and Other Interested Stakeholders

Subject: Notice of Preparation of Supplement to the Environmental Impact Report for the 2021 Regional Plan and Public Scoping Meeting Notice

The San Diego Association of Governments (SANDAG), as lead agency under the California Environmental Quality Act (CEQA), will prepare a Supplement to the Final Program Environmental Impact Report (SEIR) for an amendment to the 2021 Regional Plan. In accordance with CEQA Guidelines Section 15082, SANDAG has issued this Notice of Preparation to provide responsible agencies, trustee agencies, and other interested stakeholders with information describing the proposed project and its potential environmental effects.

Project Location

The Project location includes the 18 cities and unincorporated areas of San Diego County.

Project Description

Senate Bill 375 (SB 375) provides for a planning process to coordinate land use planning and regional transportation plans (RTP) to help California meet the greenhouse gas (GHG) emissions reductions established in Assembly Bill 32. SB 375 requires RTPs prepared by metropolitan planning organizations (MPOs), including SANDAG, to incorporate into an RTP a Sustainable Communities Strategy (SCS) that demonstrates how the region would achieve GHG emissions reduction targets for passenger vehicles set by the California Air Resources Board (CARB).

In March 2018, CARB updated regional GHG emissions reduction targets. The current SANDAG targets are per capita carbon dioxide emissions reductions from passenger vehicles of 15 percent by 2020 and 19 percent by 2035, relative to 2005 levels. In accordance with state and federal law, SANDAG developed the 2021 Regional Plan, which included both the region's RTP and SCS, and achieved the 2020 and 2035 GHG emissions reduction targets set by CARB. On December 10, 2021, the SANDAG Board of Directors adopted the 2021 Regional Plan and certified the Final Program EIR for the 2021 Regional Plan.

Following adoption of the 2021 Regional Plan, the SANDAG Board directed staff to prepare a focused amendment to the 2021 Regional Plan without the regional road usage charge (Project), and an environmental analysis for the Board's consideration. A road usage charge is a direct user fee where drivers pay to use the roadway network, whether the vehicle is powered by gas or electricity or hydrogen, based on distance traveled or other factors.

EIR Scope

A lead agency may choose to prepare a supplement to an EIR when "[a]ny of the conditions described in Section 15162 would require the preparation of a subsequent EIR" and when "only minor additions or changes would be necessary to make the previous EIR adequately apply to

the project in the changed situation." (CEQA Guidelines § 15163, subd. (a)(1)–(2).) A supplement to an EIR "need contain only the information necessary to make the previous EIR adequate for the project as revised. (CEQA Guidelines § 15163, subd. (b).) As the lead agency, SANDAG will describe and analyze the impacts of the proposed Project on the physical environment. The SEIR will identify potential impacts to the following environmental resources:

- Aesthetics and Visual Resources
- Agricultural and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology, Soils, and Paleontological Resources
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use
- Mineral Resources
- Noise and Vibration
- Population and Housing
- Public Services and Utilities
- Transportation
- Tribal Cultural Resources
- Water Supply
- Wildfire

In addition, the SEIR will address cumulative impacts, growth inducing impacts, alternatives, and other issues required by CEQA.

Submitting Comments

Responsible and trustee agencies, and other interested stakeholders are invited to provide written comments on the scope and content of the SEIR. Consistent with CEQA, your response should be sent at the earliest possible date, but no later than thirty days after publication of this Notice. Please submit your comments by 5:00 p.m. PST on January 9, 2023, by mail or email to:

Kirsten Uchitel, Associate Regional Planner
SANDAG
401 B Street, Suite 800
San Diego, CA 92101
Kirsten.Uchitel@sandag.org

Scoping Meeting

SANDAG will hold a public scoping meeting where interested stakeholders will receive a brief presentation on the Project and will have the opportunity to provide comments on the scope and content of the environmental analysis that will be included in the SEIR for the Project.

Date and Time: December 21, 2022, at 4:00 p.m. PST

Place: Virtual meeting accessible at https://us02web.zoom.us/j/84519676872
Call in at +1 669 900 6833
Meeting ID: 845 1967 6872

Appendix A-2
NOP Comments

From: Kirsten Uchitel
To: Lauren Lee
Subject: 2021 Amendment Comment
Date: Friday, January 27, 2023 11:21:29 AM

From: Brit Chadwick <britchadwick@gmail.com>
Sent: Friday, December 16, 2022 6:20 PM
To: Kirsten Uchitel <kirsten.uchitel@sandag.org>
Subject: Public comments

To whom it may concern,

The Vehicle Miles Traveled tax (VMT) makes rural and semi rural communities suffer far more than metro and suburban communities and is in no way equitable.

We are already paying excessive fuel taxes.

Sandag has never supported road improvements for Ramona and we tend to drive more miles so we'll pay a bigger portion of the VMT tax with less to show for it.

We still remember Sandag is the agency that decided instead of improving Hwy 67 for vehicles, they'd add more bike lanes.

As a Ramona resident who lives off of highway 67, I oppose the Vehicle Miles Traveled Tax.

Sincerely,
Britni Chadwick
16246 Boortz LN
Ramona CA 92065
--
Britni Chadwick, Coordinator
TLC Supported Living Services
(858)705-1748
Inline image

From: Kirsten Uchitel
To: Lauren Lee
Subject: 2021 Amendment Comment
Date: Friday, January 27, 2023 11:24:18 AM

From: Dan Silver <dsilverla@me.com>
Sent: Thursday, December 22, 2022 3:05 PM
To: Kirsten Uchitel <Kirsten.Uchitel@sandag.org>
Cc: Keith Greer <keith.greer@sandag.org>; Michael Beck <beckehl@icloud.com>
Subject: Notice of Preparation of Supplement to the Environmental Impact Report for the 2021 Regional Plan

Dec. 22, 2022

Kirsten Uchitel, Associate Regional Planner SANDAG
401 B Street, Suite 800
San Diego, CA 92101

RE: Notice of Preparation of Supplement to the Environmental Impact Report for the 2021 Regional Plan

Dear Ms Uchitel:

Endangered Habitats League (EHL) appreciates the opportunity to comment on the scope of the Supplemental EIR (SEIR). For your reference, EHL is a regional conservation group dedicated so ecosystem protection, sustainable land use, and collaborative conflict resolution.

EHL is deeply concerned over the negative effects of removing the road charge. A road service charge of some type is inevitable due to loss of the gas tax with electrification, and San Diego could have been a national leader.

The SEIR should account for the direct loss of funds from all classes of vehicles (electric, gas, etc.). It should also account for the incentives and disincentives inherent in a carefully crafted road charge. Losing the road charge means that driver behavior will not be modified, and there will be corresponding increase in VMTs and GHGs, *irrespective* of whether the project list itself is unaltered. Mitigation measures should be offered to compensate for the loss of behavioral change. However, the increased GHG impacts may not be mitigable.

Finally, the SEIR should include a "no action" alternative in which the road charge is maintained, and an alternative for a partial or refined road charge geared to targeted disincentives for long commutes or multiple daily trips.

Thank you for considering our views

Regards and Holiday wishes,
Dan

Dan Silver, Executive Director
Endangered Habitats League
8424 Santa Monica Blvd., Suite A 592
Los Angeles, CA 90069-4267

213-804-2750
dsilverla@me.com
https://ehleague.org

From:	Kirsten Uchitel
To:	Lauren Lee
Subject:	2021 Amendment Comment
Date:	Friday, January 27, 2023 11:22:18 AM

From: Gary King <gking@startmail.com>
Sent: Sunday, December 18, 2022 1:03 PM
To: Kirsten Uchitel <kirsten.uchitel@sandag.org>
Subject: STOP TAXING US!

Dear SANDAG,

You have been deaf to the financial plight of citizens in this RECESSION. Your misappropriations of our taxes for lavish dinners & booze are embarrassing & criminal embezzlement. You demand tax increases incessantly while you waste our tax dollars on mass transit with few riders, but plenty of risks of criminal attack & Covid transmission. Then you steal our roadways & street parking near local stores from vehicular traffic for a scant group of loud bicycle activists who don't pay road taxes, but zip around without helmets & ignore traffic laws.

You ignored your obligation to expand & maintain roads & freeways in North County that was required by tax measures passed on propositions years ago. So, instead you built billion dollar projects in 2 cities, San Diego & Chula Vista, you reduce general traffic lanes, you set up toll roads to make us pay twice for the lanes we need, and you spend all your damn time figuring out how to raid our bank accounts for your next dinner party, political activities & government worker unions (who parasitize taxpayers for lavish pensions & who funnel money back to support your regime).

You sicken me. But your corruption also make it impossible for many retired in California to survive financially here. Your insane "Milleage Tax" schemes, repeated increases in sales taxes, and the $1.40 per gallon gas taxes punish the working class & retired communities. You aren't true "Public Servants," but see yourselves as the Ruling Elitists that think you

"know better" what to spend OUR money for.

I spit on you. SANDAG must be dissolved & every one of you fired without severance or pensions. Parasites & Crooks are what you are. Go to Hell!
Gary King

From:	Kirsten Uchitel
To:	Lauren Lee
Subject:	Amendment Comment
Date:	Friday, January 27, 2023 11:31:41 AM

From: David De Vries <DDeVries@poway.org>
Sent: Monday, January 9, 2023 1:43 PM
To: Kirsten Uchitel <kirsten.uchitel@sandag.org>
Cc: Bob Manis <BManis@poway.org>; SDFORWARD <sdforward@sandag.org>; asilva@poway.org; JohnWilly Aglupos <JAglupos@poway.org>; Hector Salgado <HSalgado@poway.org>; Charlotte Brenner <CBrenner@poway.org>; Linh Diep <LDiep@poway.org>; Hoger Saleh <HSaleh@poway.org>
Subject: Supplemental Environmental Impact Report for an amendment to the 2021 Regional Plan Comments - City of Poway

Thank you for allowing us to submit comments on the Supplemental Environmental Impact Report for an amendment to the 2021 Regional Plan.

Regarding Scripps Poway Parkway, the City of Poway would like to see vehicle, bike, pedestrian and transit infrastructure improvements and connections to be added from the Highway 67 through Scripps Poway Parkway to the I-15 Freeway. Please note that the majority of the City of Poway and areas east of the City of Poway are in the Very High Fire Severity Zone. Evacuation routes for the region should consider alternative routes and not only highway routes. Figure 4.9-2 of the EIR shows that there are no evacuation routes through the City of Poway. Providing vehicle, bike, pedestrian and transit infrastructure improvements along Scripps Poway Parkway and establishing it as an Evacuation Route will provide better access for emergency vehicles and sufficient routes for persons evacuating through the City of Poway. I have spoken to several property and business owners within the South Poway Business Park (SPBP) including Geico and parking is a constant issue. There is currently no public transit route into the SPBP. Having public transit, bike, pedestrian and highway/road improvements/connections providing more efficient access to the SPBP is essential for future employment growth and public safety in the area. Many workers in the Poway area live in Ramona and East County and this is a vital connection for the City and the Region. SANDAG has also identified the SPBP as a Tier 3 employment center in their draft Employment Center analysis. Construction is also underway to add thousands of more employees in the SPBP. To be clear, we are recommending that Scripps Poway Parkway be shown as a critical connection, a multimodal corridor, and an evacuation route in the San Diego region (https://www.sandag.org/uploads/publicationid/publicationid_4720_28341.pdf).

Regarding the Hwy 67, please note that the City of Poway's General Plan Transportation Element

and the San Vicente CMCP includes a multi-use path onSR-67 (reference p. 3 http://docs.poway.org/weblink/0/doc/50446/Electronic.aspx). This multi-use path would include a separated two-way bike path and a fenced DG equestrian trail. The multi-use path provides a critical and safe pathway for hikers, bikers, runners, walkers, children, and equestrians. A multi-use path also creates a necessary loop between the City's Iron Mountain trailhead and other destinations (e.g., Mt. Woodson, Lake Poway) which is also a goal within the Transportation Element. We recommend the Regional Plan be consistent with the San Vicente CMCP and with the City's plans. Also, for public safety, please recall that there are considerable traffic collisions along the Hwy 67 and we recommend that traffic safety improvements be considered along the Hwy 67 corridor.

State Route 67 is also designated as a scenic roadway by the Poway General Plan. As a part of the General Plan requirements, a 50-foot wide landscape open space easement is required from adjacent property owners from the ultimate right-of-way line along State Route 67 when development is proposed. This easement shall be landscaped and modified as needed to enhance the scenic quality of the area as discussed in the General Plan Transportation Element Policy B – Scenic Roadways. Providing scenic roadway elements to the design will also help the corridor be more compatible with surrounding open space. To contribute to the General Plan goals, we would suggest that the right-of-way incorporate design elements consistent with a scenic roadway (e.g., naturalized decorative solid walls, native landscaped medians and shoulders, additional landscape areas and trees where feasible, earthen berms). Also, the EIR for the 2021 Regional Plan Table 4.1-1 and Figure 4.1-1 shows Highway 67 as not an Officially Designated or an Eligible State Scenic Highway, however, the Caltrans Scenic Highway System Lists (https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways) notes Highway 67 as an Eligible State Scenic Highway and the EIR needs to be revised to show Highway 67 as an Eligible State Scenic Highway.

As a part of the San Diego Forward Plan and the 5 Big Moves Plan, SANDAG established the SR-67 corridor as a Comprehensive Multimodal Corridor Plan (CMCP) calling for a multimodal road along the SR-67 (https://www.sdforward.com/docs/default-source/default-document-library/agenda-june-5-2020.pdf?sfvrsn=891afe65_4) . As stated on p. 6-2 of the 2050 RTP, "Our region has consistently supported a multimodal approach to transportation that looks at the overall system and improvements that benefit all modes, rather than prioritizing one over the other. This approach gives all of the transportation system users choices traveling within and through the region." Further, "A well designed and thoughtfully integrated multimodal transportation system will give people choices, allowing them to select the transportation mode that is best suited for a particular trip. In an area as large and diverse as the San Diego region, this approach is necessary to make the best use of our limited transportation resources." As discussed, a multi-modal transportation system provides users transportation options and choices and thereby reduces traffic congestion and ghg emissions. Regional multi-use paths have been a great asset to communities across the country. Here in San Diego, the SR-56 Bike Path is separated from the highway and is often used by runners, walkers, and equestrians. In contrast, it is uncommon to see bikers, walkers, and equestrians in a bike route adjacent to a highway (for instance, SR-76). A multi-use path is also kid friendly because of the separation from the highway and kids are often seen on the SR-56 Bike Path and not commonly seen within bike routes adjacent to a Highway. The multi-use path also accommodates a more rural aesthetic and is safer for users. Multi-use paths have become a critical component to the

transportation system and are treasured by the communities they are a part of. The addition of the multi-use path along Hwy 67 is more consistent with the goals and policies of the 2050 RTP. We recommend the San Vicente corridor plan provides a separated mixed-use path throughout the full length of the corridor.

Regarding unique geological features or landforms, page 4.7-30 of the EIR for the 2021 Regional Plan notes that the City of Poway General Plan "does not contain policies or regulations specific to unique geological features or landforms." This is incorrect, the General Plan and Habitat Conservation Plan notes unique geological features and landforms and related policies that include the preservation of rock outcroppings, open space, hillsides, ridgelines, and cultural, historical, and paleontological resources. Please update this in the EIR to be accurate.

Regarding Poway's General Plan, page 4.11-16 of the EIR for the 2021 Regional Plan notes that the City of Poway Comprehensive Plan was adopted November 1991 and that the Housing Element update is in the process of being updated. Please update the EIR as follows: "Poway General Plan November 1991 (Transportation Element updated March 2010; Housing Element updated August 2021; Public Safety Element being updated as of October 2021)."

Thank you for considering our comments. Please feel free to reach out to me with any questions.

Thank you,

David De Vries, AICP
City Planner
Development Services
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From: David De Vries <DDeVries@poway.org>
Sent: Thursday, August 5, 2021 10:34 AM
To: San Diego Association of Governments - San Diego Association of Governments (sdforward@sandag.org) <sdforward@sandag.org>
Cc: Bob Manis <BManis@poway.org>
Subject: 2021 Regional Plan Comments - City of Poway

Thank you for allowing us to submit comments on the Draft 2021 Regional Plan.

Regarding Scripps Poway Parkway, the City of Poway would like to see vehicle, bike, pedestrian and transit infrastructure improvements and connections to be added from the Highway 67 through Scripps Poway Parkway to the I-15 Freeway. I have spoken to several property and business owners within the South Poway Business Park (SPBP) including Geico and parking is a constant issue. There is currently no public transit route into the SPBP. Having public transit, bike, pedestrian and highway/road improvements/connections providing better more efficient access to the SPBP is essential for future employment growth in the area. Many workers in the Poway area live in Ramona and East County and this is a vital connection for the City and the Region. SANDAG has also

identified Scripps Poway as a Tier 3 employment center in their draft Employment Center analysis. Construction is also underway to add thousands of more employees in the SPBP. To be clear, we are recommending that Scripps Poway Parkway become a critical connection and a multimodal corridor (https://www.sandag.org/uploads/publicationid/publicationid_4720_28341.pdf).

Regarding the Hwy 67, please note that the City of Poway's General Plan Transportation Element includes a multi-use path on the west side of SR-67 (reference p. 3 http://docs.poway.org/weblink/0/doc/50446/Electronic.aspx). This multi-use path would include a separated two-way bike path and a fenced DG equestrian trail. The multi-use path provides a critical and safe pathway for hikers, bikers, runners, walkers, children, and equestrians. A multi-use path also creates a necessary loop between the City's Iron Mountain trailhead and other destinations (e.g., Mt. Woodson, Lake Poway) which is also a goal within the Transportation Element. We recommend the San Vicente corridor plan is consistent with the City's plans.

State Route 67 is also designated as a scenic roadway by the Poway General Plan. As a part of the General Plan requirements, a 50-foot wide landscape open space easement is required from adjacent property owners from the ultimate right-of-way line along State Route 67 when development is proposed. This easement shall be landscaped and modified as needed to enhance the scenic quality of the area as discussed in the General Plan Transportation Element Policy B – Scenic Roadways. Providing scenic roadway elements to the design will also help the corridor be more compatible with surrounding open space. To contribute to the General Plan goals, we would suggest that the right-of-way incorporate design elements consistent with a scenic roadway (e.g., naturalized decorative solid walls, native landscaped medians and shoulders, additional landscape areas and trees where feasible, earthen berms).

As a part of the San Diego Forward Plan and the 5 Big Moves Plan, SANDAG established the SR-67 corridor as a Comprehensive Multimodal Corridor Plan (CMCP) calling for a multimodal road along the SR-67 (https://www.sdforward.com/docs/default-source/default-document-library/agenda-june-5-2020.pdf?sfvrsn=891afe65_4) . As stated on p. 6-2 of the 2050 RTP, "Our region has consistently supported a multimodal approach to transportation that looks at the overall system and improvements that benefit all modes, rather than prioritizing one over the other. This approach gives all of the transportation system users choices traveling within and through the region." Further, "A well designed and thoughtfully integrated multimodal transportation system will give people choices, allowing them to select the transportation mode that is best suited for a particular trip. In an area as large and diverse as the San Diego region, this approach is necessary to make the best use of our limited transportation resources." As discussed, a multi-modal transportation system provides users transportation options and choices and thereby reduces traffic congestion and ghg emissions. Regional multi-use paths have been a great asset to communities across the country. Here in San Diego, the SR-56 Bike Path is separated from the highway and is often used by runners, walkers, and equestrians. In contrast, it is uncommon to see bikers, walkers, and equestrians in a bike route adjacent to a highway (for instance, SR-76). A multi-use path is also kid friendly because of the separation from the highway and kids are often seen on the SR-56 Bike Path and not commonly seen within bike routes adjacent to a Highway. The multi-use path also accommodates a more rural aesthetic and is safer for users. Multi-use paths have become a critical component to the transportation system and are treasured by the communities they are a part of. The addition of the

multi-use path along Hwy 67 is more consistent with the goals and policies of the 2050 RTP. We recommend the San Vicente corridor plan provides a separated mixed-use path throughout the full length of the corridor.

Lastly, during the workshop portion for the Draft 2021 Regional Plan, workshops were provide by area (North, East, Central, etc.). Based on the mapped areas shown, Poway residents and community stakeholders were not represented as a part of any region and that outreach with appropriate comment period should be provided prior to moving forward with Draft. I'd be happy to assist you with what an appropriate outreach should be.

Thank you for considering our comments. Please feel free to reach out to me with any questions.

Thank you,

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From:	Kirsten Uchitel
To:	Lauren Lee
Subject:	2021 Amendment Comments
Date:	Friday, January 27, 2023 11:31:13 AM
Attachments:	20230108_SANDAG_2023_Draft_SEIR_Scoping_Comments_57-Pages.pdf

From: Katheryn Rhodes <laplayaheritage@gmail.com>
Sent: Sunday, January 8, 2023 9:16 AM
To: Kirsten Uchitel <kirsten.uchitel@sandag.org>; Keith Greer <Keith.Greer@sandag.org>; Katheryn Rhodes <laplayaheritage@gmail.com>
Subject: Public Scoping Commends 2023 SEIR

Please see attached.

Regards,

Katheryn Rhodes
619-402-8688

January 8, 2023

SANDAG
401 B Street, Suite 800
San Diego, California 92101. Via email.
Attention: Kirsten Uchitel, Associate Regional Planner kirsten.uchitel@sandag.org
Keith Greer, Environmental Planning Manager Keith.Greer@sandag.org

Subject: Public Scoping Comments on SANDAG's new 2023 Draft Supplement to the Environmental Impact Report (2023 Draft SEIR) for the 2021 Regional Plan; 12/09/2022 CEQA Notice of Preparation (NOP); and 12/21/2022 Public Scoping Meeting. State Clearinghouse No. 202212021.

References: 12/21/2022 Video https://www.youtube.com/watch?v=g8j-9AM0pTE&t=54s
12/09/2022 CEQA 2023 Draft SEIR Notice of Preparation (NOP).
https://sandag.org/-/media/SANDAG/Documents/PDF/regional-plan/2021-regional-plan/environmental-impact-report/nop-2021-regional-plan-amendment-2022-09-12.pdf 12/21/2022 2023 Draft SEIR Presentation
https://sandag.org/-/media/SANDAG/Documents/PDF/regional-plan/2021-regional-plan/environmental-impact-report/supplemental-environmental-impact-scoping-meeting-2022-12-21.pdf

Dear SANDAG:

Thank you for the opportunity to present public scoping comments to SANDAG's new upcoming 2023 Draft Supplement to the Environmental Impact Report (SEIR) for SANDAG's 2021 Regional Plan which was approved 13 months ago on 12/10/2021. This new 2023 Draft SEIR is unneeded, but is being updated to take out SANDAG's extra local Road Usage Charge (RUC), aka Mileage Tax, as a funding source for transit projects at the direction of the SANDAG Board of Directors (BOD).

The unneeded 2023 Draft SEIR will analyze the associated predicted increases in GreenHouse Gas (GHG) emissions and Vehicle Miles Traveled (VMT) resulting from getting rid of the extra local RUC Mileage Tax revenues, "*along with a cumulative impacts analysis and an analysis of alternatives that further reduce environmental impacts.*"

In addition, the 2023 Draft SEIR should update Appendix V Funding and Revenue assumptions for a public 0.5-cent Sales Tax increase in 2022 that never happened.
"*The 2021 Regional Plan assumes a one-half cent measure following the 2022 election*"
https://sdforward.com/docs/default-source/final-2021-regional-plan/appendix-v---funding-and-revenues.pdf?sfvrsn=e3c3fd65_2

My request is the SANDAG Board take back their 10/28/2022 Vote on Agenda Item 8 for $1.5 million increase in the FY-2023 Program Budget for an Amendment to the 2021 Regional Plan to get rid of the extra local RUC Milage Tax and the associated requirements for a new 2023

Draft SEIR within one year, by a new Board Agenda Item and vote do to nothing, and wait for the 2025 EIR instead. https://twitter.com/LaPlayaHeritage/status/1586352068985384960

This will allow SANDAG to be in conformance with existing California Air Resources Board (CARB) requirement of -19 percent reduction of 2005 GHG levels by 2035. Until the new required comprehensive 2025 EIR is published, which will most likely require meeting new expected higher CARB GHG reduction goals.

Instead of an unneeded 2023 Draft SEIR, the SANDAG Board should allow SANDAG staff to concentrate on the upcoming state required comprehensive updated Environmental Impact Report (EIR) for SANDAG's upcoming 2025 Regional Plan. Where a scoping meeting is planned next week, on 01/12/2023. Short-term by not taking out the RUC Milage Tax and not updating the 2023 Draft SEIR, SANDAG staff can concentrate on the Regional Housing Needs Assessment (RHNA) and Housing Element updates for small cities. Instead of two EIRs, there will be three EIRs in a four year period: the adopted EIR for the 2021 Regional Plan, the unneeded Draft SEIR in 2023, and a new required comprehensive EIR in 2025.

Instead of a new 2023 Draft SEIR to the adopted 2021 EIR; a new comprehensive 2025 EIR is needed due to substantial changes for several government projects in downtown and the Midway neighborhood that require major revisions, and due to new information becoming available in accordance with Public Resources Code (PRC) Section 21166.

Instead of a limited amount of Resource Areas, comprehensive Updated Analysis are required for the 2023 Draft SEIR and 2025 EIR studies for the following: Greenhouse Gas (GHG) Emissions, Geology, Soils, Mineral Resources, Transportation, Water Supply, Hydrology and Water Quality, Public Services and Utilities, Geologic Hazards, Population and Housing, Land Use, and Hazardous Materials.

Resource Area: Greenhouse Gas (GHG) Emissions.

The California Legislative Analyst's Office (LAO) released their California Air Resources Board (CARB) 2022 Scoping Plan Update on Assessing California's Climate Policies on 01/04/2023. The LAO recommended major future changes to CARB to achieve new GHG reduction targets. https://lao.ca.gov/Publications/Report/4656?utm_source=t.co&utm_medium=referral&utm_campaign=4656

"*California Legislative Analyst's Office says we won't meet our 2030 emissions goals. Part of the problem - state plans call for a 25% reduction in driving by 2030 whereas state policy will achieve only a 4% reduction by 2045*."
https://twitter.com/AaronGuhreen/status/1610705155586150400

By the time the 2023 Draft SEIR and/or the 2025 EIR are approved, there may be significant changes to the -19 percent reduction in GHG levels by 2035 that may change so dramatically that SANDAG would not meet the new California goals without massive changes to upcoming plans. Therefore, a new 2023 Draft SEIR may not meet the new GHG levels, and therefore may be useless.

SANDAG should also analyze GHG reductions from the new Otay Mesa East Port of Entry (POE) Border Crossing, Airport Connectivity and Central Mobility Hub (CMH) project, Del Mar Train Track relocation, Midway Rising, downtown City Hall redevelopment, etc.

Resource Areas: Geology, Soils, Mineral Resources, Transportation, Water Supply, Hydrology, Water Quality, and Public Services and Utilities.

So far SANDAG has yet to analyze the potential massive reduction in Greenhouse Gas (GHG) emission that can be achieved through Attachment-1 the alternative La Playa Plan (LPP) for a Full Tidelands Reclamation project on liquefiable soils, consisting of former filled in Salt Marsh Tide Lands with high water tables, subject to tidal influences, and flooding from below. www.tinyurl.com/20190130a www.tinyurl.com/20210527a

The alternative La Playa Plan (LPP) would create new subterranean public space including transit corridors, Urban Storm Water capture in underground cisterns to improvement water quality, parking, and basements. Including the Midway neighborhood, Sports Arena, San Diego International Airport (SDIA), the Port of San Diego's Headquarters and the North Embarcadero areas, Naval Base Point Loma, Old Town Campus (NBPL OTC) SPAWAR Redevelopment, and SANDAG's Airport Connectivity and Central Mobility Hub (CMH) projects. A thorough analysis of all Resource Areas for the La Playa Plan (LPP) for a full Tidelands Reclamation project would confirm it mitigates for Sea Level Rise through adaptation, will future-proof low income San Diego neighborhoods against Climate Change and tidal flooding during King Tides, plus dramatically reduce GHG emissions.

Plus, the liquefiable hydraulic fill placed on former Salt Water Marsh Lands, can be reclassified as Mineral Resources to be used for construction, and beach sand replenishment projects.

In addition, SANDAG should analyze an alternative site for a new City Hall, directly north of the County Administration Center on Pacific Highway, between Grape and Hathorne Street.

Resource Area: Geologic Hazards.

By now SANDAG's should have conducted preliminary fault investigations for the CEQA analysis for the Airport Connectivity and Central Mobility Hub (CMH) projects along Pacific Highway, North Harbor Drive, and C Street along the trolley tracks in downtown San Diego. These preliminary fault investigations should have confirmed or denied active faulting presumed northwest of the Rental Car Center (RCC), on North Harbor Drive, at Pacific Highway and Laurel Street, at Pacific Highway and Broadway, and at Pacific Highway and Harbor Drive, amongst other areas. All fault investigations require third-party review, and submission to the State Geology. How many fault investigations have been conducted by SANDAG? Where are the third-party reviews? Did SANDAG submit their fault investigations and third-party reviews to the State Geologist as required?

Substantial changes including new 09/23/2021 State of California Alquist-Priolo (AP) Maps for the active Rose Canyon Fault Zone (RCFZ) in the La Jolla and Point Loma Quadrangles. The final AP maps took out the Navy Broadway Complex (NBC) Manchester Pacific Gateway, 1QHQ https://iqhqreit.com/project/radd/; the SANDAG and San Diego Metropolitan Transit Service (SDMTS) new Downtown Headquarters and Bus Stopover project, and the western terminus of Route-52/La Jolla Parkway/Interstate I-5 from Draft map areas where no active faulting was found based on inadequate and incomplete fault investigations, without third-party reviews.

Instead, the final AP maps for "*Earthquake Zones of Required Investigation"* included the NBC/MPG/IQHQ, Seaport Village, North Embarcadero, Old Town, Bay Park, San Diego International Airport (SDIA), the downtown SANDAG and SDMTS Headquarters and Bus Stopover project, and Interstate I-5/Route-52/La Jolla Parkway in areas where active faulting is presumed until more required scientific information is given to the State Geologist. Third-party reviews to confirm or deny active faulting at these still presumed active sites are still missing.

Attachment-2 is the 10/28/2022 SANDAG Item-13 Audit Committee regarding my ongoing Seismic Hazard concerns and solutions of reconvening the Caltrans's 2006 Coronado Fault Technical Advisory Panel (TAP) for seismic guidance. In addition, in areas of former Salt Marsh Tide Lands, any feature for active faulting would be buried by either unconsolidated fill soils or are located underwater. SANDAG should state that active faulting should be presumed in these underwater areas as well, and that fault investigation should be mandated. In addition, SANDAG should require Seismic Reflection lines, not just limited trenching be used.

https://www.conservation.ca.gov/cgs/Documents/Publications/EZRIM/POINT_LOMA_EZRIM_a11y.pdf
https://www.conservation.ca.gov/cgs/Documents/Publications/EZRIM/LA_JOLLA_EZRIM_a11y.pdf

SANDAG's planned new Headquarters and SDMTS Bus Stopover is located directly north of the new State Courthouse at 1100 Union Street. Windows are breaking at the Courthouse, which also has sewage smells, and plumbing problems. These are all signs of foundation movement. In addition, the City of San Diego is allowing construction at Union and C Street, where active faulting was previously found during fault investigations for new State and Federal Courthouses. https://www.cbs8.com/article/news/local/windows-spontaneously-shattering-at-the-san-diego-courthouse/509-2f34b49c-6fe2-4c33-84df-ce08995d18be

Resource Areas: Land Use, Population and Housing, and Hazardous Materials.

There has been substantial changes in new significant environmental effects with new public projects including Midway Rising by the City of San Diego in the Midway neighborhood, Naval Base Point Loma, Old Town Campus (NBPL OTC) SPAWAR Redevelopment, downtown City Hall redevelopment, the planned Seaport Village project, the new Otay Mesa East Port of Entry (POE) Border Crossing, SANDAG's Airport Connectivity and Central Mobility Hub (CMH) projects, and Attachment-3 the new 01/12/2021 Federal Aviation Administration (FAA) laws allowing normally restricted airport revenue diversion for rail and transit access to San Diego International Airport (SDIA). Please analyze the new FAA laws to confirm that the Airport Connectivity and CMH projects can be fully funded using Airport revenues only.

Also there has been no CEQA analysis of Resource Areas for Land Use or Population and Housing for the massive increase in Federal United States Navy and military personnel presence in San Diego since 2020. There is a need for military workforce affordable housing at the Old Town Campus (NBPL OTC) SPAWAR Redevelopment project, which is also a toxic waste Superfund site. Currently there are no requirements for Affordable Housing, therefore, presumably only luxury housing will be built. The Navy and military should clean up the toxic Superfund site. Plus take care of new personnel and homeless Veterans with public funding at this Federal site, and at the City of San Diego's Midway Rising project at the Sports Arena, and downtown City Hall Redevelopment project. Plus discuss the Navy's Spawar Superfund site and if there are any plans to clean up the toxic mess on liquefiable soils.

There has also been a massive increase in homeless deaths in San Diego due to the lack of Affordable Housing and Emergency Shelters in San Diego. Please analyze the dire homeless situation in San Diego. According to the SDUT, approximately 10,000 SROs were destroyed in downtown San Diego from 2010-2016. However, the annual Regional Housing Needs Assessment (RHNA) reports compiled by SANDAG from numbers given to them by the City of San Diego, and San Diego Housing Commission (SDHC) stated there were hardly any destroyed affordable housing units, with some years zero. SANDAG needs to be investigations on how many Affordable Housing units were destroyed in former Redevelopment Agency (RDA) Project Areas, without replacement units, or moving expenses for the newly homeless seniors.

The EIRs for the NBPL OTA, Midway Rising, and downtown City Hall Redevelopment should be tiered with the 2023 Draft SEIR and 2025 EIR in accordance with Public Resources Code (PRC) Sections 21093:

"tiering of environmental impact reports will promote construction of needed housing and other development projects by (1) streamlining regulatory procedures, (2) avoiding repetitive discussions of the same issues in successive environmental impact reports, and (3) ensuring that environmental impact reports prepared for later projects which are consistent with a previously approved policy, plan, program, or ordinance concentrate upon environmental effects which may be mitigated or avoided in connection with the decision on each later project."
https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=13.&title=&part=&chapter=2.6.&article=

For example, Midway Rising stated they will confirm with the City of San Diego Standards for sea level rise adaptation. City Standards include porous pavements, but nothing else. There is no discussion of required foundations for high rise structures on liquefiable soils. SANDAG should create new design and construction standards that everyone should follow. Which hopefully will follow the La Playa Plan (LPP) for a full Tidelands Reclamation taking out liquefiable soils and creating subsurface space, so foundations will not be built on shifting sands.

ALTERNATIVE FUNDING: Normally Restricted FAA Airport Revenue for Transit.

SANDAG's Board voted to not put the Road Usage Charge (RUC) Mileage Tax or a 2022 Sales Tax Increase on the Ballot. Therefore, Appendix V Funding and Revenue should be amended for the 2023 SEIR and 2025 EIR.

These reductions in funding assumption have been mitigated from the new $300+ million from the State and Federal government for the Del Mar Train Track Bluff Stabilization and Relocation project, the new expected revenues from the Otay Mesa East Port of Entry (POE) project, and the $350 million from the San Diego County Regional Airport Authority (SDCRAA) for the SANDAG's Airport Connectivity project. So far in 3 years, there has been $0 from the SDCRAA to SANDAG. Please investigate if, and when, the $350 million will be requested from the FAA Airport District Officer (ADO) in Los Angeles, what is the timeline for payments?

Below is the new 01/12/2021 FAA Memorandum that lets normally restricted FAA Revenue be used off site for Rail Access and Transit projects, and full funding for a Central Mobility Hub (CMH). Allowing FAA Revenue Diversion for transit in general. FAA Revenue can be used as an alternative funding source to the Road Usage Charge (RUC) to reduce GHG.

https://www.faa.gov/airports/pfc/pfc_updates/media/pfc_75_21_rail_access_policy.pdf
https://downloads.regulations.gov/FAA-2016-6596-0024/attachment_1.pdf
https://downloads.regulations.gov/FAA-2016-6596-0040/attachment_1.pdf

Linked below is the Record of Decision (ROD) for LaGuardia Airport (LGA) Improvement Project in Queens, New York that uses normally restricted airport revenue for off airport transit to connect the airport with existing rail and transit stations.
https://www.faa.gov/airports/environmental/environmental_documents/lga/media/EIS-ROD-LGA-NY-Access-Improvement-2021-07-21.pdf

Also linked below is the final FAA Grandfather Airport order where both the private airlines and Federal FAA staff were trying to take away the States Port Authority of New York and New Jersey (PANYNJ) Grandfathered status, and lost in 2022 after several years of legal fighting. Federal FAA staff and the private Airlines came together against the States Tidelands Trusts to try to sabotage the public's Grandfathered Revenue Diversion status. New York and New Jersey local governments, and the public fought for their public Tidelands Trust rights, and Billions in normally restricted FAA Cash for transit and rail links to the airport.
https://downloads.regulations.gov/FAA-2015-0026-0075/attachment_1.pdf

Similar, but opposite, to how the San Diego County Regional Airport Authority (SDCRAA), the local FAA Los Angeles (LA) Airport District Officer (ADO), and SANDAG staff think San Diego International Airport (SDIA) somehow lost their Grandfather status for State Public Tidelands based on misinterpretation of State law years later, and without public notices or public hearings by the Airport, SANDAG, County, or the State.

In conclusion, please ask the SANDAG Board to revote on getting rid of the extra local RUC Mileage Tax and a new 2023 Draft SEIR, and ask to wait for the required updated 2025 EIR instead.

In addition, Updated Analysis are required for several Resource Areas including:
Land Use, Mineral Resources, Population and Housing, Public Services and Utilities, Transportation, Geology, Soils, Greenhouse Gas (GHG) Emissions, Water Supply, Geologic Hazards and Hazardous Materials, Hydrology and Water Quality.

Regards

Katheryn Rhodes
laplayaheritage@gmail.com
619-402-8688
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Attachment-1 04/19/2022 Alternative La Playa Plan (LPP) for a Full Tidelands Reclamation project to be analyzed in the 2023 Draft EIR and 2025 EIR
Attachment-2 10/28/2022 SANDAG BOD Item-13 Seismic Hazard Concerns
Attachment-3 04/25/2022 Sabotage of SANDAG's Airport Connectivity On-Airport Rail Access Project and Central Mobility Hub CMH) Funding by the San Diego County Regional Airport Authority (SDCRAA) and San Diego International Airport (SDIA).

April 19, 2022

SANDAG, 401 B Street, Suite 800, San Diego, California 92101
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Ryan Kohut, (619) 595-5339, ryan.kohut@sandag.org
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Keith Greer, (619) 699-7390, keith.greer@sandag.org

Subject: The La Playa Plan (LPP) for a Central Mobility Hub (CMH) and Subway Transit Corridors (STC) to the Airport and Convention Center. A continuation of the 1908 and 1926 Nolan Plans for Public Government Buildings on our Waterfront. Including a New City Hall, and new SANDAG and Port Headquarters along Pacific Highway.

Dear SANDAG:

Prior to publishing your CEQA Notice of Preparation (NOP) for Mayor Todd Gloria and SANDAG's Updated Vision for a two-phased project for transit to the Airport, and a downtown Central Mobility Hub (CMH) as part of a new City Hall compound for the City of San Diego; please analyze the La Playa Plan (LPP) for a Full Tidelands Reclamation as its own Alternative Project in the CEQA Notice of Preparation (NOP) and the Supplemental Environmental Impact Report (SEIR).

Currently, SANDAG's Phase 1 plans include new above and below ground Transit Corridors to San Diego International Airport (SDIA); a new transit station from the Rental Car Center (RCC); improvements at the existing Middletown Station at West Palm Avenue with a new transit station; a separate Transit Corridor to the Santa Fe Train Depot with a new transit station; a new transit station at the County Administration Center (CAC); and a new Unified Port of San Diego Headquarters. Besides a new Intermodal Transit Center (ITC) [now CMH], with 14% transit to the airport; a new low-cost Youth Hostel hotel, and direct access ramps from Interstate I-5 to the Rental Car Center (RCC) are also required. Per previous California Coastal Commission (CCC) approvals.

SANDAG's Phase 2 plans include a new Central Mobility Hub (CMH) and City Hall in the middle of downtown San Diego at the location of the existing dilapidated City Hall and surrounding public property. On 10 blocks, including City of San Diego property bounded by A, C, and Front Streets, and Third Avenue. With subsurface tunnels for subway connections 80 feet below grade, as part of a new downtown City Hall compound, which includes the dangerous 101 Ash Street litigation.
https://voiceofsandiego.org/2022/04/13/gloria-sandag-settle-on-airport-transit-connection-and-a-regional-transit-hub-downtown/
https://www.sandiegouniontribune.com/news/transportation/story/2022-04-13/regional-planners-change-course-on-long-sought-plan-for-delivering-transit-to-airport
https://sandiego.hylandcloud.com/211agendaonlinecouncil/Documents/ViewDocument/March_14th_DREAM_Presentation?meetingId=4903&documentType=Agenda&itemId=207758&publishId=557342&isSection=false

At the December 3, 2021 SANDAG Board of Directors meeting as Item 4, staff identified the existing Port Headquarters (HQ) on Pacific Highway as the **Superior Alternative** for the Central Mobility Hub (CMH) and transit to the airport. https://sandag.org/uploads/meetingid/meetingid_5685_31105.pdf

*"SANDAG analysis to date on the Port HQ site, however, demonstrates that it offers a proximate, potentially **superior alternative** to the ITC site for a transit connection to the Airport due to the larger size of the available land and the closer location to Airport terminals. SANDAG is actively exploring the Port HQ site in close collaboration with the Port and is taking into account potential Port needs, such as a low-cost accommodation hotel, as well as the Airport needs to connect to the Rental Car Center."*

<u>The La Playa Plan (LPP) should be analyzed as its own Alternative in the SEIR.</u>

The LPP Airport Connectivity Project consists of a Central Mobility Hub (CMH) and direct transit connections to the Airport. The La Playa Plan (LPP) Alternative CEQA project agrees with SANDAG staff that Port Headquarters on State Public Tidelands adjacent the airport, is a **"Superior Alternative"** for a new Central Mobility Hub (CMH). The LPP for a Full Tidelands Reclamation consists of the following elements, some of which are shown on Figures 1-3:

- New Central Mobility Hub (CMH) on Pacific Highway, South of Port HQ, directly East of the Train Tracks. With views of San Diego International Airport (SDIA) and downtown.
- New SANDAG and Port Headquarters at Southeast corner of Pacific Highway & Sassafras Street.
- Adaptive Reuse of the existing Port HQ for the required low-cost Youth Hostel hotel.
- New Subway Transit Corridors (STC) several new Subway Stations. With underground corridors for Class 1 Bike Lanes, and Pedestrian walkways.
  <u>Subway Transit Corridor STC-1</u> From the Central Mobility Hub (CMH) and Rental Car Center (RCC). south along Pacific Highway to Laurel Street, then West along Harbor Drive and Airport property, to both Airport Terminals and Harbor Island.
  <u>Subway Transit Corridor STC-2</u> Along Pacific Highway connecting at Laurel Street at a new transfer station, south to Harbor Drive, and the 12th and Imperial SDMTS Trolley Station.
- Automated People Movers (APM) to start with. With analysis of alternative Personal Rapid Transit (PRT) podcar vehicles and systems in the SEIR.
- New Subsurface Subway Station at the Airport Rental Car Center (RCC).
- Direct connecting ramps from Interstate I-5 to the Rental Car Center (RCC) on Pacific Highway.
- New San Diego City Hall directly north of the County of San Diego Administration Center (CAC) bounded by Pacific Highway, Grape Street, Harbor Drive, and Hawthorn Street.
- Trenched underground tunnels under Grape and Hawthorn Streets and the Train Tracks. With direct subsurface connections from Interstate I-5 on- and off-ramps, west to Pacific Highway and Harbor Drive. Moves fast through traffic underground, allowing passenger drop off at the new STC Station at the Future City Hall.
- Confirm that San Diego International Airport (SDIA) is 1 of 12 Grandfathered Airport on public State Port Tidelands which allows normally restricted FAA Airport revenue to be diverted for off airport transportation projects.
- Required San Diego International Airport (SDIA) to annex land on the east side of the Airport to the train tracks. From Washington Street to Laurel Street, to create new Airport property. So that ALL hoarded Billions in FAA Restricted Airport Revenue can fund the full Central Mobility Hub (CMH) and Subway Transit Corridors (STC) to the Airport projects. A joint Central Mobility Hub (CMH) and City Hall site in downtown San Diego could never be annexed by the airport. Which is another reason to not choose the downtown CMH site.

The La Playa Plan (LPP) provides effective subsurface and surface transportation access to the airport. The La Playa Plan (LPP) can "*provide the connectivity, density and overall convenience we need to truly transform the regional transit system through this investment… The Central Mobility Hub is a fundamental concept in San Diego Forward: The 2021 Regional Plan, which is SANDAG's blueprint for enhanced mobility.*" The public Waterfront *"is the perfect location for a transformational project that will enhance transit mobility for the entire region."*

The LPP envisions new joint Headquarters for SANDAG (326 employees), and the Port of San Diego (526 employees). For a Total of 852 employees on the Waterfront. With an unknown number requiring office space. A new multi-story building is planned at the Port Headquarter's existing parking lot. Directly north of the existing Port HQ, south of Sassafras Street. With Adaptive Reuse of the existing Port Headquarters into the CCC required low-cost Youth Hostel hotel.

The new Central Mobility Hub (CMH) would be located directly south of the Port Headquarters with views of the Airport and downtown. The CMH would include room for future a High-Speed Rail depot, and access to MTS Trolley, COASTER and Amtrak Pacific Surfliner commuter rails, and a Greyhound Bus Station. The CMH would be attached to two subsurface Subway Transit Corridors (STC) using Automated People Movers (APM) to the Airport, Harbor Island, Convention Center, and the SDMTS 12th and Imperial Transit Station. With new multi-stories of underground space for transportation, parking, and airport cell phone lots. With CEQA analysis for a new alternative Waterfront location for a new City Hall for San Diego, bounded by Pacific Highway, Grape Street, Harbor Drive, and Hawthorn Streets, in accordance with the Nolan Plans.

The two Subway Transit Corridors (STC) will intersect at Pacific Highway and Laurel Street. The main Subway Transit Corridor (STC-1) will connect the new Central Mobility Hub (CMH) to the Rental Car Center (RCC) on Pacific Highway; the planned SDIA Airport Transit Station between the two Airport Terminals; and links and new transit stations on Harbor Island.

The LPP also includes a separate second Subway Transit Corridor (STC-2) from Laurel Street and Pacific Highway, south to the SDMTS 12th and Imperial Transit Station. With new subsurface subway stations at the new City Hall for the City of San Diego located on Pacific Highway, Grape Street, Harbor Drive, and Hawthorn Street; the San Diego County Administration Center (CAC); near the Santa Fe Train Depot at Broadway and Pacific Highway; IQHQ the former Navy Broadway Complex (NBC); Seaport Village; and the San Diego Convention Center. With opportunity to extend the Subway Transit Corridors (STC) north to the Midway, Sports Arena, Pacific Beach, Ocean Beach, and Liberty Station neighborhoods; and south to the International Border on State public trust tidelands.

At the March 14, 2022 City Council meeting, several City Council Members were excited for a potential new **Waterfront** location between Hawthorn and Grape for a new City Hall, only if it constructed close to public transit. In the CEQA documents, SANDAG will already analyze a new City Hall and transit station. Instead of downtown, please analyze the **Superior Waterfront** location.

When analyzing a downtown location for a new City Hall, please also investigate putting the C Street trolley below grade, from the Santa Fe Depo to Park Avenue (12th Avenue). Moving transit below grade will allow C Street to become a downtown pedestrian plaza in accordance with plans.

The La Playa Plan (LPP) for a Full Tidelands Reclamation through Bathtub Foundations.

The La Playa Plan (LPP) is San Diego's Green New Deal (GND) for natural resource efficiency. See Pages 16-25 https://www.sandag.org/uploads/meetingid/meetingid_5126_25250.pdf

A Full Tidelands Reclamation project would bring in new Federal and State revenue streams to the San Diego Region. SANDAG, Cities, and the County of San Diego have not applied for the major Federal and State Reclamation grant funding available for storm water capture and reuse. Which can be realized using structural cistern foundations at sea level. Only limited Climate Change funding for Sea Level Rise (SLR) adaption has been secured. With no future SLR projects planned by either the City of San Diego, Airport, or the Port for uplift of streets and pavements, already happening at the Port, old Midway Post Office, and Sports Arena sites due to high King Tides. https://voiceofsandiego.org/2016/01/07/those-giant-tides-are-worse-than-ever-and-may-be-hint-of-whats-to-come/ https://www.youtube.com/watch?v=MNztqtmhTJI

A Full Tidelands Reclamation project would creating new subsurface space from 15 to 50 feet deep for transportation project including Subway Transit Corridors (STC), and Urban Storm Water capture and reuse with the use of cisterns. All improvements would be located on Public Trust Tidelands, east of San Diego International Airport (SDIA) across Pacific Highway to the Train and Trolley Tracks, from Washington Street to Laurel Street to Harbor Drive.

The Central Mobility Hub (CMH) and subsurface Subway Transit Corridors (STC) to the Airport project should include a Full Tidelands Reclamation of liquefiable soils under all structures. With all foundations embedded into formational material. The Subway Transit Corridors (STC) should be constructed using a series of bathtub foundations to create waterproof bulkheads to future proof against Sea Level Rise (SLR) and create subsurface space for transportation, parking, and Urban Storm Water capture and reuse. Construction of the bathtub foundation embedded into competent soils, with a shallow water table, will get rid of the seismic hazard of liquefaction. The former Navy Broadway Complex (NBC) has constructed a large bathtub foundation, several stories deep that increased their parking dramatically. The adjacent Seaport Village also plans to use the bathtub foundation design to mitigate against Sea Level Rise (SLR).

The Qatar Integrated Railway Project video is a great example of the Cut and Cover, Bottom-Up trench construction method, using slurry walls. This construction method is a relatively inexpensive way to create subsurface space, with minimal surface traffic disruptions. https://www.youtube.com/watch?v=ORAPYUUriHs&t=56s Trenching is cheaper than tunneling, and is opened to the open air. Trenching get rids of the seismic hazard of liquefaction to create a new waterproof United States Bulkhead, and subterranean space for transportation. Tunneling does not.

San Diego Bay's existing United States Bulkhead elevation was established in 1850 by the US Army Corps of Engineers (USACE). Climate Change and associated Sea Level Rise (SLR) requires that a new **higher** United States Bulkhead elevation be established for San Diego Bay as part of this project. Existing porous Bulkheads on San Diego Bay includes some wooden piles. The Undocumented Fill from dredging operations since 1850 create partial reclamation conditions, and unstable ground. With liquefiable soils subject to tidal influences.

The State Mines and Geology Board (SMGB) should reanalyze Port tidelands, and reclassify the liquefiable areas from Mineral Resource Zone MRZ-1, to MRZ-2 instead. The dredged spoils from the trenched excavations should be sorted for use as constructed material, and available for beach sand replenishment projects. Currently, the San Diego Region imports sand and gravel from Canada. Historically, San Diego County pays the highest cost for raw materials such as

sand and gravel in California. A local supply of sand and gravel is needed for several proposed public construction projects including the Central Mobility Hub (CMH), the Subway Transit Corridors (STC), Midway Sports Arena Redevelopment, the Navy's SPAWAR Redevelopment, a new City Hall, new SANDAG and Port Headquarters, and the North Embarcadero Visionary Plan (NEVP). *"Over the last decade, prices have varied from more than 20 per ton in areas with depleting or depleted aggregate supplies and high demands such as San Diego"*
– California Geological Survey (CGS) 2018.
https://www.conservation.ca.gov/cgs/Documents/Publications/Map-Sheets/MS_052_California_Aggregates_Report_201807.pdf
https://www.conservation.ca.gov/cgs/Documents/Publications/Map-Sheets/MS_052_California_Aggregates_Map_201807.pdf
https://www.sandag.org/uploads/publicationid/publicationid_1558_12638.pdf
https://www.latimes.com/business/la-fi-canadian-gravel-20171104-htmlstory.html

The 2006 CALTRANS Coronado Fault Tunnel Technical Advisory Panel (TAP) should be reconvened and renamed the Rose Canyon Fault Zone (RCFZ) Technical Advisory Panel (TAP).
https://scholarsmine.mst.edu/cgi/viewcontent.cgi?article=2901&context=icrageesd
The new RCFZ TAP should analyze and give guidance to SANDAG regarding seismic hazards including active faults throughout the projects, sheet pile wall construction, and foundation design. The LPP would create a Full Tidelands Reclamation and subsurface space throughout areas of liquefaction, with a low water table, and relatively shallow depths to competent formational materials. The US Army Corps of Engineers (USACE) should also give guidance to SANDAG for the dredging operations required for a Full Tidelands Reclamation adjacent San Diego Bay.

Title 14, Code of Federal Regulations, includes the DOT Federal Aviation Administration (FAA) "*Part 77 - Objects Affecting Navigable Airspace*." The associated FAA Part 77 determination are discretionary, and done by the FAA Airport District Officer (ADO) in Los Angeles (LA) on a case-by-case basis, after a nearby development project is submitted. With the exception of the FAA's blanket 500-foot maximum height limit for high-rise structures in downtown San Diego.
https://www.ecfr.gov/current/title-14/chapter-I/subchapter-E/part-77

It would be great if SANDAG created their own GIS map for FAA Part 77 maximum elevation contours adjacent the SDIA airport runway. With maximum allowable heights to 600 feet, with height contours in 20-foot increments. Then have the map approved by the FAA ADO in LA.

Proposed new LPP improvements are located adjacent the airport runway. Without a FAA Part 77 Determinations calculations to create a maximum elevation contour map, it is unknown if the new SANDAG and Port Headquarters can be 10 to 20 stories in height. Or if the Central Mobility Hub (CMH) or new City Hall on Pacific Highway can be 3 to 8 stories tall.

Funding the La Playa Plan (LPP) by confirming Grandfathered Airport Revenue Diversion status, and Annexing Port Tidelands to create new Airport Land.

The Central Mobility Hub (CMH) and Subway Transit Corridors (STC) from Mexico to Pacific Beach can be fully funded solely through FAA Airport Revenue diversion allowed for through Grandfathered Airports Revenue diversion status. Please request a legal opinion from the California State Lands Commission (SLC) if SDIA lost its Grandfathered status when the Port

and Airport split in 2002. Or if the Airport and FAA ADO LA Staff made up the excuse in order to **Hoard Cash.**

Senate Bill SB-1896, written by former State Senator Steve Peace was approved on September 26, 2002, split up the Port and Airport. Mr. Peace stated that changes to Grandfathered Airport Revenue diversion status was specifically not part of his SB-1898 Bill. And SDIA is still a Grandfathered Airport, with the Port as the Airport Sponsor.
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=200120020SB1896

The San Diego County Regional Airport Authority (SDCRAA) Act is documented in Public Utility Code (PUC) Sections 170000-170084. PUC 170060 "*a) The port shall retain trusteeship of lands underlying the airport consistent with the State Lands Commission's requirement and shall execute a 66-year lease with the authority for control of the airport property. The authority shall pay one dollar ($1) per year during the term of the lease… (b)(1) The port may continue or enter into contracts, memorandums of understanding, or other agreements necessary to fulfill its responsibilities as trustee of the lands underlying the airport or adjacent lands under its control."*
https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=17.&title=&part=&chapter=3.&article=

The September 30, 2009 FAA Airport Compliance Manual (ACM) and the Federal Register identified San Diego International Airport (SDIA) and the San Diego Unified Port District as its Public Trust Tideland Sponsor as, as 1 of 12 Grandfathered Airport in the United States. On November 22, 2021, the FAA updated their Airport Compliance Manual (ACM). Page 214 of their ACM report still identifies SDIA as 1 of 12 Grandfathered Airport that allow revenue diversion. https://www.faa.gov/documentLibrary/media/Order/Order-5190-6B-Change1.pdf

*"**Grandfathered Airport List***

1. *State of Maryland—Baltimore/Washington International and Martin State.*
2. *Massachusetts Port Authority—Boston-Logan and Hanscom Field.*
3. *Port Authority of New York and New Jersey—JFK, Newark, LaGuardia, and Teterboro.*
4. *City of Saint Louis, Missouri—Lambert-St. Louis.*
5. *State of Hawaii—all publicly owned/public use airports.*
6. *City and County of Denver—Denver International.*
7. *City of Chicago—Chicago O'Hare and Midway.*
8. *City and County of San Francisco—San Francisco International.*
9. ***Port of San Diego—San Diego International.***
10. *Niagara Frontier Transportation Port Authority, NY—Greater Buffalo and Niagara Falls.*
11. *City and Borough of Juneau, AK—Juneau International.*
12. *Texarkana Airport Authority, AR—Texarkana Regional"*

The MOU to fund the CMH and STC mentioned several Federal and FAA Regulations. But did not include the most important one -- the 2009 Airport Compliance Manual (ACM), and 2021 Update. Both of which confirm continuous Grandfathered Airport Revenue diversion status for SDIA.

Another way to fully fund the Central Mobility Hub (CMH) and Subway Transit Corridors (STC) to the Airport Terminals is to require the SDCRAA and San Diego International Airport (SDIA)

annex and lease additional public Port Tidelands on the east side of the airport for $1. Including Pacific Highway, from the airport east to the train tracks. From Washington Street on the North to Laurel Street to the South, then west along North Harbor Drive. Then the annexed public Trust property can be considered official Airport property. Then **Any and All** normally restricted FAA Airport Revenue can be diverted to fully fund the projects on newly acquired, on site Airport property. The Central Mobility Hub (CMH) at the Port Headquarters could be fully funded through the LPP. Compared to the planned joint Central Mobility Hub (CMH) and City Hall site in downtown San Diego, which could never be annexed by the airport, and has limited funds.

In order to **Hoard Cash**, around 2012 the SDCRAA and SDIA staff, and the FAA ADO in LA started the unfounded rumors that SDIA lost its Grandfathered Airport status when the Port and Airport split in 2002. Therefore, Airport Revenue cannot pay for off airport mitigation projects. These legal and financial lies have been repeated and parroted by SANDAG staff, without independent analysis or verification. As of FY-2022, for the Central Mobility Hub (CMH), Project Number 1149000, RTIP Number SAN258, SANDAG has spent a total of $38 million ($38,339,000). While the Airport has contributed $0 (nothing).

San Diego International Airport (SDIA) and the San Diego County Regional Airport Authority (SDCRAA) are **Hoarding Cash** reserved for off-site Airport mitigation. Virtually stealing from the public. Claiming they are only allowed to pay their "*fair share contributions"* for the traffic mess made by their constant expansions and on-airport improvements. Both are in violations of several CEQA documents for off-site mitigation, traffic, and transit improvements. Previous agreements with the California Coastal Commission (CCC), CALTRANS, SANDAG, Port, and City of San Diego have been ignored. Instead of only a rich and beautiful world class Airport (SDIA), the San Diego County Region can have a beautiful world class Transportation System.

Both SDIA and SDCRAA are violating the 2008 Airport Master Plan by failing to meet the goal of 14% transit to the airport. Transit to the Airport was 1% in 2008, and 14 years later is still 1% in 2022. SDIA and SDCRAA have refused to admit that normally restricted FAA Airport Revenue can be used to fully mitigate for their massive Airport improvements including the new Terminal 1 (T1), Terminal 2 (T2) Parking Structure, and the Rental Car Center (RCC). Citing their "*fair share contributions*" as an excuse to not mitigation projects they agreed to fully pay for during the CEQA approval process.

Their other scare tactic is the potential for the FAA ADO in LA to not approve expenditures for mitigation of off-airport projects, because his approval is Discretionary. So far, the Airport has never asked for FAA ADO LA budgetary approvals for SANDAG's CEQA analysis and environmental review for the Central Mobility Hub (CMH) and transit to the airport projects. The Airport also slow walks FAA approvals, by refusing to ask the FAA Airport District Officer (ADO) in Los Angeles to approve the $515 million from the Airport to SANDAG for this project. The 2020 $515 million promise from the airport, requires that SANDAG secures Non-Airport Revenue totaling $350 million from State, Federal, and Other Sources including Public Private Partnerships (PPP). In previous budgets, the SDCRAA always had ongoing contracts with engineers and construction consultants. With balances of at least has $20+ million available in unused consulting contracts to fund technical reviews. SANDAG should ask the SDCRAA and SDIA staff how much is immediately available in existing outstanding consulting contracts.

The 2020 Memorandum of Understanding (MOU), and Proposed SDCRAA and SANDAG Joint Authority PUC Changes for Airport Transit and Circulation Projects.

On February 14, 2020, as Item 7 SANDAG's Board of Directors approved the MOU "*Memorandum of Understanding regarding Major Regional Projects"* between SANDAG, San Diego Unified Port District (SDUPD), City of San Diego, and the San Diego County Regional Airport Authority (SDCRAA).

The Memorandum of Understanding (MOU) goals state: *"improvements to Airport access are expected to provide environmental benefits, including reduced greenhouse gas emissions, criteria and hazardous pollutant emissions,* [reduced] *vehicles miles traveled, noise, and traffic congestion on the surrounding roadways and highways*."
https://sandag.org/uploads/meetingid/meetingid_5527_27177.pdf

MOU. Section 1 "*E. The Airport Authority shall have sole discretion to determine which projects require FAA-approval for the use of airport revenue… the Airport Authority will use best efforts to secure FAA concurrence that such AOLA Funding is an eligible use of airport revenue consistent with the FAA Revenue Use Policy and applicable federal laws.*
MOU Section 1 "*F. In accordance with the Final ADP EIR, the Airport Authority will use best efforts to fund the following mitigation measures, subject to FAA approval, which the Airport Authority shall use best efforts to obtain."*

PUC Section "*170048 (a) The authority has* ***exclusive responsibility*** *to study, plan, and implement any improvements, expansion, or enhancements at San Diego International Airport."*
PUC Section "*170052 The authority shall be responsible for developing all aspects of airport facilities that it operates, including, but not limited to, all of the following:*
(a) The location of terminals, hangars, aids to air navigation, Runway Protection Zones (RPZ), Airport Influence Areas (AIA), parking lots and structures, and all other facilities and services necessary to serve passengers and other customers of the airport.
(b) Street and highway access and egress with the objective of minimizing, to the extent practicable, traffic congestion on access routes in the vicinity of the airport.
(c) Providing for public mass transportation access in cooperation and coordination with the responsible public transportation agency in whose jurisdiction the airport is located.
(d) Analyzing and developing intercity bus and passenger rail access to terminals in cooperation with an established agency or organization experienced in developing and operating that service

The MOU and current law give the SDCRAA *"sole discretion"* for planning and constructing transit and circulation to the Airport. The MOU does not allow SANDAG to seek independent FAA ADO LA approval for delayed funding for Airport Connectivity transit projects.

The MOU and PUC laws should be changed to required SANDAG and SDCRAA have Joint Discretion and decision-making authority for airport connectivity, and transit to the airport. And allow SANDAG to contact the FAA ADO in LA directly for faster and clearer funding approvals.

The MOU for $515 million for "*Pre-Approved Funding*" was over signed 2+ years ago. To date, the Airport has given $0 (nothing) to SANDAG for CEQA Environmental Review and Technical Studies for the Airport Connectivity Project. Future Airport Budgets do not even mention the joint project of a Central Mobility Hub (CMH) and Transit to the Airport. Therefore, for future Airport Budgets, Airport staff are asking for $0 (nothing) for this project. This allows staff to continue to purposely hoard cash, belonging to the region, not just the rich airport.

Without new Revenue from the Airport for FY-2023 this Airport Connectivity project cannot move forward. SANDAG is only budgeting $4 million for the Central Mobility Hub (CMH) project and transit to the airport. The Airport should budget and give SANDAG at least an additional $20+ million for FY-2023 Budgets to continue the Environmental Review process under CEQA.

Future Alternatives to Automated People Movers (APM) to be discussed in the CEQA SEIR.

The Nolan Plans envisioned direct connections and links from the Waterfront on San Diego Bay, to Balboa Park. The La Playa Plan (LPP) includes Gondolas starting from the future Central Mobility Hub (CMH) directly south of the Port's Headquarters, crossing Interstate I-5. Figures 1-3 show the general Gondola alignment, east along Redwood Street, to Balboa Park and the Hillcrest neighborhood. A Gondola is this area would provide spectacular views of San Diego Bay, and allow San Diegans to park in subsurface parking structures, then take an Automated People Mover (APM) to the Central Mobility Hub (CMH), and board the adjacent Gondola Depot to Balboa Park.

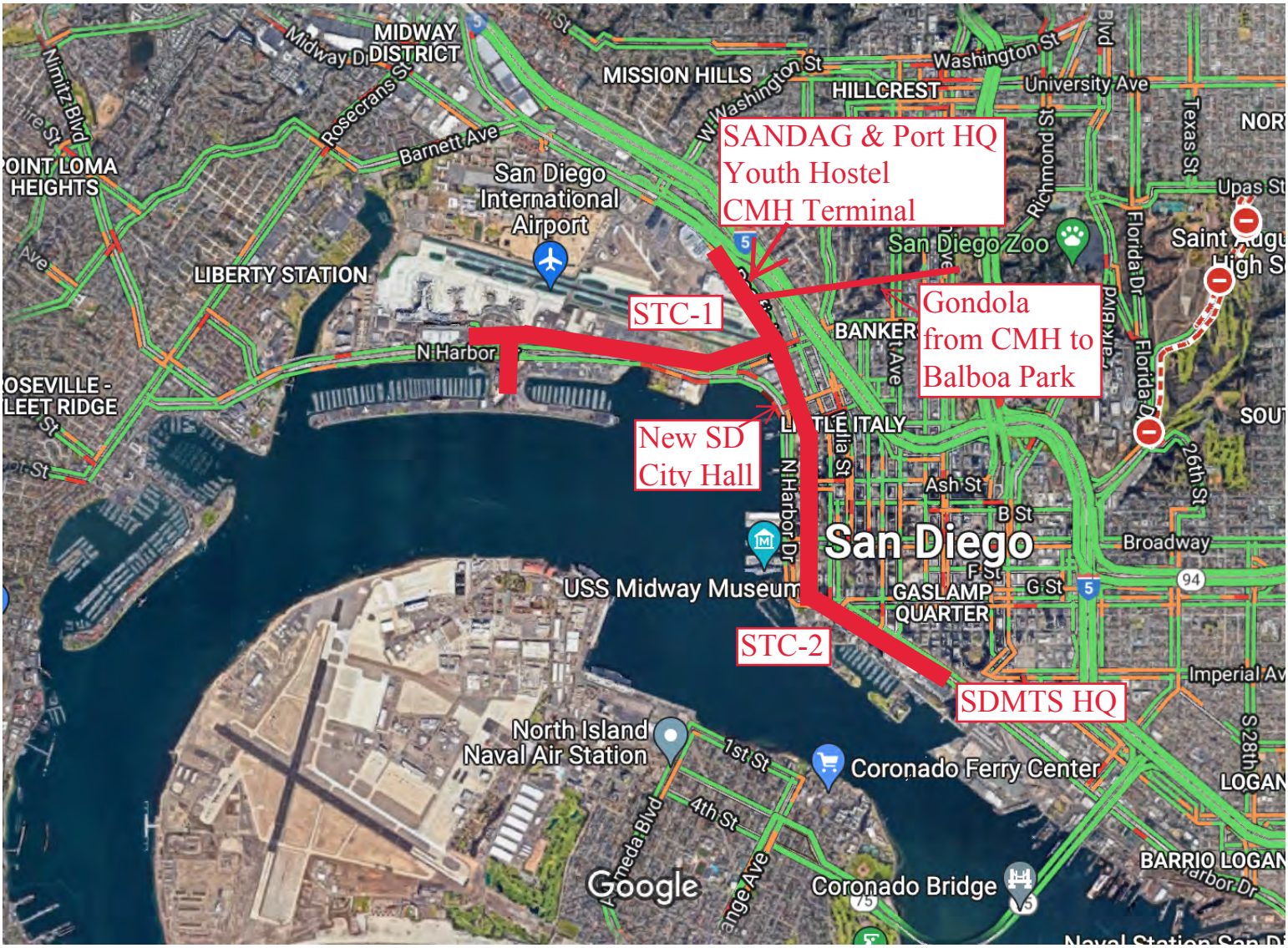
Beside just Automated People Movers (APM), SANDAG should also analyze the latest Maglev technology and Personal Rapid Transit (PRT) podcar vehicles and systems for transit to the airport in the CEQA SEIR. Elon Musk and Tesla should also be contacted for their recommendations for alternative future vehicles for the new Subway Transportation Corridors (STC) on public lands. Which could include space for his Hyperloop Technology. https://www.tesla.com/blog/hyperloop
https://tcdocs.ingeniumcanada.org/sites/default/files/2020-08/Hyperloop%20prelim%20study.pdf

SANDAG's Phase 1 Maglev Study report dated March 17, 2006 should be updated. A new Maglev study should be conducted for new 25-mile Subway Transit Corridors (STC) from the International Border with Mexico, north to Pacific Beach on State Public Trust Tidelands.
https://www.sandag.org/programs/transportation/comprehensive_transportation_projects/Maglev/2006_maglev_reduced.pdf
Currently, at 19 mph, the one-way journey takes 1 Hour 20 Minutes by Trolley from San Ysidro to the Balboa Avenue Trolley Stations. Versus a 40 mph on an Automated People Mover (APM) with a travel time of 37 Minutes. Or a future 100 mph Personal Rapid Transit (PRT) Maglev vehicle, with a travel time of 15 Minutes. Or a 350 mph Maglev Bullet Train with a travel time of 4 Minutes.

Thank you for this opportunity to present the La Playa Plan (LPP) for a Full Tidelands Reclamation as an Alternative project for analysis in SANDAG's CEQA NOP and SEIR. If you have any questions, please contact me.

Regards,
Katheryn Rhodes, Civil Engineer RCE 62730
laplayaheritage@gmail.com 619-402-8688

Google Maps



Imagery ©2022 Google, Imagery ©2022 CNES / Airbus, Landsat / Copernicus, Maxar Technologies, Sanborn, U.S. Geological Survey, USDA/FPAC/GEO, Map data ©2022 1 mi

Live traffic Fast Slow

Two New Subway Transit Corridors (STC), Subway Stations, and Automated People Movers (APM):
* Subway Transit Corridor STC-1 From the Central Mobility Hub (CMH) and Rental Car Center (RCC) along Pacific Highway to Laurel Street, then West to both Airport Terminals and Harbor Island, and
* Subway Transit Corridor STC-2 Along Pacific Highway connecting at Laurel Street, south to Harbor Drive, and the 12th and Imperial SDMTS Trolley Station.

New City Hall at Pacific Highway, Harbor Drive, Grape and Hawthorne St

FIGURE 1

The La Playa Plan (LPP) for a Full Tidelands Reclamation on the SDIA Airport Layout Plan (ALP).
* New Port and SANDAG Headquarters at Southeast corner of Pacific Highway and Sassafras Street.
* Adaptive Reuse of the existing Port HQ for the low-cost Youth Hostel.
* New Central Mobility Hub (CMH) on Pacific Highway, South of Port HQ, directly East of Train Tracks.
* New Subway Transit Corridors (STC) Along Pacific Highway to Laurel Street, then West to both Airport Terminals and Harbor Island.
* New Subway Station at the Rental Car Center (RCC) with direct access ramps to Interstate I-5.

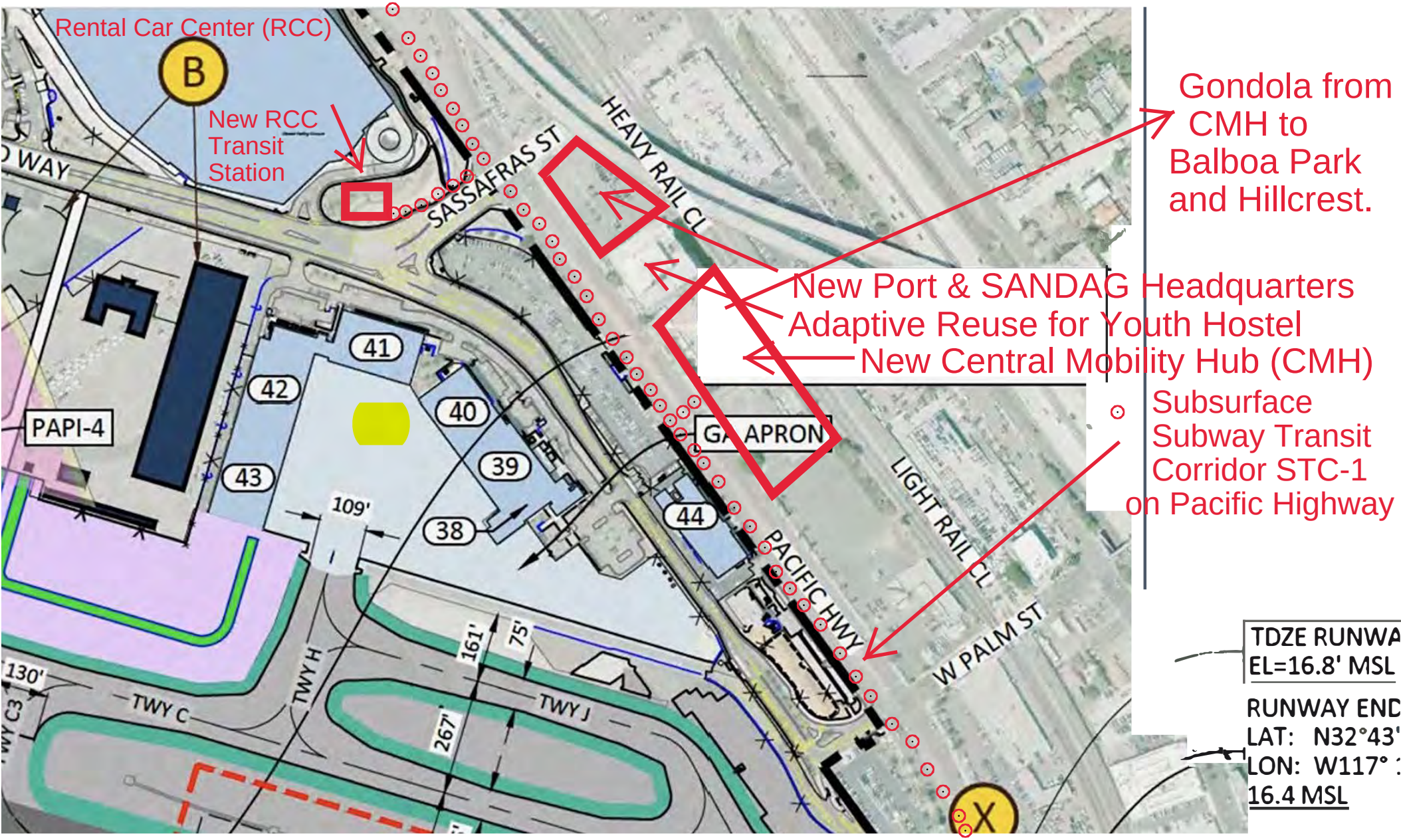


FIGURE 2

https://www.san.org/DesktopModules/Bring2mind/DMX/API/Entries/Download?Command=Core_Download&EntryId=14619&language=en-US&PortalId=0&TabId=225

San Diego International Airport

SURVEY CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	MSL (feet)
310	1846392.02	6268078.80	10.05
311	1846255.37	6266672.22	11.306
312	1847486.59	6266857.60	9.749
313	1846550.61	6271053.27	14.213
314	1847370.42	6271221.63	14.842
350	1845852.63	6275498.53	9.143
351	1844713.46	6265847.34	13.867
352	1848406.16	6266855.59	12.131
353	1853250.53	6265911.18	54.933
354	1851608.21	6273091.83	18.336
355	1850682.87	6274512.91	26.888
356	1852949.84	6278340.05	267.874

SURVEY CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	MSL (feet)
357	1850026.85	6276716.48	141.809
358	1848534.16	6277816.77	160.555
359	1849079.76	6276570.42	41.408
360	1847653.39	6277131.92	21.776
361	1847186.00	6277977.84	50.612
362	1845881.50	6277805.00	17.967
363	1844085.70	6278781.13	27.675
364	1846147.22	6276678.36	11.816
365	1846132.21	6274404.10	10.873
366	1847267.32	6272187.89	13.717
367	1846354.12	6272187.89	13.717
368	1847811.28	6270705.51	13.634
369	1848343.17	6273941.76	13.503
370	1848596.32	6271573.87	12.788
371	1848656.02	6267997.17	12.689
372	1848433.53	6268608.32	13.309
373	1848332.58	6269640.06	13.399
374	1847587.63	6272151.12	15.62
375	1846736.39	6274990.10	12.466
376	1849274.58	6275018.02	17.773
377	1850741.36	6272493.58	12.269
378	1849913.80	6273723.14	17.267
379	1849790.03	6272113.28	13.619
380	1849722.01	6269941.89	14.149
381	1850082.85	6268850.45	12.242
382	1850088.51	6267638.68	9.632
383	1848978.45	6267341.58	11.13

Intermodal Transportation Center

SANDAG & Port HQ
Youth Hostel
Central Mobility Hub (CMH)

Gondola to Balboa Park

CMH

STC-1

STC-2

Property Acquisition Pending

RUNWAY END 9 - RUNWAY LP
LAT: N32°44'13.6413"
LON: W117° 12' 15.6841"
13.7 MSL

RUNWAY 9 DISPLACED THRESHOLD
LAT: N32°44'10.9157"
LON: W117° 12' 04.4302"
16.0 MSL

RUNWAY 27 DISPLACED THRESHOLD
LAT: N32°43 52.9447"
LON: W117° 10' 50.2643"
14.6 MSL

TDZE RUNWAY 27 - RUNWAY HP
EL=16.8' MSL

RUNWAY END 27
LAT: N32°43'48.0086"
LON: W117° 10' 29.9018"
16.4 MSL

ARP
LAT: N32° 44' 00.8000"
LON: W117° 11' 22.8000"

SAN C 1994

TDZE RUNWAY 9
EL=16.6' MSL

RWY 9-27 (9,401' x 200') 50' SHOULDERS. 105.99° TRUE — CROSSWIND COMPONENT - 20 KNOTS

EXISTING EMAS
317' X 218'

RWY 27 DEPARTURE RP2

RWY 9 APPROACH RP2

RWY 27 APPROACH RP2

RWY 9 DEPARTURE RP2

PART 77 APPROACH SURFACE 50:1

PART 77 APPROACH SURFACE 34:1

AP 1973 SAN STA B3

SAN AP 1966 STA A3

MARINE CORPS RECRUIT DEPOT

GLIDESLOPE ANTENNA

RVR

ASOS

PAPI-4

WINDSOCK

RON APRON

GA APRON

CARGO APRON

NORTH HARBOR DR

GUANTANAMO ST

NEVILLE RD

MCAIN RD

NAVY LAGOON

PACIFIC HWY

WASHINGTON ST

ADMIRAL BOLAND WAY

SASSAFRAS ST

W PALM ST

LIGHT RAIL CL

UNION ST

INDIA ST

STATE ST

KETTNER BLVD

LAUREL ST

CALIFORNIA ST

CALIFORNIA LEAST TERN NESTING AREA

BEACON

US COAST GUARD

HARBOR ISLAND EAST BASIN MARINA

Basis of Survey:

1. **Basis of Bearings:** Bearings are referenced to grid north as defined by the California Coordinate System 1983 (CCS83), Zone 6, and are based on the calculated line from Point No. 374 (Station SDUPD-59) to Point No. 371 (SDUPD-59), as shown on Record of Survey 17055. I.E. N75°34' 34"W.
2. **Basis of Coordinates:** Coordinates are referenced to the North American Datum Of 1983 at Epoch 2010.00 and are expressed in terms of the California Coordinate System 1983 (CCS83), Zone 6. Distances are ground and in terms of the U.S. Survey Foot. Control Point 350: Grid Distance = Ground Distance X Combined Scale Factor (1.00001478) Control Point 350: Northing: 1845852.6289 Easting: 6275498.5303.
3. **Benchmark:** The basis of elevations for this survey is the North American Vertical Datum of 1988 (NAVD88). Benchmark designation is Point No. 374 (Station SDUPD-59) per Record of Survey 17055 located in the northeast corner of concrete fuel vault south of vehicle service road at the foot of Stillwater Road. Elevation 15.62 (NAVD88).
4. **Date of Survey:** August 24, 2016.

EXISTING BUILDING AND FACILITIES TABLE

BUILDING NUMBER	TOP ELEV MSL	DESCRIPTION
1	48'	TERMINAL ONE (T1)
2	55'	TERMINAL TWO (T2) EAST
3	90'	T2 WEST
6	47'	USO AND PARKING OPERATIONS BUILDING
7	26'	TRITURATOR
8	44'	HVAC PLANT
9	32'	SWITCHGEAR BUILDING
10	35'	WASH BAY
11	50'	AIR CARGO BUILDING
12	41'	SOUTHWEST AIRLINES PROVISRAY AIR CARGO BUILDING
13	41'	AIR CARGO BUILDING
14	N/A	FUEL DISPENSING FACILITY
15	47'	AIRLINE SUPPORT
16	45'	AIRLINE SUPPORT
18	65'	SDCRAA ADMINISTRATION OFFICE
19	38'	SDCRAA MAINTENANCE SHOPS
20	28'	SDCRAA FACILITIES MANAGEMENT OFFICE
21	40'	SDCRAA SHIPPING AND RECEIVING
22	N/A	ELECTRIC VAULT & EMERGENCY GENERATOR
23	22'	FAA COMMUNICATIONS
25	TBD	SWA CARGO
26	34'	RUNWAY 9 LOCALIZER SHELTER, LOCALIZER ANTENNA, & DME ANTENNA
27	19'	RUNWAY 27 LOCALIZER ANTENNA
28	N/A	ELECTRICAL UTILITY AREA
29	22'	RUNWAY 27 LOCALIZER TRANSMITTER BUILDING (INSIDE ROFA)

EXISTING BUILDING AND FACILITIES TABLE

BUILDING NUMBER	TOP ELEV MSL	DESCRIPTION
30	20'	RUNWAY 27 DME AND LOCALIZER ANTENNAS (INSIDE ROFA)
31	14'	FUEL DISPENSING FACILITY ADMINISTRATION BUILDING
32	46'	FUEL STORAGE TANKS
33	35'	ARFF STATION
34	48'	FEDEX SORT FACILITY
35	152'	AIRPORT TRAFFIC CONTROL TOWER
36	44'	CENTRAL RECEIVING AND DISTRIBUTION CENTER
37	92'	RENTAL CAR FACILITY
38	55'	SIGNATURE FLIGHT SUPPORT TERMINAL
39	55'	SIGNATURE FLIGHT SUPPORT HANGAR 1
40	61'	SIGNATURE FLIGHT SUPPORT HANGAR 2
41	55'	SIGNATURE FLIGHT SUPPORT HANGAR 3
42	55'	SIGNATURE FLIGHT SUPPORT HANGAR 4
43	55'	SIGNATURE FLIGHT SUPPORT HANGAR 5
44	TBD	SAN DIEGO WIND TUNNEL
45	25'	RCC BUS / TAXI HOLD LOT BUILDING
46	TBD	SOLAR CAR PORT
47	TBD	RAMP CONTROL TOWER
48	TBD	T2 WEST FIS
49	TBD	T2 PARKING PLAZA
50	TBD	SWA PROVISIONING
51	TBD	GLIDESLOPE EQUIPMENT SHELTER
52	TBD	GUARD SHACK
53	TBD	ELECTRICAL BUILDING
54	TBD	ENVIRONMENTAL HAZMAT STORAGE TRAILER

FUTURE FEATURES

FEATURE ID	DESCRIPTION
	AIRPORT SUPPORT FACILITIES
A	AIR CARGO DEVELOPMENT
B	FACILITIES MANAGEMENT DEPT. CAMPUS
C	AIRLINE SUPPORT FACILITY
D	WEST FUEL RACK
E	AIRFIELD LIGHTING VAULT
F	AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)
G	RUNWAY VISUAL RANGE (RVR)
H	RUNWAY STATUS LIGHTS (RWSL) SHELTER & MALS PAD
I	VEHICLE SERVICE ROAD (VSR)
J	AIRCRAFT FUEL STORAGE TANKS
	PHASE 1A
K	T1 REPLACEMENT TERMINAL - 19 GATES
L	T1 PARKING PLAZA
M	TAXIWAY B RELOCATION & TAXIWAY A CONSTRUCTION
N	ON-AIRPORT ACCESS ROADS
O	AIRCRAFT FUEL STORAGE - OPERATIONS FACILITY
P	RON APRON
Q	SOLID WASTE FACILITY
R	TRITURATOR/WASH BAY
S	AIRPORT ADMINISTRATION BUILDING
	PHASE 1B
T	T1 REPLACEMENT TERMINAL - ADDITIONAL 11 GATES
U	RESERVED FOR FUTURE TRANSIT USE
	OTHER PROJECTS
V	INTERMODAL TRANSPORTATION CENTER
W	NORTH SIDE PASSENGER PROCESSING FACILITY
X	BLAST FENCE
Y	ENGINEERED MATERIALS ARRESTING SYSTEMS (EMAS)

FUTURE TAXIWAY/TAXILANE DATA TABLE

NAME	DIMENSIONS						SEPARATION FROM TWY CL TO FIXED/MOVABLE OBJECT	LIGHTING
	TWY WIDTH ACTUAL-STANDARD	SHOULDER WIDTH ACTUAL-STANDARD	TWY SAFETY AREA	OBJECT FREE AREA	TWY EDGE SAFETY MARGIN	TWY DESIGN GROUP		
A	50'-50'	20'-20'	118'	186'	10'	4	93'	MITL
A1	125'-50'	20'-20'	118'	186'	10'	4	93'	MITL
A2	125'-50'	20'-20'	118'	186'	10'	4	93'	MITL
A3	271'-50'	20'-20'	214'	320'	15'	6	160'	MITL
A4	137'-50'	20'-20'	118'	186'	10'	4	93'	MITL
A5	137'-50'	20'-20'	118'	186'	10'	4	93'	MITL
A6	108'-50'	20'-20'	118'	186'	10'	4	93'	MITL
A7	124'-50'	20'-20'	118'	186'	10'	4	93'	MITL
A8	160'-75'	20'-20'	214'	320'	15'	6	160'	MITL
A9	182'-75'	20'-20'	214'	320'	15'	6	160'	MITL
A10	182'-75'	20'-20'	214'	320'	15'	6	160'	MITL
A11	136'-75'	20'-20'	214'	320'	15'	6	160'	MITL
A12	136'-75'	20'-20'	214'	320'	15'	6	160'	MITL
A13	136'-75'	20'-20'	214'	320'	15'	6	160'	MITL
B2	75'-75'	20'-20'	214'	320'	15'	6	160'	MITL
B3	94'-75'	20'-20'	214'	320'	15'	6	160'	MITL
A3 (TLN)	306'-320'	0'-0'	214'	320'	15'	6	160'	MITL
A10 (TLN)	50'-50'	0'-0'	118'	186'	10'	4	93'	MITL
E (TLN)	50'-50'	0'-0'	118'	162'	10'	3	81'	MITL
G (TLN)	276'-75'	0'-0'	214'	276'	15'	5	160'	MITL
K (TLN)	162'-50'	0'-0'	118'	162'	10'	3	81'	MITL
L (TLN)	162'-50'	0'-0'	118'	162'	10'	3	81'	MITL
M (TLN)	271'-50'	20'-20'	214'	320'	15'	6	160'	MITL

PACS/SACS LOCATIONS

DESIGNATION	TYPE	LATITUDE	LONGITUDE	ELEVATION
AP 1973SAN STA B3	PACS	32°-44'-11.75616" N	117°-12'-17.53779" W	9.5'
SAN C 1994	SACS	32°-44'-03.69278" N	117°-11'-24.68196" W	14.6'
SAN AP 1966 STA A3	SACS	32°-43'-47.77451" N	117°-10'-38.57462" W	11.8'

GRAPHIC SCALE: 1" = 400'

LEGEND

- Subway Transit Corridors (STC)
- Subway Stations

	EXISTING	FUTURE
AIRPORT BOUNDARY		
BUILDING RESTRICTION LINE		
NAVAID CRITICAL AREA		
RUNWAY THRESHOLD LIGHTS		
GLIDESLOPE ANTENNA		
RVR		
ROTATING BEACON		
ASOS		
PAPI-4		
WINDSOCK		
SURVEY MONUMENT		
TRAVERSE WAY POINT WITH ADJUSTED MSL ELEV.		
AIRPORT REFERENCE POINT (ARP)		
RUNWAY SAFETY AREA (RSA)	RSA	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	
RUNWAY OBSTACLE FREE ZONE (OFZ)	OFZ	
RUNWAY PROTECTION ZONE (RPZ)	RPZ	
TAXIWAY OBJECT FREE AREA (TOFA)		TOFA
TAXIWAY SAFETY AREA (TSA)		TSA
PRECISION OBSTACLE FREE ZONE (POFZ)		
FENCE		
BLAST FENCE		
ROADWAY		
FUTURE SERVICE ROADWAY		
BUILDING NUMBER		
FEATURE NUMBER		
BUILDINGS TO BE DEMOLISHED		
BUILDING		
OFF AIRPORT BUILDING		
RUNWAY		
TAXIWAY		
SHOULDER		
APRON		
FAULT ZONE		
FAULT ZONE BUFFER		
CALIFORNIA LEAST TERN NESTING AREA		

ALP Prepared By

JACOBSEN | DANIELS
Planning, Implementation, Operations & Management

Drawn: CLS
Approved: SRG
Date: 06-16-2021
Project No.: 09-071-12-01

No.	Date	Revisions

Notes

1. Survey Control Points 351, 353, 354, 356, 357, 358 and 363 are located beyond the plan view area.
2. Taxiway and taxilane data is provided on Data Sheet 2; not shown on plan for clarity.
3. NAVA D lights located in Navy Lagoon were not identified because they are beyond the extents of the survey boundary.
4. TSS not shown on plan for clarity. Refer to Approach/Departure Plan & Profile drawing.
5. The TERPS Departure Surface is not shown for clarity. Please refer to the Inner Approach Plan & Profile drawings for their location.
6. See Sheet 4 for existing apron dimensions.
7. See Terminal Area Plan for future terminal apron dimensions.
8. Refer to Inner Approach drawing for traverse way locations.
9. Perimeter fence height TBD.

Sources

1. Additional existing airport information obtained from 2016 SAN ALP dated 08-11-16.
2. Survey control points obtained from topo survey drawing produced by Aerotech Mapping, Inc. for Lindbergh Field Drainage project; aerial photogrammetry flown on August 22, 2016.

MAGNETIC DECLINATION
11°56' EAST ±0.33'
AUGUST 1, 2017

SAN DIEGO INTERNATIONAL AIRPORT
LET'S GO.

FUTURE AIRPORT LAYOUT PLAN DRAWING

Airport Layout Plan Drawing Set #724

Figure 3

tinyurl.com/20210527a

May 27, 2021

CentralMobilityHub@sandag.org
Kirsten Uchitel
SANDAG
401 B Street, Suite 800
San Diego, CA 92101

Subject: SANDAG's Central Mobility Hub (CMH)
Public Comments on Scoping for the CEQA Draft EIR
https://sandag.mysocialpinpoint.com/centralmobilityhub

Dear SANDAG:

Thank you for the opportunity to comment on SANDAG's Central Mobility Hub (CMH) and alternatives under consideration. I previously presented comments at SANDAG's Public Scoping Meeting on May 11, 2021 https://www.youtube.com/watch?v=XTs1zvoqB5Y
Video Start Time: 37 to 42 Minutes; and 1 Hour 7 to 9 Minutes.

Attached please find the La Playa Plan (LPP) concept for a full Tidelands Reclamation project sent to SANDAG's Airport Connectivity Subcommittee on September 25, 2019. The La Playa Plan (LPP) would create subsurface transportation corridors including subways using structural bathtub foundations, within the boundary of SANDAG's Comprehensive Multimodal Corridor Plan for the Central Mobility Hub and Connections Corridor, west of the train tracks on partially reclaimed tidelands consisting of uncompacted, loose, hydraulic fills with a low water table.

The LPP gets rid of the seismic hazard of liquefaction, recycles trenching spoils to construct new concrete underground space for a network of subway lines for Automated People Movers (APM), and protects against sea level rise due to climate change. The concrete trenches can also capture urban stormwater runoff.

Plus trenching into bedrock provides stable foundations, instead of above-grade aerial columns that would create unnecessary visual blight in congested traffic areas. Aerial columns and guideways may interfere with SDIA airplane landing operations at the northwest corner of Pacific Highway and Laurel Street.

Instead of analyzing Concepts 1 to 4, please consider a new Concept 5 which closely resembles portions of the Proposed Project, with a few major changes. The new Concept 5 would not create a new Central Mobility Hub (CMH) at the Naval Base Point Loma Old Town Campus (OTC), the present site of the former SPAWAR, now the Naval Warfare Systems Command (NAVWAR), and the saving would allow for an expansion of the underground transit connection corridors south to the San Diego Convention Center, and west along Sports Arena Boulevard.

Instead of a new CMH, the current Old Town Transit Center (OTTC) would be expanded within its existing footprint and west onto Pacific Highway to create space for a substantially smaller future High-Speed Rail terminal that could be renamed the Old Town Transit Central Mobility

Hub (OTTCMH). In the large parking lot west of the train tracks and Pacific Highway, a full tidelands reclamation using structural bathtub foundations would create subsurface space for the northern terminal of network of subway lines for Automated People Movers (APM).

The April 21, 2021 Notice of Preparation for the Draft EIR states "*due to right-of way and other constraints, the existing transit hubs at OTTC and Santa Fe Depot could not be expanded."* What right-of-way and other constraints are there at the OTTC site, the adjacent large parking lot, and on Pacific Highway that would preclude redevelopment for a small terminal for the future High-Speed Rail that was previously planned at this location? Or the addition of an underground subway system? All properties are owned by public agencies, and utilities can always be rerouted.

Lines of subsurface structural bathtub foundations, similar to watertight bulkheads on ships, would create the new concrete underground transportation corridors to connect the Old Town Transit Center (OTTC) with the San Diego International Airport (SDIA). Via the NAVWAR redevelopment project, the Airport Rental Car Center (RCC), and Harbor Island East Basin as shown in the Proposed Project.

However the new Option 5 would continue the underground transportation corridor south under Pacific Highway and Harbor Drive to connect to downtown San Diego, the Santa Fe Depot, and the 12th and Imperial Transit Center near the San Diego Convention Center. Subsequent subway lines would also connect to the Sports Arena redevelopment project. Locations for the new subway corridors and underground transit stations would require reconfiguration and full tidelands reclamation of major public roads including Pacific Highway, Harbor Drive, Laurel Street, and Sports Arena Boulevard; and rerouting of existing utilities.

If the concrete trenches are two-story in depth, then car through-traffic could also be rerouted underground to create new green spaces for the Coastal Rail Trail to make the area along Pacific Highway pleasant and safer for pedestrians and bicycles.

Regards,

Katheryn Rhodes
laplayaheritage@gmail.com
619-402-8688

September 25, 2019

SANDAG
401 B Street, Suite 800
San Diego, California 92101
clerk@sandag.com

Subject: September 25, 2019. Airport Connectivity Subcommittee.
Item 3. Recommended Concepts for Improved Regional Airport Connectivity.
The La Playa Plan (LPP) Concept. A Full Tidelands Reclamation Project.
Central Mobility Hub with Subterranean Automated People Mover (APM) Route adjacent Train Tracks and Pacific Highway, Instead of Concept 2 Surface/Elevated APM Route
https://www.sandag.org/uploads/meetingid/meetingid_5268_26543.pdf

Dear SANDAG:

Thank you for the opportunity to provide comments on this thorough preliminary feasibility analysis of four concepts.

1. Seismic

Specifically, thank you for confirming that active faulting of the Rose Canyon Fault Zone needs to be confirmed or denied at the Preliminary Design Phase for both the Old Town and Airport properties, in order to save money.

> **Section 5.4.d. Geotechnical, Seismic Conditions, Hazardous Materials, and Soils.**
>
> Page 61. *"Comprehensive Geotechnical Fault Hazard, Environmental, and Hazardous Materials studies should be performed during the Preliminary Design Phase."*
>
> Page 62. *"Crossing an active fault will increase the cost of all structures. Late identification of a fault during construction may cause unknown cost and construction delays. Extensive Geotechnical Investigation, and Fault Studies will be required."*

Prior all government agencies including SANDAG, City of San Diego, County of San Diego, Port of San Diego, and the San Diego County Regional Airport Authority (SDCRAA) stated that fault investigations are only needed prior to Building Permits being issued, or after Construction has already started, or not at all. Also, all government agencies stated that the Airport and the Old Town Midway Corridor were Categorically Exempt, and outside the boundaries in official Alquist-Priolo (AP) Maps, therefore fault investigation were not required at all. But fault investigations could be done on a volunteer basis by the SDCRAA, Port, and the City.

To resolve these issues, please update the old 2003 Point Loma Quadrangle (16 years-old) and 1991 La Jolla Quadrangle (28 years-old) AP-Maps with guidance from our State Geologist to include the Airport, Midway Corridor, Old Town, Sports Arena, Mission Bay, La Jolla, and Point Loma for the Point Loma Fault as areas for further investigation for potential inclusion into new and updated AP-

Maps and Zones. Also, please require all existing fault investigations with third-party approvals to be turned into the State Geologist to update the old AP-Maps.
Then require the Port and Airport Authority to confirm or deny active faulting as part of the Port's upcoming Port Master Plan (PMP), and the SDCRAA's Airport Development Plan (ADP) through funding of their own. Currently in their CEQA documents, neither government agency has planned to confirm or deny active faulting during their "Preliminary Design Phase" because they are considering themselves exempt, and have legal loopholes to not knowing.

Please ask for State Legislation to move all regional planning and CEQA-level project of the Airport and Port to SANDAG.

2. FAA Grandfathered Airport Revenue.

Also thank you for confirming that normally-restricted Federal Aviation Administration (FAA) Airport Revenue funds could be used to pay for projects off-airport grounds with the approval of the Los Angelica FAA Airport District Officer (ADO). This is great news that local government acknowledges the availability of use of previously hoarded Airport Revenue for off-site mitigation, transportation projects to the airport, and a Central Mobility Hub outside the airport's footprint.

This acknowledgement that hoarded and normally-restricted Federal Aviation Administration (FAA) Airport Revenue funds could have always been used to pay for the San Diego International Airport (SDIA) mitigation projects for the Rental Car Center (RCC) including connector ramps to Interstate 5, and local road improvements is great movement forward.

Currently, the official SANDAG guiding legal analysis on the use of Airport Revenue is the March 9, 2018, SANDAG Executive Committee Item 7 San Diego Regional Airport Authority: Federal Funding and Responsibilities. Page 4 of the report stated: *"As discussed below, the Airport Authority under Federal Law is prohibited from spending Airport Revenue for Off-Airport Transportation Facilities. Virtually all Revenue of the Airport Authority is so restricted."*

www.tinyurl.com/20180309a

https://sandag.org/index.asp?fuseaction=meetings.sc&mid=EC030918&cName=Executive%20Committee&mType=Regular%20Session&mDate=3/9/2018
Audio: 45 Minutes to 1 Hour and 11 Minutes.

Please see Audio Time 53-56 minutes for the Loophole under FAA requirements for allow Airport Revenue funding for off-site transportation projects including transit to the airport and an Intermodal Terminal Center (ITC).

Thank you for the great discussion on the availability of normally-restricted airport revenue through a new $500 million agreement with the Airlines, which comes from Airport Revenue which makes up 46% of Total Revenues. However, at SDIA the citizens of the State of California are also allowed access to other 54% Non-Airport Revenue sources due to being 1 of 12 Grandfathered Airports located on State Tidelands. Other non-aviation Non-Airport revenue sources include leases, fees, sale taxes, and other revenue sharing agreements with third-parties.

Thank you very much for a great report . Plus and forcing the Airport to admit that formally hoarded $500 million in Airport Revenue can be used for mitigation and off-airport transportation projects. Prior the Airport and SANDAG both stated it would be illegal to use Airport Revenues off site.

Airport Comprehensive Annual Financial Report (CAFR) Revenues for FY-2018 and FY-2017

SDIA CAFR Revenues	FY-2018	FY-2017
Airport Revenue	$123,157,000 46%	$116,381,000 47%
Non-Airport Revenue	+ $142,674,000 54%	+ $132,466,000 53%
TOTAL REVENUE	= $265,831,000	= $248,847,000

As part of this Airport Connectivity project please ask the State Lands Commission (SLC) for a Legal Opinion if San Diegan International Airport (SDIA) gave up their Grandfathered Airport Revenue Diversion status with the creation of the SDCRAA away from the Port of San Diego.

If Grandfathered Airport status is acknowledged, then there will be Billions in additional Airport Revenue dollars that in theory could pay for these Regional Transportation project under the control of our elected officials through SANDAG. If the full La Playa Playa planned is analyze for a subterranean transportation corridor from Mission Bay to the Border, additional value can be created and funded with help of Federal and State Reclamation and Water bonds.

3. The La Playa Plan.

The La Playa Plan is a continuation of the 1908 and 1926 Nolan Plans, which established Lindbergh Field – San Diego International Airport (SDIA), Pacific Highway, Harbor Drive, regional transportation infrastructure, and public government buildings on our publicly-owned Waterfront mostly founded on uncompacted, loose, hydraulic fills. The La Playa Plan will "future proof" the public and private lands through a full State Public Trust Tidelands Reclamation project by taking out all the hydraulic fills, so foundations for new free subterranean lands can be founded on competent soils, not subject to flooding, or sea level rise. Both the Navy Broadway Complex (NBC) and Seaport Village will be design using Bathtub foundations specifically to combat climate change.

The depths to competent formational material under the liquefiable bay fill range from zero adjacent west of the train tracks to approximately 40 feet near Terminals 1 and 2.

Instead of hauling out dredge soils, we ask SANDAG to request a formal evaluation to potentially reclassification of Mineral Resources Zone (MRZ) for Urbanized Areas for the Airport, Port, Pacific Highway, Midway Corridor, Mission Bay from MRZ-1 to MRZ-2 . Then recycle and use spoils for use as construction material and Beach Replenishment projects.

The La Playa Plan is part of the new Green New Deal (GND) for resource efficiency, which focuses on maximizing the use of our natural State Public Trust Tidelands for the financial benefit of all. The GND public works projects would create new jobs, combat climate change, build new and free subterranean space, take out all hydraulic fills, recycle raw materials, while adapting partially reclaimed land to full reclamation for sea level rise, using the regional planning powers of SANDAG. Please see the attached document for a full public trust tidelands reclamation project.

The LPPC Subterranean APM Route would provide proof of concept for the La Playa Plan. Which could then be used all along San Diego Bay to create up to a zero to 40-foot subterranean corridor for transportation projects and storm water capture. This would help low income communities along San Diego Bay, and help with social equity issues by creating wealth.

4. The La Playa Plan Concept. An Alternative Subterranean Design Based Upon Concept 2, and Concept 4

We would like to present an additional concept for CEQA Review called the La Playa Plan Concept (LPPC) for a Full Tidelands Reclamation Project funded in part by Grandfathered Airport Revenues.

The La Playa Plan Concept is similar to Concept 2. However, instead of At-Grade, Surface, and/or Elevated Automated People Mover (APM) Route, the APM Route would be subterranean, and located adjacent west of the existing Train Corridor and/or Pacific Highway, without encroaching into private property and existing underground utilities.

In addition, there would only be one stop at the Rental Car Center (RCC) instead of the two stops in Concept 2. Since the tunnel can be exposed to the air at every level and not a tunnel, normal fire mitigations measures are feasible.

Also, a new United States Bulkhead Elevation will be established, to combat climate change and sea level rise problems on liquefiable soils. All first-story building elevation will be built to at least the new US Bulkhead height. And a shallow tunnel system design would be used, where all liquefiable soils would be excavated, down to formational grade.

Page 28 states: *"Another suggestion was to create a shallow tunnel system of roadways, to and from the airport for improved connectivity. This concept was not carried forward due to cost, impacts to the community, and design and construction challenges. It would be expensive and challenging to construct in the soils made up of bay fill and around the airport from the surface level to roughly 40 feet deep (see Figure 4-2)."*

The 40-foot depth to formational materials may be a maximum, not minimum depth to formational materials. It is reasonable to assumed the depth to formational material at the Airport Transit-Ready Areas located between Terminals 1 and 2 along North Harbor Drive is 40 feet. However, adjacent and west of the train tracks, the elevation to competent formation materials may only zero to ten feet. Therefore, an actual analysis of depth to formational materials should be analyzed in the upcoming CEQA review for a subterranean route along Concept 2 APM Route, and adjacent and west of the train tracks.

The maximum 40-foot depth to formational materials is a plus, not a minus. Up to three level of transportation corridors could fit into a 40-foot high tunnel opened to the air. Including a subterranean APM Route, and In-bound and Out-Bound Airport Traffic. Please reanalyze our La Playa Plan for a shallow tunnel system to create a Full Tidelands Reclamation project on liquefiable soils. That would create subterranean space 15 to 40 feet deep to future-proof and combat climate change and sea level rise through the use of connection of Structural Bathtub Foundations to create new transportation routes.

Regards,

Katheryn Rhodes 619-402-8688 rhodes@laplayaheritage.com

FIGURE 5 - CISTERN. This article is about the underground water reservoirs that prevent evaporation unlike surface water reservoirs.
http://en.wikipedia.org/wiki/Cistern

A **cistern** (Middle English *cisterne*, from Latin *cisterna*, from *cista*, box, from Greek *kistê*, basket) [1] is a receptacle for holding liquids, usually water. Often **cisterns** are built to catch and store rainwater. They range in capacity from a few liters to thousands of cubic meters (effectively covered reservoirs).

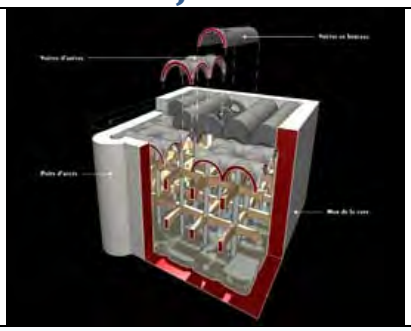
Cisterns are commonly used in areas where water is scarce, either because it is rare or because it has been depleted due to heavy use. Early on, the water was used for many purposes including cooking, irrigation, and washing. Present day **cisterns** are often only used for irrigation due to concerns over water quality. **Cisterns** today can also be outfitted with filters or other water purification methods when the water is meant for consumption. It is not uncommon for cisterns to be open in some way in order to catch rain or to include more elaborate rain-catching systems. It is recommended in these cases to have a system that does not leave the water open to mosquitoes or algae, which are attracted to the water and then potentially carry disease to nearby humans.

Some **cisterns** sit on the top of houses or on the ground higher than the house, and supply the running water needs for the house. They are often supplied not by rainwater harvesting, but by wells with electric pumps, or are filled by manual labor or by truck delivery. Very common throughout Brazil, for instance, they were traditionally made of concrete walls (much like the houses, themselves), with a similar concrete top (about 5 cm. thick), with a piece that can come out for water filling and be re-inserted to keep out debris and insects. Modern cisterns are manufactured of plastic (in Brazil with a characteristic bright blue color, round, in capacities of about 10k and 50k liters). These **cisterns** differ from water tanks in the sense that they are not completely enclosed and sealed with one form, rather they have a lid made of the same material as the cistern, which is removable by user.

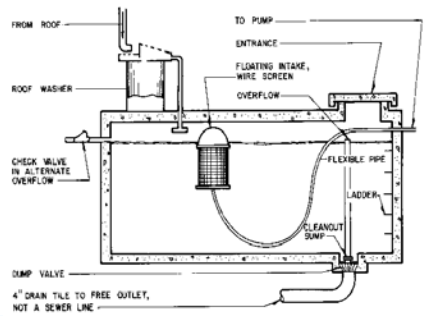
To keep a clean water supply, the cisterns must be kept clean. It is recommended to inspect them regularly, keep them well-enclosed, and to occasionally empty them and clean them with an appropriate dilution of chlorine and to rinse them well. Well water must be inspected for contaminants coming from the ground source. City water has up to 1ppm (parts per million) chlorine added to the water to keep it clean, and in many areas can be ordered to be delivered directly to the cistern by truck (a typical price in Brazil is BRL$50, USD$20 for 10k liters). If there is any question about the water supply at any point (source to tap), then the cistern water should not be used for drinking or cooking. If it is of acceptable quality and consistency, then it can be used for (1) toilets, and housecleaning; (2) showers and hand washing; (3) washing dishes, with appropriate sanitation methods, and for the highest quality, (4) cooking and drinking. Water of non-acceptable quality for the before mentioned uses may still be used for irrigation. If it is free of particulates but not low enough in bacteria, then boiling may also be an effective means to prepare the water for drinking.

Many greenhouses use cisterns to help meet their water needs, especially in the USA. Some countries or regions, such as Bermuda and the U.S. Virgin Islands have laws that require rainwater harvesting systems to be built alongside any new construction, and cisterns can be used in these cases. Other countries, such as Japan, Germany and Spain, also offer financial incentives or tax credit for installing cisterns. Cisterns may also be used to store water for firefighting in areas where there is an inadequate water supply.

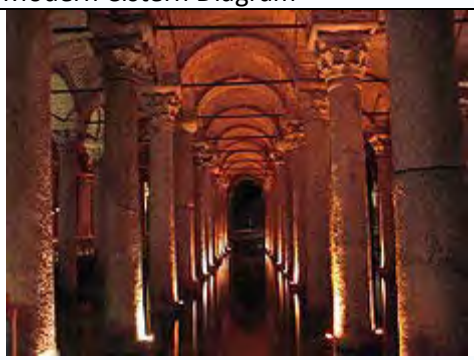
Cistern El Jadida in Morocco



Modern Cistern



Modern Cistern Diagram



Yerebatan Sarnıcı, Istanbul, 138 m x 65 m, 80.000 m³, Justinian I., 523-542

Figure 6 – Reclaimed Public Trust Tidelands are shown in the color Brown as Quaternary Artificial Fill (Qaf).

The areas of undocumented fill (Qaf) in the City of San Diego includes Port tidelands around San Diego Bay, where the liquefiable soils can be replaced by Cistern Structural Foundations embedded into formational soils.

Proposed projects in the planning stage include the North Embarcadero Vision Plan (NEVP) project, the Chula Vista Bayfront Master Plan project, and the San Diego International Airport (SDIA)/Lindbergh Field Intermodal Transportation Center.

Future projects may include the city-owned Sports Arena in the Midway area, and the Kinder-Morgan Fuel spill at Qualcomm Stadium.

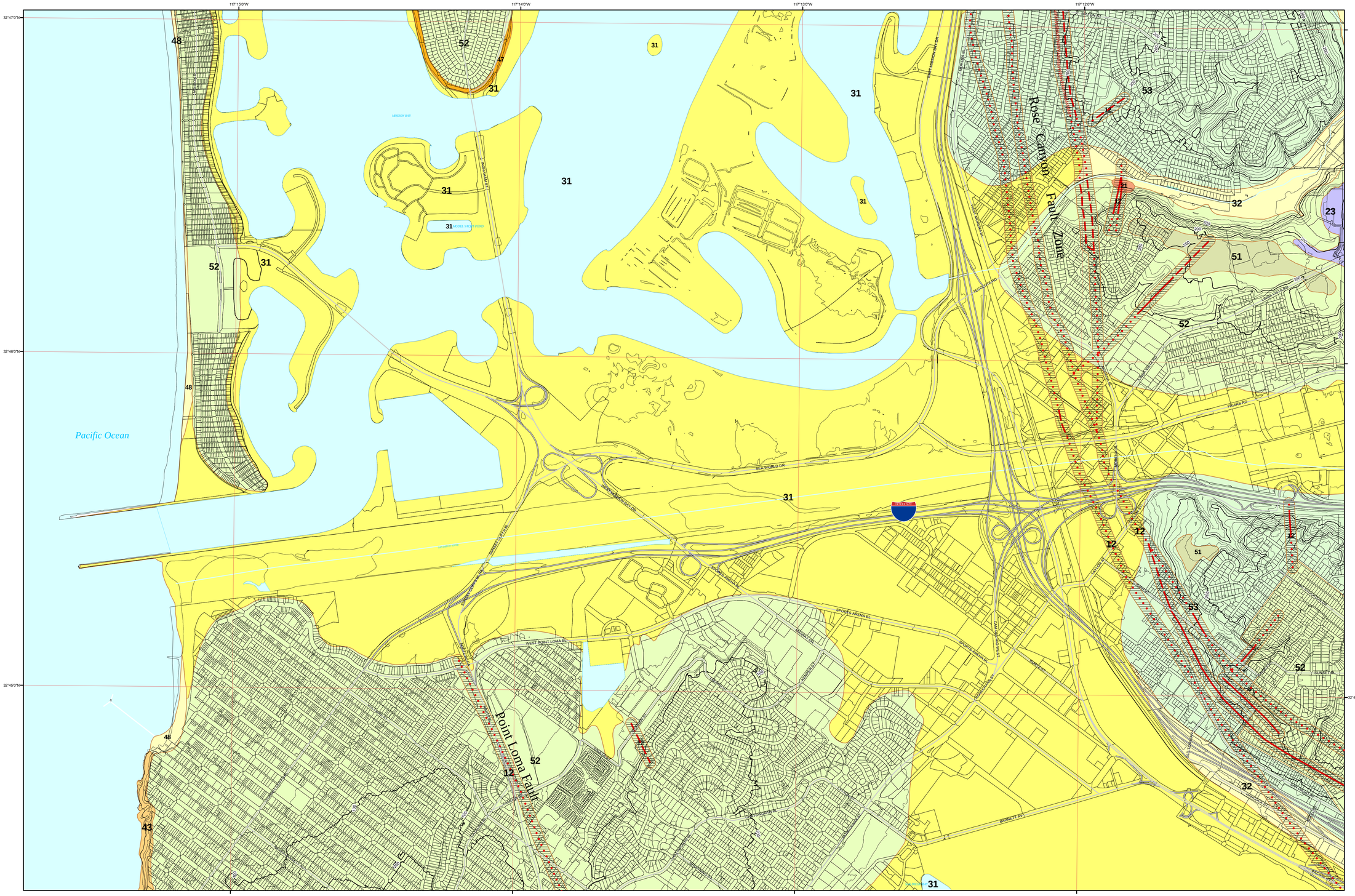
If our proposed water-proof subterranean multi-purpose NFL Chargers Stadium/ Convention Center Phase III Expansion/ Cistern Structural Foundation (NFLCS/CC/CSF) is built, then the great idea of using Cisterns under new development projects on reclaimed tidelands and liquefiable soils to collect, capture, and clean urban storm water runoff can be used county-wide as an example of Green Engineering Design.

Geological Map of the San Diego 30’ x60’ Quadrangle, California. Compiled by Michael P. Kennedy and Siang S. Tan, 2005, by the California Geological Survey (CGS).

ftp://ftp.consrv.ca.gov/pub/dmg/rgmp/prelim_geo_pdf/sandiego_map2_ai9.pdf

Areas in Yellow

Areas in Yellow are Hydraulic Fills subject to Liquefaction.



LEGEND

Geologic Hazard Categories

FAULT ZONES

- 11 Active, Alquist-Priolo Earthquake Fault Zone
- 12 Potentially Active, Inactive, Presumed Inactive, or Activity Unknown
- 13 Downtown special fault zone

LANDSLIDES

- 21 Confirmed, known, or highly suspected
- 22 Possible or conjectured

SLIDE-PRONE FORMATIONS

- 23 Friars: neutral or favorable geologic structure
- 24 Friars: unfavorable geologic structure
- 25 Ardath: neutral or favorable geologic structure
- 26 Ardath: unfavorable geologic structure
- 27 Otay, Sweetwater, and others

LIQUEFACTION

- 31 High Potential -- shallow groundwater major drainages, hydraulic fills
- 32 Low Potential -- fluctuating groundwater minor drainages

COASTAL BLUFFS

- 41 Generally unstable Numerous landslides, high steep bluffs, severe erosion, unfavorable geologic structure
- 42 Generally unstable Unfavorable bedding plains, high erosion
- 43 Generally unstable Unfavorable jointing, local high erosion
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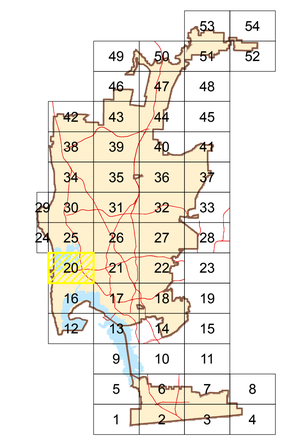
- Concealed Fault
- Shear Zone

Index Map



SanGIS Basemap Accuracy

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City of San Diego
SEISMIC SAFETY STUDY
Geologic Hazards and Faults

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Development Services Department

N

S

0 400 800 1,600 2,400 Feet

0 120 240 480 720 960 Meters

GRID TILE: 20

GRID SCALE: 800

DATE: 4/3/2008

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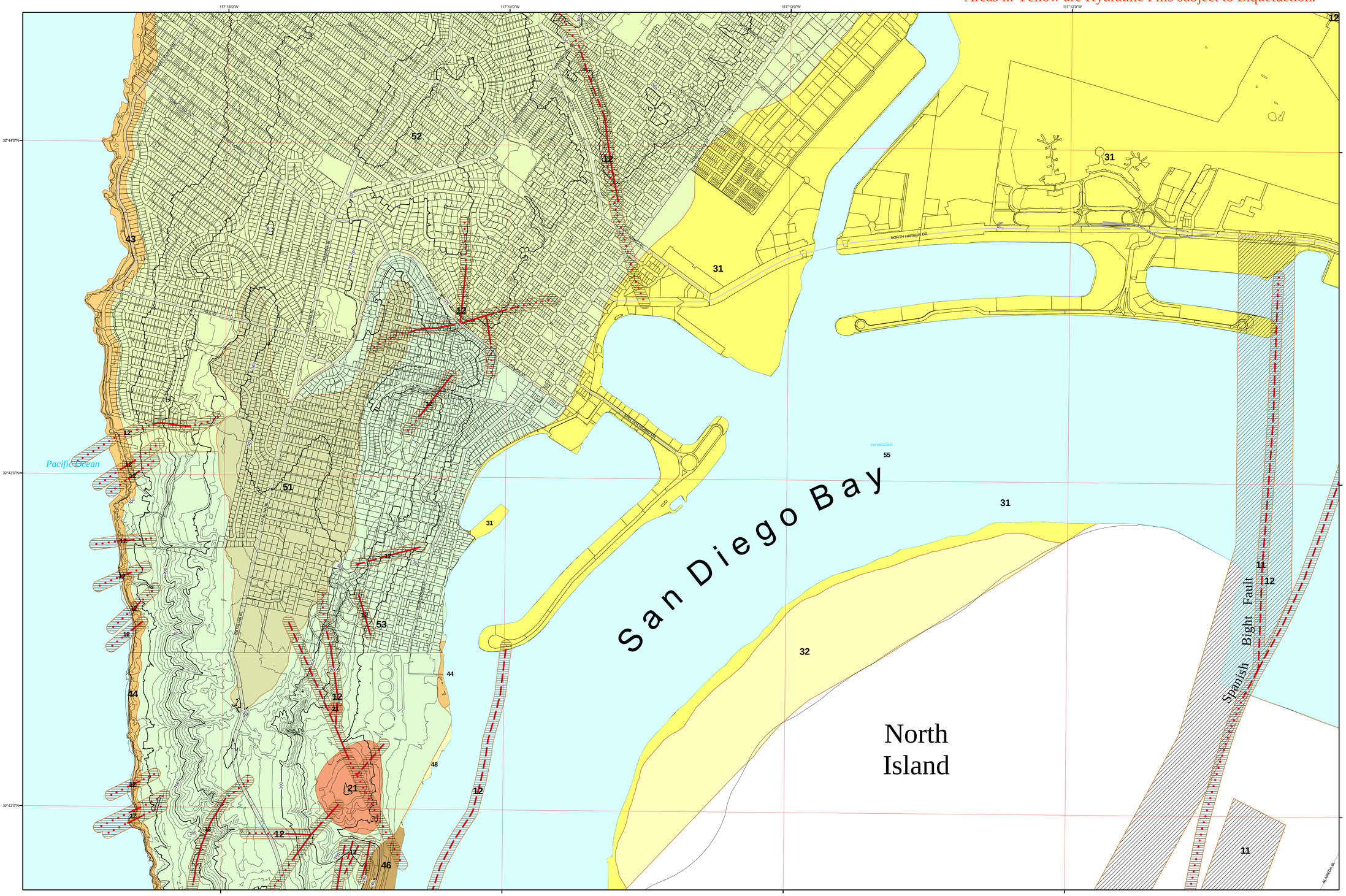

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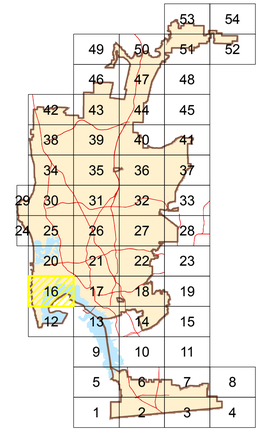

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City of San Diego
SEISMIC SAFETY STUDY
Geologic Hazards and Faults

Development Services Department

0 400 800 1,600 2,400 Feet

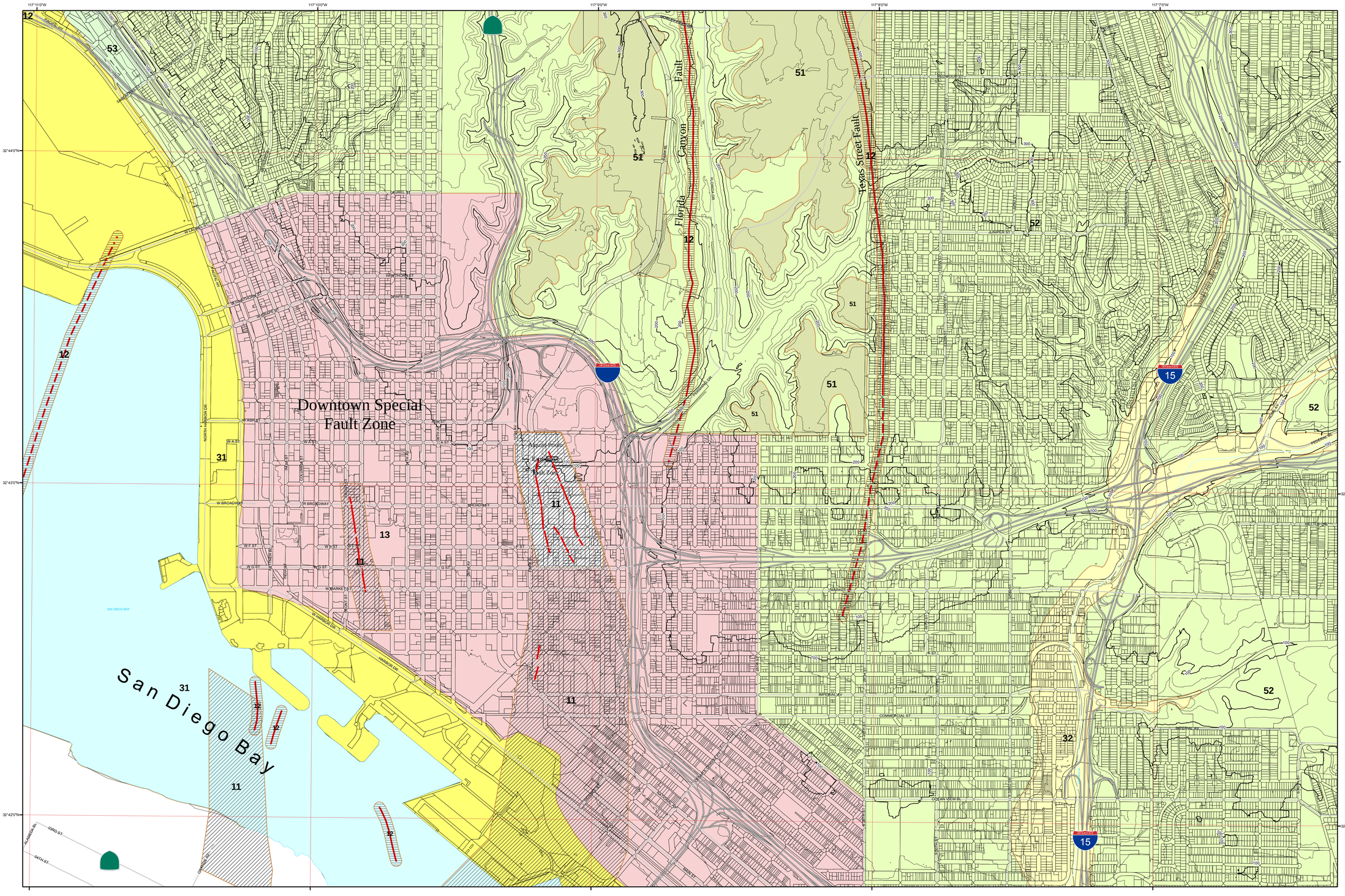
0 120 240 480 720 960 Meters

GRID TILE: 16

GRID SCALE: 800

DATE: 4/3/2008

Areas in Yellow are Hydraulic Fills subject to Liquefaction.



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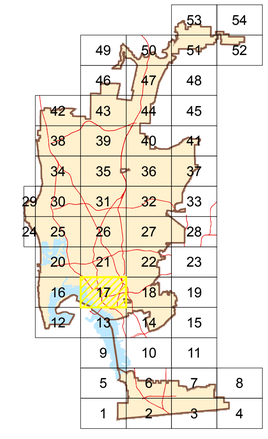

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Geologic Hazards and Faults

Development Services Department

0 400 800 1,600 2,400 Feet

0 120 240 480 720 960 Meters

N S

GRID TILE: 17

GRID SCALE: 800

DATE: 4/3/2008

Table 2: Status of External Fraud, Waste and Abuse Reporting Fiscal Year 2022-23

No.	Incident Type	Case #	Received	Date Started	Status/Outcome	Date Closed
1	Abuse	PPY004	1/13/20	1/13/20	Open/Unresolved	Pending
	An allegation stating that SANDAG is allowing for unsafe traffic circles, ignoring, and lying to the SANDAG Board of Directors, and evading the Brown Act. The matter is on hold and pending additional information that OIPA has requested from the complainant. As of 4/07/22, no additional information has been provided by complainant.					
2-5	Combination of Allegations (GM, Waste, and Abuse)	PY001-22, PY003-22, PY004-22, PY006-22	07/27, 02/02, 02/08,02/14	Not started	Open	Pending
	An allegation stating that SANDAG, the City of San Diego and Consultants working on the Bike Project are grossly mismanaging, wasting, and abusing public dollars. The claim includes four different complaints filed through the fraud, waste, and abuse hotline. The matter includes concerns that the project has doubled in estimated cost. Additionally, there are allegations that in some areas that have been completed, the contractors failed to ensure that proper safety guidelines be followed including proper signage and advanced posting of work task.					
6	Combination of Allegations (Waste, GM, Abuse)	PY007-22	02/25/22	03/16/22	Open	Pending
	An allegation regarding misuse and abuse by a SANDAG consultant/contractor. The claim is regarding abuse of billing, overreaching of authority and failure to adhere to the terms of the contract. The claimant states that these actions by the contractor have been ongoing for many years.					
7-8	Combination of Allegations (GM, Abuse, COI, Quid Pro-Quo)	PY009-22, PY012-22	02/17/22, 08/04/22	Not started	Open	Pending
	An allegation regarding misuse and abuse by a SANDAG consultant/contractor and prior SANDAG employee. The claim is regarding abuse of power, conflict of interest (COI), overreaching of authority and financial gain by prior employee and contractor. Claimant provides detail of a “this for a that” agreement. On 8/04/22 a complaint was filed relating to this same contractor. The accusation is related and will be investigated together. PY013-22 claims that the contractor violated SANDAG’s DBE program and that SANDAG DBE was informed, was provided support yet ignored the matter. The complainant who was a subcontractor claims that there were also matters involving conflict of interest.					
9	Public Safety Issue	002-23	08/7/22	Not Started	Open	Pending
	Complainant alleges that since 2006, for 16 years, she has had ongoing concerns regarding Seismic Safety on SANDAG, Port, Airport, and City of San Diego public funded projects. Specifically, for SANDAG, the concern is Seismic Safety concerns on the Rose Canyon Fault Zone (RCFZ) on SANDAG's Headquarters and SDMTS Bus Maintenance Facility in downtown San Diego, the double tracking over the San Diego River, the Old Town Station, and the limited fault investigations for only 3 bridges along the Mid-Coast Corridor, and the new stations and Transit Oriented Development (TOD) housing projects adjacent new trolley stops. The Complainant alleges that in the past SANDAG stated they were not confirming or denying active faulting along the full Mid-Coast corridor					

	or the bridges over the San Diego River due to budget constraints. The ask is to require all SANDAG, Airport, Port, and City fault investigations to have third-party approvals. With the fault investigation reports and approvals sent to the State Geologist within 30 days of approval. Second, reconvene the Caltrans 2006 Coronado Fault Technical Advisory Panel (TAP) or reconvene or contact Caltrans's Seismic Advisory Board (SAB) for free Seismic guidance and approvals for public funded projects on liquefiable soils. Additional State Seismic guidance and approvals should be required for SANDAG's proposed Airport connectivity project for a new subway/trolley to the airport, Central Mobility Hub (CMH), and new City Hall complex, the Navy Broadway Complex (NBC), Seaport Village, and SANDAG's new Headquarters and SDMTS Bus Maintenance Facility.

Table 3: Status of Internal Fraud, Waste and Abuse Reporting Fiscal Year 2022-23

No.	Incident Type	Case #	Received	Date Started	Status/Outcome	Date Closed
10	Combination of Allegations	PY010-22	03/8/22	03/25/22	Open	Pending
	An allegation of employee misuse of SANDAG Vehicle.					
11	Combination of Allegations	PY011-22	03/10/22	Not started	Open	Pending
	An allegation of employee misuse of SANDAG minor equipment used while working remotely and otherwise. Information and detail regarding the matter was provided.					
12	Theft of Time	PY008-22	03/08/22	Not started	Open	Pending
	Allegations of a current SANDAG employee and theft of time. Claimant states and provides examples of the employee and theft of time including coming in late, leaving early, etc. OIPA had planned a time audit, but due to limited resources this has been pending review. However, this matter will be individually reviewed to determine if actions should be taken.					
13	Misuse and Abuse	001-23	07/22/22	8/9/22	Open	Pending
	Allegation of misuse and abuse of public funds. Complainant alleged that SANDAG has paid out hundreds of thousands to employees over the past years that were unreasonable material amounts. Complainant provided dollar amounts for various past employees that were released from their duties at SANDAG yet were at will. Complainant demanded that the matter be reviewed as the amounts were material and the employees were at will. The complainant alleged that the polices should be changed and the Board should set more perimeters around how SANDAG management spends public funds.					

April 25, 2022

tinyurl.com/20220425a

SANDAG, 401 B Street, Suite 800, San Diego, California 92101
Clerk@sandag.org hasan.ikhrata@sandag.org coleen.clementson@sandag.org
Ryan Kohut, (619) 595-5339, ryan.kohut@sandag.org
Omar Atayee, (619) 595-5319, omar.atayee@sandag.org
Keith Greer, (619) 699-7390, keith.greer@sandag.org

Subject: Sabotage of SANDAG's Airport Connectivity On-Airport Rail Access Project and Central Mobility Hub CMH) Funding by the San Diego County Regional Airport Authority (SDCRAA) and San Diego International Airport (SDIA).

References: The following References are Attached and Linked Below.

May 31, 2016. SDCRAA and SDIA Letter to US DOT Regarding FAA Policy
"Comments, Proposed Policy Amendment Regarding PFC Eligibility of Ground Access Projects Meeting Certain Criteria, Docket No. FAA-2016-10334"
https://downloads.regulations.gov/FAA-2016-6596-0024/attachment_1.pdf

June 16, 2016. SDCRAA and SDIA Letter to US DOT Regarding FAA Policy
"Supplemental Comments, Proposed Policy Amendment Regarding PFC Eligibility of Ground Access Projects Meeting Certain Criteria, Docket No. FAA-2016-6596"
https://downloads.regulations.gov/FAA-2016-6596-0040/attachment_1.pdf

January 12, 2021. Federal Aviation Administration (FAA) Memorandum. 18 Pages
"FAA Passenger Facility Charge PFC 75-21 Eligibility of On-Airport Rail Access Project"
https://www.faa.gov/airports/pfc/pfc_updates/media/pfc_75_21_rail_access_policy.pdf

Dear SANDAG:

Great news. As referenced above and linked below, on January 12, 2021, the United States Department of Transportation (DOT) and the Federal Aviation Administration (FAA) made a dramatic change on the use of FAA Passenger Facility Charge (PFC) Funding Policy for On-Airport Rail Access Projects. The previous FAA Policy required that "*airport ground access projects must be for the **exclusive use** of airport patrons and airport employees*."

The new 2021 FAA Policy allows the use of PFC funds for On-Airport ground access projects that are **not exclusive** to the airport. This new FAA Policy is fantastic. It allows for more flexibility and local control of normally restricted FAA Airport Revenue for full funding of On-Airport rail projects, people movers, and Intermodal connections including a Central Mobility Hub (CMH). Please notify the SANDAG Board Members of this transformative policy change.

Using this new 2021 Federal FAA Policy, in order to fully fund SANDAG's Airport Connectivity Project consists of a Central Mobility Hub (CMH) and direct transit connections to the Airport; the project **needs to be On-Airport by acquiring of a Right-of-Way (ROW), or annexing adjacent San Diego Unified Port District (SDUPD) land** east from the airport to the train tracks. From Washington Street to Laurel Street, and North Harbor Drive. Through the same $1 lease the airport already pays since 2002. The alternative of siting a CMH in downtown San Diego would not allow FAA PFC funding to be used. http://tinyurl.com/20220419a

"**Policy Statement**… II. Eligibility… *FAA has reconsidered this interpretation and determined the 2004 exclusive use policy is unduly limiting. FAA supports the use of PFC to "encourage the development of intermodal connections on airport property between aeronautical and other transportation modes and systems to serve air transpiration passengers and cargo efficiently and effectively and promise economic development. 49 U.S.C. 47101(a)(5).""*
https://www.govinfo.gov/content/pkg/USCODE-2020-title49/pdf/USCODE-2020-title49-subtitleVII-partB-chap471-subchapI-sec47101.pdf

***"III. PFC eligibility for a railway serving an exclusive use, on-airport station and then extending to serve additional stations beyond the airport**. Airport rail access projects serving an exclusive use, on-airport station and then extending to serve additional stations beyond the airport may be eligible for PFC funding… Policy: an eligible airport ground access project is one meeting the following conditions: (1) The road or facility may only extend to the nearest public highway or facility of sufficient capacity to accommodate airport traffic; **(2) the access road or facility must be located on the airport or within a right-of-way acquired by the public agency**; and (3) the access road or facility must exclusively serve airport traffic… 69 FR 6366, 6367.*
*Under this new policy, on-airport rail access projects no longer will be treated identically to road access projects, **and a portion of a rail access project may be eligible even if the rail project in its entirety serves more than exclusively airport traffic.** Three preferred methodologies for calculating the portion of the project eligible for PFC funding are:*
(1) prorating the eligible cost based on the forecast ratio of airport to non-airport ridership;
(2) calculating the cost to build a hypothetical stand-alone people mover system connecting the airport's terminal(s) to a regional transit system, which would otherwise meet the requirements of the 2004 PFC Policy; or
(3) calculating the difference between the cost of a line that bypasses the airport and the cost of a through-line configuration."
https://www.faa.gov/airports/pfc/pfc_updates/media/pfc_75_21_rail_access_policy.pdf

This great new 2021 FAA Passenger Facility Charge (PFC) Policy Change was secretly **Sabotaged and Opposed** by the San Diego County Regional Airport Authority (SDCRAA) and San Diego International Airport (SDIA) leadership; in the referenced and attached 2016 Comment Letters on the FAA Policy Change. Written by the previous SDIA Airport President and CEO Thella Bowens. Thankfully the FAA pushed back, and thwarted the SDCRAA and SDIA plans to continue to **Hoard** FAA Airport Revenue. I cannot find any SDCRAA SDIA Agenda Items on this subject of the FAA PFC Policy Change. It may be that Airport staff wrote these letters without SDCRAA Board approval. Or the Board knew and directed staff to write the letters. Either way, the public and other elected officials in San Diego County were unaware. Excerpts from the Comments letters include the following:

May 31, 2016. "*The San Diego County Regional Airport Authority is the operator of San Diego International Airport (SDIA). **We are submitting comments regarding our opposition to the proposed change to Federal Aviation Administration (FAA) policy that would allow for the use of Passenger Facility Charges (PFCs) to fund airport rail access projects located on airport property that do not exclusively serve an airport**… **Opening up eligibility for projects such as rail access that involve outside agencies may potentially bring pressure to participate in funding a project that is not a high priority at SDIA**… Also, one of the typical features of airport access projects is that the benefits are often split between airport users and others. Because of this, project costs are allocated between the airport and partnering agency or entity. **A flawed methodology to allocate costs can lead to an incorrect share of costs being attributed to the airport**. The proposed change to PFC eligibility for rail access suggested three cost allocation methodologies: 1) Incremental Cost Comparison; 2) Separate System Comparison; and 3) Prorated Costs Based on Ridership*

Forecast. We believe that all of these methodologies have drawbacks."
https://downloads.regulations.gov/FAA-2016-6596-0024/attachment_1.pdf

June 16, 2016. *"**Political Influence**. **There is no mechanism for airports to resist local political pressures to use PFCs to fund rail projects in close proximity to airports. Without strict controls on the use of PFCs**, airports- whether municipal/county-owned or governed by an independent authority- **could be pressured to use PFC revenues to build projects that have little or no value to airports and their stakeholders.** City or county-owned airports, in particular, could be subject to local influence by elected officials and regional leaders. **For example, a transfer of adjacent property interest to the airport through a right-of-way could increase the apparent PFC eligibility for the 'on-airport' portion of a city or county owned rail system. As a result, airports would have to hope that the FAA rejects PFC applications to which the airport was opposed.** Revenue diversion regulations were designed to help protect airports from undue political influence. **Expanding the eligibility of PFC use, as has been proposed, would begin to open the door to using PFCs on non-airport/aviation projects if not strictly defined**… One of the three proposed methodologies (eligibility based on ridership) is unverifiable and can subject the airport to an unwarranted share of costs. **The people mover method could create unwarranted and astronomical cost eligibility…**"* https://downloads.regulations.gov/FAA-2016-6596-0040/attachment_1.pdf

For Grandfathered Airport Revenue Diversion status, San Diego International Airport (SDIA) sponsor is the San Diego Unified Port District (SDUPD). SDIA is 1 of 12 Grandfathered Airports on State Tidelands that includes the Port Authority of New York and New Jersey (PANYNJ). The La Guardia Airport (LGA) Access Improvement Project by PANYNJ is very similar to San Diego Airport Connectivity project. Linked below is the FAA Record of Decision (ROD) for new transit stations from LGA Airport, and a new a 3-mile Subway Transit Corridor (STC), located On-Airport and Off-Airport. With Automated People Movers (APM) to directly connect the Airport to the local rail system using PFC funding. Due to the use of FAA PFC funding, the LGA Access Improvement Project was subject to the Federal NEPA EIS process. *"The Proposed Action would connect two on-Airport stations at LGA with a transfer station at Willets Point. The off-Airport station would provide connections to the Mets–Willets Point stations of the* [Long Island Railroad] *LIRR Port Washington Branch and the New York City Transit (NYCT) Subway Flushing Line (7 Line)."*
https://www.faa.gov/airports/environmental/environmental_documents/lga/media/EIS-ROD-LGA-NY-Access-Improvement-2021-07-21.pdf

In conclusion, this is great news that a Non-Exclusive, On-Airport Central Mobility Hub (CMH), Subway Transit Corridors (STC), and Transit Station On-Airport can be fully funded using FAA Passenger Facility Charges (PFC). In addition, portions of Off-Airport Subway Transit Corridors (STC) and Stations can also be funded by PFC. Full funding can only be realized by acquiring Airport Right-of-Ways (ROW), or annexing adjacent land to create new On-Airport property. Therefore, the Port Headquarters location is still a **Superior Alternative** for the CMH because it is located between the airport and the closest rail connection. A downtown CMH would be excluded from PFC funding. In 2002, SB-1896 *"transferred planning and land use responsibilities for airport land from the SANDAG or its successor to the Authority.*"
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200120020SB1896
Due to the purposeful funding sabotage, SANDAG should request the Public Utility Code (PUC) laws be changed, to give back Airport planning and development and the associated Billions in Cash for Regional transportation project funding to SANDAG. Please contact me with questions.

Regards, Katheryn Rhodes, Civil Engineer RCE 62730 laplayaheritage@gmail.com 619-402-8688

SAN DIEGO INTERNATIONAL AIRPORT
LET'S GO.

May 31, 2016

Docket Management Facility
U.S. Department of Transportation
1200 New Jersey Avenue SE.
West Building Ground Floor, Room W12-140
Washington, DC 20590-0001.

Re: Comments, Proposed Policy Amendment Regarding PFC Eligibility of Ground Access Projects Meeting Certain Criteria, Docket No. FAA-2016-10334

The San Diego County Regional Airport Authority is the operator of San Diego International Airport (SDIA). We are submitting comments regarding our opposition to the proposed change to Federal Aviation Administration (FAA) policy that would allow for the use of Passenger Facility Charges (PFCs) to fund airport rail access projects located on airport property that do not exclusively serve an airport.

Generally, we consider an expansion of PFC eligibility for projects to be positive, as the ability to fund a greater variety of projects is beneficial for overall airport development and the associated plan of finance. Over $1 billion of PFC revenue at SDIA is committed through 2036 to pay for bonds used for a major terminal expansion completed in 2013. This leaves very little in uncommitted PFCs to be used for other projects. Opening up eligibility for projects such as rail access that involve outside agencies may potentially bring pressure to participate in funding a project that is not a high priority at SDIA. Although we may gain additional PFC revenue in the future from increased passenger growth or from an increase in the $4.50 PFC level, we anticipate not being able to address all future facility needs with the available PFCs.

Also, one of the typical features of airport access projects is that the benefits are often split between airport users and others. Because of this, project costs are allocated between the airport and partnering agency or entity. A flawed methodology to allocate costs can lead to an incorrect share of costs being attributed to the airport. The proposed change to PFC eligibility for rail access suggested three cost allocation methodologies: 1) Incremental Cost Comparison; 2) Separate System Comparison; and 3) Prorated Costs Based on Ridership Forecast. We believe that all of these methodologies have drawbacks.

PO Box 82776 • San Diego, CA 92138-2776
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We appreciate your consideration of our comments regarding the proposed policy amendment regarding PFC eligibility of ground access projects meeting certain criteria, and hope you find them helpful.

Please contact me at 619.400.2444 or via e-mail at tbowens@san.org if you need additional information or clarification regarding our comments.

Sincerely,

Thella F. Bowens
President/CEO

SAN DIEGO INTERNATIONAL AIRPORT
LET'S GO.

https://downloads.regulations.gov/FAA-2016-6596-0040/attachment_1.pdf

SAN DIEGO INTERNATIONAL AIRPORT
LET'S GO.

https://www.regulations.gov/comment/FAA-2016-6596-0040

https://www.regulations.gov/comment/FAA-2016-6596-0036
The American Society of Civil Engineers supports the proposed rule change. Airports ought to be allowed to use PFC funds for ground access projects in which the airport is not the terminus of the rail line (assuming PFC funds pay for only the portion of the rail costs that benefit airport passengers, as the three proposals would). This rule change would give airports more flexibility in utilizing locally collected PFC funds for the benefit of airport users.

June 16, 2016

Docket Management Facility
U.S. Department of Transportation
1200 New Jersey Avenue, SE
West Building Ground Floor, Room W12-140
Washington, DC 20590-0001

Re: Supplemental Comments, Proposed Policy Amendment Regarding PFC Eligibility of Ground Access Projects Meeting Certain Criteria, Docket No. FAA-2016-6596

On May 31, 2016, the San Diego County Regional Airport Authority submitted comments opposing the proposed change to FAA policy to allow for the use of Passenger Facility Charges (PFCs) to fund rail access projects that do not exclusively serve an airport. This supplemental letter provides additional comments outlining in more detail reasons that the current PFC eligibility rules should not be amended as proposed in Docket No. FAA-2016-6596.

Intended Use of PFCs

PFCs were established to be used for three purposes: 1) preserve or enhance safety, security, or capacity of the national airport system; 2) reduce noise from an airport that is part of such a system; or 3) furnish opportunities for enhanced competition between or among air carriers. The proposed use of PFCs for a rail line does not meet any of those three purposes.

Except for Grandfathered Airports who are allowed to use Airport Revenue off site for Transportation in general.

Political Influence

There is no mechanism for airports to resist local political pressures to use PFCs to fund rail projects in close proximity to airports. Without strict controls on the use of PFCs, airports - whether municipal/county-owned or governed by an independent authority – could be pressured to use PFC revenues to build projects that have little or no value to airports and their stakeholders. City or county-owned airports, in particular, could be subject to local influence by elected officials and regional leaders. For example, a transfer of adjacent property interest to the airport through a right-of-way could increase the apparent PFC eligibility for the 'on-airport' portion of a city or county owned rail system.

As a result, airports would have to hope that the FAA rejects PFC applications to which the airport was opposed. Revenue diversion regulations were designed to help protect airports from undue political influence. Expanding the eligibility of PFC use, as has been proposed, would begin to open the door to using PFCs on non-airport/aviation projects if not strictly defined.

Cost Allocation Methodologies

The FAA's proposed change to PFC eligibility for rail access outlines three different allocation methodologies: 1) Incremental Cost Comparison; 2) Separate System Comparison; and 3) Prorated Costs Based on Ridership Forecast. Having multiple methodologies could cause issues to arise between the project sponsor and the FAA during review of an application. FAA staff could struggle

with approving a project based on a methodology for which they have no reference point. One of the three proposed methodologies (eligibility based on ridership) is unverifiable and can subject the airport to an unwarranted share of costs. The people mover method could create unwarranted and astronomical cost eligibility. The best method of the three - the incremental cost method – still has the potential to inflate the cost eligibility beyond what it actually should be. Notwithstanding these concerns, the identification of one cost allocation method would allow a better framework for FAA to evaluate a project, and would be commensurate with other eligibility formulas, such as the two choices for terminal project eligibility (square footage or specific cost).

Except for Grandfathered Airports who are allowed to use Airport Revenue off site for Transportation in general.

Airport Improvement Program Funding

There should exist a requirement that airports who use PFCs for rail and similar projects must forego AIP discretionary funds. Although there could be some limitation on that exclusion (e.g. funding levels not to exceed the amount received the year prior to adding rail project to their Airport Capital Improvement Plan). Airports using PFCs for rail projects should also be excluded from participating in the Letter of Intent (LOI) Program.

We appreciate your consideration of these additional comments regarding the proposed policy amendment regarding PFC eligibility of rail access projects and hope that you find them helpful.

Please contact me at (619) 400-2444 or via e-mail at tbowens@san.org if you need additional information or clarification regarding our comments.

Sincerely,

Thella F. Bowens
President/CEO

https://www.faa.gov/airports/pfc/pfc_updates/media/pfc_75_21_rail_access_policy.pdf
https://downloads.regulations.gov/FAA-2016-6596-0024/attachment_1.pdf
https://downloads.regulations.gov/FAA-2016-6596-0040/attachment_1.pdf

Grandfathered Airports allow for normally restricted FAA Airport Revenue Diversion for 12 Grandfathered Airport Sponsors including SDIA, with the Port as the Airport Sponsor.

Federal Aviation Administration

Memorandum

PFC = Passenger Facility Charge.

Date: January 12, 2021

To: Regional Airports Directors, 610 Branch Managers, and ADO Managers

From: Robert J. Craven, Director, Office of Airport Planning and Programming, APP-1

Subject: INFORMATION: PFC Update, PFC 75-21

PFC 75-21. Eligibility of on-airport rail access projects

This PFC Update letter provides guidance on the *Passenger Facility Charge (PFC) Program: Eligibility of on-airport rail access*. This Policy amends FAA policy previously published in 2004, *Notice of Policy Regarding Eligibility of Airport Ground Access Transportation Projects for Funding Under the Passenger Facility Charge Program* (69 FR 6366) (the 2004 Policy), to make rail lines that do not exclusively serve the airport PFC eligible, and provides several methodologies for calculating the PFC-eligible costs. All other ground access projects using PFC funds continue to follow the 2004 Policy.

FAA's PFC Order (FAA Order 5500.1, Chapter 1, section 1-22(d)) notes differences between PFC and Airport Improvement Program (AIP) eligibility. This PFC Update further clarifies that when using PFC funds, rail line eligibility is now treated differently than when using AIP funds. There is no change to AIP policy on ground access project eligibility, as outlined in Table P-3 of the AIP Handbook.

This Update also modifies section 4-6(e) of the PFC Order, which currently states that airport ground access projects must be for the exclusive use of airport patrons and airport employees. Under the 2020 Policy, on-airport rail access projects no longer will be treated identically to road access projects, and a portion of a rail access project may be eligible even if the rail project in its entirety serves more than exclusively airport traffic.

For further information, please contact APP-510 at (202) 267-3831.

Background

Section 123(e) of Public Law 108-176, Vision 100-Century of Aviation Reauthorization Act (December 12, 2003) directed FAA to publish a policy on the eligibility of ground access projects for PFC funding. The 2004 Policy was published on February 10, 2004 (69 FR 6366). The 2004 Policy presented the relevant statutory requirements as well as FAA's regulations and guidance on PFC-funded ground access transportation projects in a consolidated form.

The 2004 Policy restated the agency's longstanding policy that a surface transportation project must meet the following conditions to be eligible for AIP or PFC (see also FAA Order 5100.38D, Appendix P, Table P-3) funding:

(1) the road or facility may only extend to the nearest public highway or facility of sufficient capacity to accommodate airport traffic;
(2) the access road or facility must be located on the airport or within a right-of-way acquired by the public agency; and
(3) the access road or facility must exclusively serve airport traffic.

In addition, the 2004 Policy stated that the "eligibility criteria for access roads" would be used "to judge eligibility of rail and fixed guideway systems." The first and second elements are relatively straightforward to apply and evaluate. The third element, exclusive use, requires more explanation. The origin of this exclusivity element is an FAA policy, later codified by Congress, that expressly applied only to roads. 49 U.S.C. 47102(28). The 2004 Policy stated that "exclusive use of airport patrons and employees means that the facility can experience no more than incidental use by non-airport users." 69 FR 6368.

The 2004 Policy also stated that "[r]elated facilities, such as acceleration and deceleration lanes, exit and entrance ramps, lighting, equipment to provide operational control of a rail system or people mover, and rail system or people mover stops at intermediate points on the airport are eligible when they are a necessary part of an eligible access road or facility…." 69 FR 6367. In addition, "the public agency must retain ownership of the completed ground access transportation project. The public agency may choose to operate the facility on its own or may choose to lease the facility to a local or regional transit agency for operation within a larger local or regional transit system." 69 FR 6367.

In the past, before and after the publication of the 2004 Policy, FAA found that almost all rail stations located on-airport were eligible for PFC funding under agency guidelines, because they were exclusively used by airport patrons and employees. However, under the 2004 Policy whether the right-of-way or rail line itself met the exclusive use element depended upon the configuration of the rail line. If the configuration terminated at the airport, then it met the exclusive use element. Thus, to meet the terms of the 2004 Policy, some on-airport stations were connected to an off-airport railway system via a spur line.

If the railway was a through-line where the airport station was not the terminus, however, it failed to meet the exclusive use element.

In 2014, FAA received a request for the use of PFC revenue to fund an on-airport rail station and related railway, where the railway would not exclusively serve airport traffic as interpreted in the 2004 Policy. The railway would not terminate at the airport station but continue beyond the airport property to other stations. The agency reconsidered whether the 2004 Policy's exclusive use element, as applied to rail access projects, is unduly limiting, restricting the approval of PFC funds for some airport ground access projects that are otherwise consistent with statutory limitations and the agency's mission to "encourage the development of intermodal connections on airport property between aeronautical and other transportation modes and systems to serve air transportation passengers and cargo efficiently and effectively and promote economic development." 49 U.S.C. 47101(a)(5).

FAA's consideration of the request highlighted the competing policy goals. When a public agency extends the railway beyond the airport, it provides more transit options for more travelers and increases the utility of the system. This positive outcome is consistent with FAA's policy of encouraging intermodal connections. A paradoxical consequence of this intermodal enhancement, however, is that funding options diminish pursuant to the 2004 Policy.

As noted earlier, the 2004 Policy was based on FAA Order 5100.38B (May 31, 2002) and related guidance that determined PFC and AIP eligibility for access roads. However, there are fundamental differences between railway systems and road systems. With road systems, all that is needed to facilitate efficient access to the air transportation system is a direct connection from the airport to a main thoroughfare or population center, as individual drivers can then choose their own path to their destination. The roads used by airport visitors are typically part of a broader system that may be funded, constructed, and maintained by multiple levels of government or private entities for multiple purposes and journeys. Given the open and variable nature of road systems, it is critical for FAA to apply strict eligibility criteria that tie the funding of the on-airport project to the exclusive use of the airport. Without such criteria, users of the infrastructure could benefit from federally approved funds designed to improve access to the national air transportation system without ever intending to visit, or actually visiting, the airport. Moreover, the exclusive use requirement as applied to roads is mandated by statute. 49 U.S.C. 47102(28).

On-airport rail access projects, on the other hand, are planned, funded, constructed, operated, and used differently than on-airport road projects. By their nature, passenger rail and rail transit aggregate passenger traffic along fixed routes with a limited number of stops, each with their own justification and purpose. Users of road infrastructure have more flexibility and control in determining their route than users of rail, who are limited in their options. Non-airport users of rail are not taking advantage of the airport portions

of a railway system by choice, but are likely to be passing through the airport because they cannot use the railway system to their destination without doing so. Thus, the distributed network of roads, as compared to the fixed path of rail, justifies the differentiated treatment that Congress has now ordained.

In addition, FAA has observed an increasing number of circumstances and physical configurations in which continued adherence to the 2004 Policy's interpretation of "exclusive use" for rail projects may not appropriately balance competing policy goals. Indeed, rigid application to rail projects of the exclusive use policy that is now mandated by statute for roadway systems has frustrated FAA's own objectives as set forth in 49 U.S.C. 47101(b)(5) and (6).

FAA's analysis is further informed by changes in population and demographic trends that have occurred since issuance of the 2004 Policy. Many airports that were originally constructed on the periphery of population centers are now ensconced as suburban growth has extended to and beyond the airport. It may no longer make sense for a downtown railway or transit line to terminate at the airport, where there exists a pool of potential users beyond the airport. However, under the 2004 Policy, which equates on-airport rail access projects with "access roads," extending railway access beyond the airport so that these populations can also access the airport precludes the use of federally approved funds, such as PFCs, for significant portions of the project since the line would go beyond the airport and no longer serves airport traffic exclusively.

To modify the exclusivity element for the on-airport portion of rail access projects, on May 3, 2016, FAA published a proposed policy titled Passenger Facility Charge (PFC) Program: Eligibility of Ground Access Projects Meeting Certain Criteria (81 FR 26611) (hereinafter 2016 Proposed Policy). In the Proposed Policy, FAA solicited comments on its proposal to amend the existing policy to consider the eligibility of rail access projects that are located on-airport but may not exclusively serve airport traffic. FAA's proposed amendment is consistent with the agency's mission to encourage the development of intermodal connections on airport property. The proposal also identified three proposed methodologies by which an airport could calculate PFC-eligible costs of a rail access project serving that on-airport station that then extends to serve off-airport stations.

Following publication of the 2016 Proposed Policy, the President signed the Reauthorization Act of 2018 (Pub. L. 115-254, section 123 (Oct. 5, 2018) (hereinafter "Reauthorization Act")). Section 123 of the Reauthorization Act provides:

> Not later than 6 months after the date of enactment of this Act, the Administrator of the Federal Aviation Administration shall, after consideration of all public comments, publish in the Federal Register a final policy amendment consistent with the notice published in the Federal Register on May 3, 2016 (81 FR 26611).

Discussion of Comments and Final Policy

FAA received comments from 40 commenters including air carriers, airport operators, government entities, rail authorities, transit authorities, trade associations, and private individuals (Docket number FAA-2016-6596). Commenters included:

- Trade Associations: Airlines For America (A4A), Southern Rail Commission, International Air Rail Organization, International Air Transport Association (IATA), Airports Council International - North America (ACI-NA), American Association of Airport Executives (AAAE), Regional Plan Association (RPA), United States Travel Association, and the American Society of Civil Engineers (ASCE)
- Air carriers: Delta Air Lines
- Airport operators: Greater Orlando Airport Authority (FL), San Diego Regional Airport Authority (CA), Los Angeles World Airports (CA), New Orleans International Airport (LA), Metropolitan Washington Airports Authority (DC), San Diego International Airport (CA), Phoenix Mesa Airport Authority (AZ), City of Phoenix Aviation Department (AZ), Lee County Port Authority (FL)
- Government entities: City of College Park (GA), City of Austin (TX), San Bernardino Associated Governments (CA), New York City Economic Development Corporation (NY)
- Rail Authorities: Louisiana Super Regional Rail Authority (LA), National Railroad Passenger Corporation (AMTRAK)
- Transit Authorities: Utah Transit Authority (UT), Los Angeles County Metropolitan Transportation Authority (CA)
- Thirteen Individuals

Most comments were supportive of the proposed policy. Some commenters expressed a preference for one methodology over another, but none offered alternatives, and none specifically argued against any of the three methodologies. Many commenters (including the Metropolitan Washington Airports Authority (MWAA), AMTRAK, Greater Orlando International Airport, New Orleans International Airport, the United States Travel Association, Utah Transit Authority, and Phoenix Mesa Airport) supported a change that would give public agencies the flexibility to determine the most efficient ways to use PFC revenues and, in doing so, encourage the development of intermodal transportation systems. Two members of AAAE stated that expanding PFC eligibility for certain on-airport rail access projects will allow airports to accommodate increasing passenger levels and reduce landside congestion.

However, some commenters (such as the Greater Orlando Airport) expressed concern that two of the methodologies would introduce ambiguity by analyzing a theoretical project that may never have been planned or analyzed in sufficient detail. Similar concern was expressed that the assumptions and costing methodologies used for the proposed project and a theoretical alternative could open arguments resulting in

conflicting conclusions. Some commenters were also concerned that the prorated methodology could result in skewed forecasts and inaccurate cost allocations over time. In some instances, commenters (such as Delta Air Lines and IATA) were concerned that this proposal could result in a subsidy to greater regional transit systems by airport users.

1. Concerns about Proposed Methodologies to Estimate Eligible Costs

In the 2016 Proposed Policy, FAA identified three methodologies by which an airport could calculate PFC-eligible costs of a railway serving an exclusive use, on-airport station that then extends to serve off-airport stations. The three methodologies were:

Except for Grandfathered Airports who are allowed to use Airport Revenue off site for Transportation in general.

(1) a determination of a prorated amount based on a forecasted ratio of airport to non-airport users;
(2) a determination of the cost to build a hypothetical stand-alone people mover system connecting the airport's terminal(s) to a regional transit system, which would otherwise meet the requirements of the 2004 PFC Policy; or
(3) a determination of the incremental costs, calculated by comparing the cost of a through line configuration with the cost of a line that bypasses the airport.

Most of the comments dealt with the mechanics of how the assumptions involved in these methodologies would be developed and how they would be applied to ascertain PFC eligibility. Some commenters (San Diego County Regional Airport Authority, A4A and others) questioned FAA's reliance on cost estimates used for two of the three methodologies. Some commenters (Greater Orlando Airport Authority, San Diego County Regional Airport Authority) stated that cost estimates, and ultimately cost comparisons, will introduce ambiguity and variability resulting in disputed estimates and assumptions. They indicated that a cost estimate for a theoretical proposed layout may lack the robustness that one would need to make a proper cost analysis, thereby leading to over inflation of the eligibility of the project.

FAA response: FAA routinely makes determinations on cost reasonableness based on PFC Update 06-50.1, dated September 8, 2006. Independent cost estimates are another tool FAA has used when assessing uncertain cost data that could result in substantial shift in project costs (up or down). Furthermore, FAA routinely assesses potential alternative project costs and planning assumptions when reviewing airport master plans, and to some extent environmental studies. FAA anticipates its evaluation of the cost estimates and planning assumptions for rail access projects to be equally robust. FAA historically has relied on assistance from the Federal Transit Administration (FTA) when assessing cost estimates.

The Greater Orlando Airport Authority questioned the use of theoretical alternatives that may not have been envisioned as a means to determine project eligibility. Other commenters (including an individual and A4A) expressed similar concerns about conducting a cost analysis utilizing alternatives. They stated that the cost to serve the

airport would require more infrastructure and would inevitably cost more than a direct route that would bypass the airport. In their view, comparing the cost of a shorter bypass railway that may never really have been envisioned versus a longer route required to serve the airport will lead to a pre-determined outcome and blanket eligibility for higher PFC eligible costs.

Except for Grandfathered Airports who are allowed to use Airport Revenue off site for Transportation in general.

FAA response: The preferred methodology determines PFC eligibility based on a prorated amount of airport to non-airport users. FAA has determined that this approach is the appropriate measure for PFC eligibility for most projects and should be the presumptive method used by the public agency. An alternative methodology should be used only in the event the public agency determines the preferred methodology is inadequate to establish eligible costs. To permit FAA to adequately consider PFC-eligible costs, a cost analysis using an alternative methodology would require documentation of sufficient planning and detailed, conceptual cost estimates.

MWAA asked FAA to clarify the second methodology, i.e., the cost for a stand-alone people mover system. MWAA argues the through-airport railway project should be eligible for up to the same level of PFC funding as the airport people mover project.

FAA response: MWAA's interpretation is consistent with FAA's intent. The stand-alone people mover system methodology is an approach that could potentially be used to identify eligible costs, and the eligibility would be based on the estimated people mover costs.

An individual commented that both a through-airport railway project and a people mover project will include an exclusive use airport station so the cost of the airport station should not be included in the calculations.

FAA Response: The public agency should prepare cost estimates for the on-airport portions of both the through-airport project and the people mover project. The people mover project may include one or more airport stations, and possibly an additional station on the regional transit system if that station is located within the airport boundary. The through-airport project may include one or more stations located close to the airport terminals.

An individual commented that the full cost of a dedicated people mover system providing access to the terminal should include any additional stops and stations such as passenger parking and rental car facilities in the cost methodology. Thus, the separate system methodology must consider these additional elements as well.

FAA Response: The theoretical case and the proposed case alternatives should be as comparable as possible, considering the same functional elements unless the physical and geometric realities of the alternatives dictate otherwise. In some cases, additional components may be necessary for purposes of the calculation.

Some commenters (A4A, San Diego County Regional Airport Authority, and Regional Plan Association) discussed the difficulty in determining a ridership percentage using a prorated forecast of airport to non-airport ridership, noting that it is difficult to predict ridership percentages before a project is developed.

FAA Response: FAA will base the prorated share of the project cost on the public agency's ridership forecast (e.g., a metropolitan planning organization's travel forecast models). FAA may coordinate ridership projections with FTA for its evaluation before PFC eligibility is determined.

MWAA suggested that additional clarification is needed for the definition, or application, of the term "ridership." MWAA's view is that ridership should be based on the ridership taking place within the boundaries of an airport, and should not include additional ridership occurring completely outside the airport and elsewhere on the regional transit system.

FAA Response: Only passengers riding to and from the airport station and the next immediate off-airport station (in either direction) should be included when counting or forecasting airport versus non-airport ridership.

A4A stated FAA should publish and accept comment on ridership forecasts that are used to support a prorated ridership PFC eligibility cost.

FAA Response: Ridership forecasts and any other supporting information must be included in the information presented in the PFC public notice and air carrier consultation meeting to meet the requirements of 14 CFR 158.23 and 158.24. Therefore, in accordance with 14 CFR 158.23(c)(2), carriers will have the ability to comment as A4A advocates. Furthermore, for capital-intensive programs such as a new railway system, public agencies are subject to public comment processes for environmental reviews or master planning activities as well. Interested parties will have the opportunity to comment through all those processes.

A4A stated that FAA should not adopt any methodology for determining PFC eligibility that is not described in the 2016 Proposed Policy, and that the agency must provide public notice and comment before any new eligibility solution is adopted.

FAA Response: This policy outlines three methodologies that may be used to determine PFC eligible costs for a railway serving an exclusive use, on-airport station that then extends to serve an off-airport station. FAA recognizes that it cannot anticipate every circumstance, so this policy preserves discretion to consider unique situations, thus correcting a significant shortcoming of the 2004 Policy. FAA may consider public notice and comment if a public agency proposes to use a substantially different methodology. Nevertheless, a unique methodology would have to be described and supported with

detailed information for the PFC public notice and air carrier consultation meeting to meet the requirements of 14 CFR 158.23 and 158.24.

2. Unintended Subsidies

Some commenters (Delta Air Lines, IATA) were concerned that the added eligibility for through-airport rail access projects would shift user fees intended for the airport system to other non-airport related infrastructure.

FAA Response: Airports have broad latitude to determine whether to impose a PFC and for which projects to use PFC revenues, with the notable caveat that, per 49 U.S.C. 40117(d)(4), airports must ensure airside needs are met before imposing a PFC above $3.00 for use on terminal and landside projects. Moreover, under 49 U.S.C. 40117(a) and (d), before a project can be funded with PFC revenue, it must meet certain eligibility requirements and must be supported with adequate justification. Landside access projects, such as a railway to an on-airport station, can meet the justification standard if the project preserves or enhances capacity in accordance with 49 U.S.C. 40117(d) and 14 CFR 158.15. The project can do this by providing additional capacity to support airside and terminal capacity or reducing roadway traffic congestion, thus making the airport more attractive to airline passengers, particularly in an area with multiple airports.

IATA commented that revenue generated from airport user-funded rail access projects should be recovered and distributed to the airport and its users.

FAA Response: The passengers who choose to use the railway system to get to the airport (and the airlines they patronize) benefit from the overall system. FAA acknowledges it may be administratively difficult to ask the transit system operator to segregate revenues or expenses on any individual segment of the system. While FAA is not including the revenue segregation as IATA suggested, nothing in this policy precludes a public agency and its local transit system operator from entering into such an agreement.

Delta Air Lines commented that an airport sponsor's grant assurances prevent revenue from being used for non-aviation purposes. It stated that PFC revenue should not be used for intermodal projects if there are airside or terminal projects that will provide greater and more direct benefits to the aviation passengers paying those fees.

FAA Response: FAA may approve PFC-eligible ground access projects only if those projects are adequately justified and have met at least one PFC objective (in accordance with 49 U.S.C. 40117(d) and 14 CFR 158.15). In addition, when a public agency requests PFC approval of an eligible surface transportation project funded by a PFC above $3.00, FAA is required to determine that the public agency has made adequate provision for financing the airside needs of the airport (including runways, taxiways, aprons, and aircraft gates). 49 U.S.C. 40117(d)(4); 14 CFR 158.17(a)(3).

3. Significant Contribution

A4A asked that "FAA reiterate in the final policy that that both the 'adequate justification' and 'significant contribution' conditions (depending on the proposed PFC level and size airport) are legal requirements that must be met in order to approve a PFC application, and also should ensure these criteria are strengthened and strictly applied in light of the proposal to loosen exclusivity." In addition, A4A commented that "FAA must apply its 'adequate justification' requirement separately to all sections of the proposed on-airport tracks." It also expressed concern that FAA has not established definitive guidance on the significant contribution criteria and that such criteria threshold needs to reflect a higher burden.

FAA Response: For all projects being considered for PFC funding, FAA must determine that it is PFC eligible, adequately justified, and will meet at least one PFC objective per 49 U.S.C. 40117 and 14 CFR 158.15. As stated previously, ground access projects, such as a railway to an on-airport station, can meet the justification standard if the project preserves or enhances capacity in accordance with 49 U.S.C. 40117(d) and 14 CFR 158.15. If the railway project consists of multiple sections, FAA will consider the specific factors of each section, as well as the methodology used, to determine that the project is adequately justified.

Section 121 of the Reauthorization Act has amended the PFC statute by eliminating the significant contribution test. FAA is still required to determine that the public agency has made adequate provision for financing the airside needs of the airport (including runways, taxiways, aprons, and aircraft gates), 49 U.S.C. 40117(d)(4), when reviewing eligible surface transportation projects funded by PFCs above $3.00.

Delta Air Lines expressed concern about approving all projects in a PFC application with a calculated PFC level greater than $3.00 when the significant contribution criteria was met with airside projects at one airport, but the ground access project not meeting the significant contribution criteria is at a different airport controlled by the same public agency.

FAA Response: As stated previously, section 121 of the Reauthorization Act eliminated the significant contribution test. Nevertheless, FAA must be able to determine that it is PFC eligible, adequately justified, and will meet at least one PFC objective as per 49 U.S.C. 40117(d) and 14 CFR 158.15.

4. General

Some commenters (San Diego County Regional Airport Authority (SDCRAA), A4A) were concerned that adding more PFC eligibility for rail access projects may bring added pressure from local authorities to seek PFC funding for non-economically justified projects that are not a high priority. SDCRAA stated "without strict controls on the use

of PFCs, airports – whether municipal/county-owned or governed by an independent authority – could be pressured to use PFC revenues to build projects that have little or no value to airports and their stakeholders. City or county-owned airports, in particular, could be subject to local influence by elected officials and regional leaders."

FAA Response: As stated previously, the public agency retains the authority regarding the proposed use of its PFC revenue to address its short and long-term capital needs at the airport. All projects must be PFC eligible, adequately justified, and meet at least one PFC objective per 49 U.S.C. 40117(d) and 14 CFR 158.15.

The Southern Rail Commission recommended FAA expand the eligibility requirements to include operating assistance to local transit agencies, passenger rail authorities, and State governments based on the proration method to be used for rail access project eligibility.

FAA Response: Under 49 U.S.C. 40117(a)(3) and (b), operating assistance is not eligible for PFC funding. There is one statutory exception that allows for PFC revenue to be used for certain "routine work to preserve and extend the useful life of runways, taxiways, and aprons at nonhub airports and airports that are not primary airports, under guidelines issued by the Administrator …." 49 U.S.C. 47102(3)(H). But, that statutory exception is not broad enough to permit FAA to expand the requirements as the Southern Rail Commission recommends.

One AAAE member commented that expanded rail eligibility without an increase in the PFC collection level would limit the effectiveness of the proposed policy.

FAA Response: An increase to the PFC collection level is outside the scope of this policy, as it requires congressional action. Nevertheless, FAA has determined a primary benefit of this policy is that a public agency may be able to use PFC revenue more cost-effectively than before because it could avoid the need to construct a PFC-eligible spur line or separate on-airport people mover system to connect to the regional transit system.

The New York City Economic Development Corporation asked that FAA consider whether the absolute prohibition on funding train tracks off airport property makes sense considering the vast differences in airport sizes. The restriction would place a burden on airports with smaller footprints even though the deviation off airport property may be significantly less than that required to serve an airport with a larger footprint.

FAA Response: The policy is consistent with FAA's statutory authorities. Airport development is defined, in part, to include "constructing, reconstructing, or improving an airport … for the purpose of transferring passengers, cargo, or baggage between the aeronautical and ground transportation modes on airport property." 49 U.S.C. 47102(3)(I) (emphasis added).

https://www.law.cornell.edu/uscode/text/49 https://www.law.cornell.edu/uscode/text/49/47102 49 U.S.C 47102(3)(I)
49 U.S.C. 47102 :(3)"airport development" means the following activities, if undertaken by the sponsor, owner, or operator of a public-use airport:
(I) constructing, reconstructing, or improving an airport, or purchasing nonrevenue generating capital equipment to be owned by an airport, for the purpose of transferring passengers, cargo, or baggage between the aeronautical and ground transportation modes on airport property."

5. Suggested Special Approval Conditions

A4A urged FAA to make clear certain policy conditions will apply upon approval of the final policy. It asked FAA to stipulate the following:

(1) this new policy is limited to on-airport rail access projects only, and no changes are being made for other ground access projects such as roadways;
(2) this new policy will only affect future project approvals;
(3) adequate justification and significant contribution are legal requirements that must be met; and
(4) the new policy does not apply to eligibility and funding under the AIP program.

FAA Response: Two of the policy conditions requested by A4A are incorporated into this final policy: 1) this policy is limited to on-airport rail access projects only, and no changes are being made for other ground access projects, such as roadways; and 2) this new policy will only affect future project approvals. Regarding the other two policy conditions, note first that the significant contribution test was eliminated by the Reauthorization Act. Second, this policy is intended to be narrowly focused on the use of PFC funds. Even though the 2016 Proposed Policy indicated this approach would apply to both PFC and AIP, AIP requirements and prioritization limit funding for rail access projects. In addition, since the publication of the Proposed Policy, most of FAA's focus and the focus of public comment has been in the area of PFCs. In summary, FAA does not contemplate a broader use of AIP funds under this policy.

A4A also commented that FAA should consider providing an agency legal opinion in the docket rescinding the previous opinions referenced in the 2004 Policy and clarifying that railway and roadway projects have different eligibility criteria, at least as to exclusivity.

FAA Response: The legal opinions referenced or cited in the 2004 Policy, such as the PFC Record of Decision, Application No. 96-03-U-00_EWR (Nov. 6, 1996) and the FAA Assistant Associate General Counsel Letter, ADAP Eligibility of High-Speed Rail Service On-Airport (Mar. 15, 1971), remain relevant only to the extent they are consistent with the statement of policy that we promulgate today.

In accordance with the preceding discussion, though consideration of the various stakeholders' comments helped clarify this policy amendment, FAA adopts the 2016 Proposed Policy without material changes. This final policy is consistent with the mandate under section 123 of the Reauthorization Act and with intermodal policy under 49 U.S.C. 47101(b)(5) and (6).

This policy amends the 2004 Policy for consideration of an application to use PFC revenue for a rail access project serving an exclusive use, on-airport station that then extends to serve additional stations beyond the airport. Under this policy, FAA treats rail

access projects differently from roads, which is consistent with 49 U.S.C. 40117(a)(3) and (b), 47102(28), 47119(a), and section 123 of the Reauthorization Act. Nevertheless, both exclusive-use stations and tracks (i.e., the railway and related infrastructure) are PFC-eligible costs under either the 2004 Policy or this policy.

Regarding rail stations, those stations located on-airport remain fully eligible for PFC funding. Regarding railway and related infrastructure, those projects that i) are located on-airport and ii) exclusively serve airport traffic remain fully eligible for PFC funding. This policy expands potential eligibility to include the on-airport portion of rail lines even if the railway and infrastructure serve stations other than those on the airport, provided the public agency's cost analysis demonstrates the portion of the proposed project adequately estimates the eligible costs that exclusively serves the airport.

This policy provides three preferred methodologies for calculating the portion of such projects eligible for PFC funding, but a public agency could use a different methodology to demonstrate the portion of the proposed project that exclusively serves the airport. The three methodologies are:

(1) prorating the eligible cost based on the forecast ratio of airport to non-airport ridership;
(2) calculating the cost to build a hypothetical stand-alone people mover system connecting the airport's terminal(s) to a regional transit system, which would otherwise meet the elements of the 2004 PFC Policy; or
(3) calculating the difference between the cost of a line that bypasses the airport and the cost of a through-line configuration.

FAA has determined, and most commenters agree, that the proration methodology is the most straightforward approach. This approach using forecasts that are reasonably justified should be adequate for most projects and should be the presumptive method used by the public agency. If, however, the public agency determines that the proration methodology would not adequately estimate the eligible costs, then the public agency may use one of the other two methodologies provided for in the 2020 Policy discussed in the "Statement of Policy." FAA anticipates using another methodology will require significant planning, cost detail, and justification for FAA to make an eligibility determination. In addition, FAA may consider other cost eligibility methodologies on a case-by-case basis if unique circumstances warrant.

The options provided are permissive, not mandatory, and are non-exclusive. This guidance does not constitute a regulation, and is not legally binding in its own right. It will not be relied upon as a separate basis by FAA for affirmative enforcement action or other administrative penalty. This guidance will not affect rights and obligations under existing statutes and regulations

This guidance will not impose any additional costs, significant or otherwise, on public agencies seeking to use Passenger Facility Charges. Airports or local transit agencies will have already conducted extensive alternatives analysis for a through-airport rail line, including the preparation of station-level ridership forecasts conceptual or schematic cost estimates, and therefore the use of the preferred methodology for calculating PFC eligibility would not create any extra workload or cost for the airport or any other entity. Airports that choose to use the stand-alone people mover system or incremental cost methodologies would also presumably do so only if such estimates were readily available from other studies, rather than developing them only for the purpose of calculating PFC eligibility.

Policy Statement

I. Applicability

The following policy is applicable only to PFC funding for rail access projects that serve an exclusive use, on-airport station and then extend to serve off-airport stations. The use of PFC revenue to finance rail access projects that terminate at an airport, and all other ground access projects, continues to follow FAA's Notice of Policy Regarding Eligibility of Airport Ground Access Transportation Projects for Funding Under the Passenger Facility Charge Program (69 FR 6366) published on February 10, 2004.

II. Eligibility

Historically, on-airport railway stations are eligible for PFC funding, because they are for the exclusive use of airport patrons and employees. However, eligibility for the right-of-way or railway itself depended upon the configuration of the railway. If the configuration terminated at the airport, such as a spur line, FAA found that it was eligible for PFC funding. If the railway was a through-line where the airport station was not the terminus, it was not.

FAA has reconsidered this interpretation and determined the 2004 exclusive use policy is unduly limiting. FAA supports the use of PFC funds to "encourage the development of intermodal connections on airport property between aeronautical and other transportation modes and systems to serve air transportation passengers and cargo efficiently and effectively and promote economic development." 49 U.S.C. 47101(a)(5). Consistent with the statutory and regulatory limitations of the PFC program, on-airport railway stations, right-of-way, and railways are eligible for PFC funding as described in this policy.

III. PFC eligibility for a railway serving an exclusive use, on-airport station and then extending to serve additional stations beyond the airport

Airport rail access projects serving an exclusive use, on-airport station and then extending to serve additional stations beyond the airport may be eligible for PFC funding. The 2004 Policy was issued in question and answer format. FAA stated under the heading "How Is PFC Eligibility Established?" that as a matter of policy: an eligible airport ground access project is one meeting the following conditions:

(1) The road or facility may only extend to the nearest public highway or facility of sufficient capacity to accommodate airport traffic;
(2) the access road or facility must be located on the airport or within a right-of-way acquired by the public agency; and
(3) the access road or facility must exclusively serve airport traffic.

69 FR 6366, 6367.

Under this new policy, on-airport rail access projects no longer will be treated identically to road access projects, and a portion of a rail access project may be eligible even if the rail project in its entirety serves more than exclusively airport traffic. Three preferred methodologies for calculating the portion of the project eligible for PFC funding are:

(1) prorating the eligible cost based on the forecast ratio of airport to non-airport ridership;
(2) calculating the cost to build a hypothetical stand-alone people mover system connecting the airport's terminal(s) to a regional transit system, which would otherwise meet the requirements of the 2004 PFC Policy; or
(3) calculating the difference between the cost of a line that bypasses the airport and the cost of a through-line configuration.

FAA has determined the proration methodology is the most straightforward and reliable methodology and, therefore, it should be the presumptive method used by the public agency. If, however, the public agency determines that using a prorated amount based on ridership methodology would not adequately estimate the eligible costs, the public agency may use one of the other methodologies. A cost analysis using another methodology should be supported with documentation of sufficient planning and defensible, conceptual cost estimates for FAA to make an eligibility determination. FAA may consider other cost eligibility methodologies on a case-by-case basis if unique circumstances warrant.

IV. Calculating eligible PFC funding using a prorated ridership methodology

Prorating the cost of a railway project serving an exclusive use, on-airport station and then extending to serve off-airport stations based on a forecast ratio of airport to non-airport ridership is generally the most straightforward and reliable methodology to use in

calculating the cost of the project eligible for PFC funding. Its reliability is based, in part, on its simplicity. The proration method looks only to ridership and avoids the consideration of hypothetical rail configurations; configurations that should be vetted for reasonableness in the first instance, and also that should be accompanied by reliable cost estimates. Because this methodology relies on a forecast of future ridership, the forecast should be based on reasonable assumptions. FAA will rigorously review the proposed forecast and applied ratio of airport to non-airport ridership.

In addition, FAA may seek advice from other Federal agencies as to the reasonableness of the forecast and may publish the forecast for public comment. Therefore, it is critical for the public agency to submit the forecast well in advance of submitting the PFC application. The public agencies using this methodology should make the forecast available during the public notice and air carrier consultation process. The burden of justifying the forecast is on the public agency.

V. Calculating eligible PFC funding using a cost analysis of a separate stand-alone people mover system

In limited circumstances, a public agency or FAA may conclude that a prorated ridership methodology does not adequately estimate the PFC-eligible cost of a project given local circumstances and considerations.

An alternative cost analysis could analyze the cost of a people mover system that connects with the regional transit system. The analysis should only include the capital development and related planning, environmental, and design costs of each option. The eligible cost is the cost of the through option not to exceed the cost of the hypothetical people mover system.

FAA will analyze, and make a determination based on, the materials in the airport's PFC application. Limiting costs for the analysis to those for capital development and related planning, environmental, and design costs ensures that the analysis is made consistent with PFC eligibility and allowable cost criteria in 14 CFR part 158. The burden of justifying the underlying assumptions and costs in this approach is on the public agency.

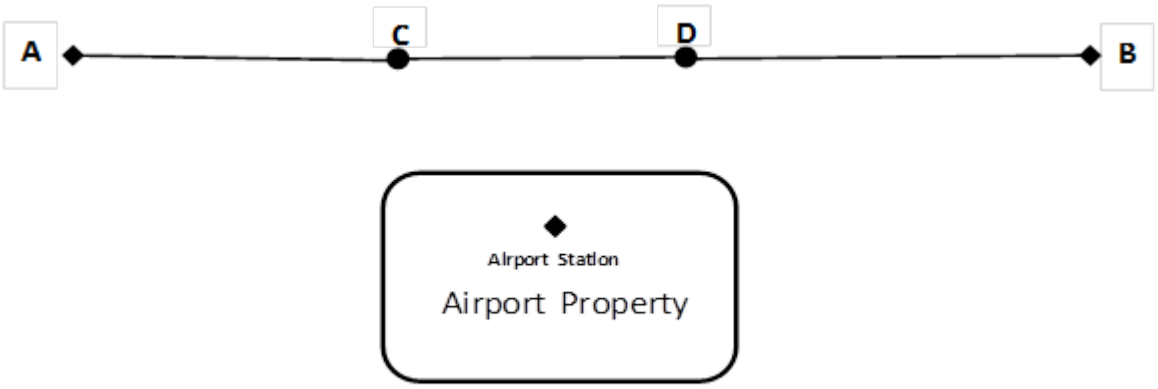
VI. Calculating eligible PFC funding using a calculation to determine the incremental costs of a railway that would benefit only the airport passengers and employees

A public agency may have better planning and cost detail from a metropolitan transit agency for a bypass option that does not serve the airport than it would for a separate people mover system serving the airport. In such instances, the public agency could use an approach that calculates those project related costs that are directly related to benefiting only the airport passengers and employees.

Detailed Discussion of Incremental Cost Alternative:

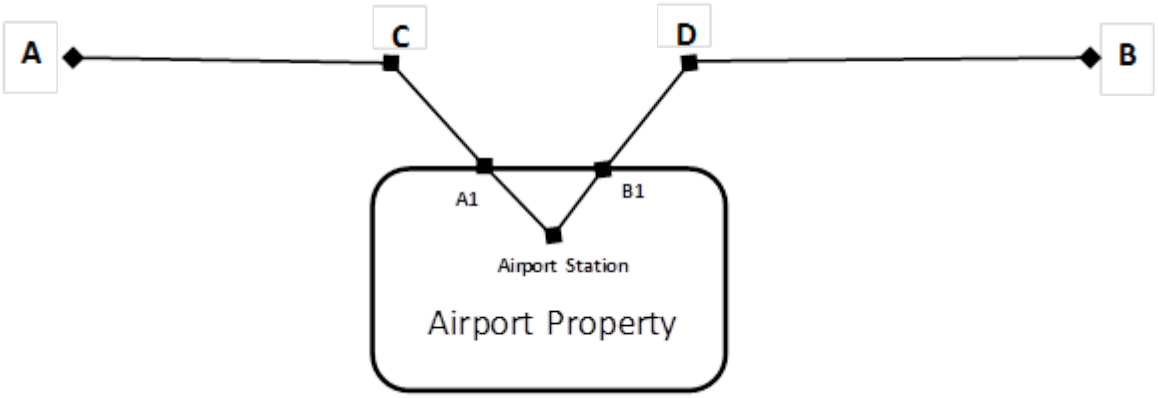
- For this alternative, FAA considers a rail line that bypasses the airport (C to D)

Track that Bypasses the Airport



- FAA then considers a proposed modification of that line which does serve the airport (C-A1-Airport Station- B1-D).

Track that Includes the Airport Station



- The cost difference between the two scenarios would be the costs specifically attributed to serving the airport passengers and airport employees (i.e., incremental costs). This cost difference is determined and that amount caps the eligibility. 14 CFR 158.13(a).
- The eligible amount then equals the costs of the on-airport property rail lines not to exceed the calculated cap (A1-Airport Station-B1).

The public agency should provide sufficient planning and cost detail for both options for FAA to determine the accuracy and reasonableness of the incremental costs. Such information should include cost elements such as the land or right-of-way acquisition

costs as well as the railway and supporting infrastructure costs. The burden of justifying the underlying assumptions and costs in this approach is on the public agency.

VII. Review of ridership forecasts

A key consideration in determining the PFC eligibility is the forecast of future airport and non-airport ridership for airport use rail access projects. FAA will evaluate, but not approve or disapprove, the forecasts provided by the public agency. FAA will consider the reliability of the forecast to complete the project evaluation. FAA will use the following considerations typically used by the Federal Transit Administration (FTA) when reviewing project forecasts:

1) the properties of the forecasting methods;
2) the adequacy of current ridership data to support useful tests of the methods;
3) the successful testing of the methods to demonstrate their grasp of current ridership;
4) the reasonableness of inputs (demographics, service changes) used in the forecasts; and
5) the plausibility of the forecasts for the proposed project.

FTA provides guidance on forecast methods and related review timelines on its website, https://www.transit.dot.gov/funding/grant-programs/capital-investments/travel-forecasts. Public agencies should consider the difficulty in accurately predicting airport versus nonairport ridership. If the forecast is not carefully developed and overstates airport ridership, it can result in the PFC revenue being improperly used for the prorated airport ridership cost, creating an unwanted subsidy. On the other hand, the forecast could underestimate airport ridership potentially underutilizing PFC funding. In determining a prorated ridership ratio, the forecast should only consider the ratio of airport to nonairport ridership to and from the airport terminal station and the next immediate off-airport station in both directions, not the entire railway ridership. To the extent possible, ridership forecasts should be supported with passenger surveys. FAA may consult FTA or other agencies in its review of ridership forecasts.

VIII. Rail Access and Airport Land Acquisition

In applying this policy, FAA will work to ensure that airports do not use PFCs to acquire land and expand rail access beyond what is eligible, adequately justified, and meets at least one PFC objective as per 49 U.S.C. 40117(d) and 14 CFR 158.15. PFC eligible costs are limited to on-airport, railway access projects. All PFC approvals are subject to evaluation under the National Environmental Policy Act. FAA already has safeguards in place to ensure that PFCs are not used to acquire land for rail access that is not for airport use. Further, airports are expected to ensure their airside needs are met before using PFC revenues for terminal and landside projects (49 U.S.C. 40117(d)(4)).

From:	Kirsten Uchitel
To:	Lauren Lee
Subject:	Amendment Comment
Date:	Friday, January 27, 2023 11:32:25 AM
Attachments:	NOP_and_ScopingLetter12_9_2022.pdf BullockToSANDAG_RE_ScopingTheSEIR_for RUC_RemovalRfromThe2021RTP.doc Ref1_AdoptedBikePedRUC_Resolution 22-01 3-14-22.pdf Ref2_RoadUseChargeLetter.pdf Ref3_MBullock-Plat-FP-EA-796315-Deriving_Climate_Stabilizing30March20-R3.docx Ref4_AG_LetterToSANDAG_2021.PDF Ref5_2020LDV_ClimateStabilizingVrsCARB_AWMA - Copy.pdf Ref6_2020PlatformClimate-TransV2.doc Ref7_DividendAccount2020v2.doc Ref8_BullockEUEC2021_ParkingOscCivicCenter.pptx Ref9_DividendAccountParkingRFI3.docx Ref10_ACE CEO Wants to Provide the Solution - Copy.pdf

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From: mike_bullock@earthlink.net <mike_bullock@earthlink.net>
Sent: Monday, January 9, 2023 2:09 PM
To: Kirsten Uchitel <Kirsten.Uchitel@sandag.org>
Cc: Hasan Ikhrata <Hasan.Ikhrata@sandag.org>; 'Mike Bullock' <mike_bullock@earthlink.net>
Subject: Scoping the SEIR for Removing the RUC from the 2021 RTP

Kirsten Uchitel, Associate Regional Planner
SANDAG
401 B Street, Suite
800 San Diego, CA
92101
Kirsten.Uchitel@sandag.org

Via E-mail: Kirsten.Uchitel@sandag.org
Subject: Scoping the SEIR for Removing the RUC from the 2021 RTP AND the NOP letter from SANDAG dated December 9, 2022.
Associate Regional Planner Uchitel,
I appreciate the opportunity to comment on the subject and the ***Notice of Preparation of Supplement to the Environmental Impact Report for the 2021 Regional Plan and Public Scoping Meeting Notice*** letter, dated December 9th, 2022. I have attached the letter, for the convenience of any reader of this email. It is the first attached file.
Please find attached my comment letter. It is the second attached file.
I have also attached all 10 of the letter's references. They are in order and named to show their reference number.
Thank you for your leadership in performing your critical work. Thank you for reading this material and for providing the comments and response. Please let me know if you would like to meet to discuss this letter or related topics.

Highest regards,

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054
760 421 9482

Former California Democratic Party Delegate, 76th Assembly District (author of 2 adopted resolutions and 5 Platform changes)
Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee (author of 5 adopted resolutions)

Final title before leaving Aerospace: ***Senior Staff Systems Engineer***

Air and Waste Management Association published and presented papers:
Author, ***The Development of California Light-Duty Vehicle (LDV) Requirements to Support Climate Stabilization: Fleet-Emission Rates & Per-Capita Driving***
Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***
Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

Quotes from the Secretary General of the UN:

1. We have a Code Red Climate Emergency
2. We are solidly on a path to an unlivable planet
3. We are driving towards Climate Hell with our foot on the accelerator
4. We are dangerously close to the point of no return

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054

January 10, 2023

Kirsten Uchitel, Associate Regional
Planner SANDAG
401 B Street,
Suite 800
San Diego,
CA 92101
Kirsten.Uchitel@sandag.org

Via E-mail: Kirsten.Uchitel@sandag.org
Subject: Scoping the SEIR for Removing the RUC from the 2021 RTP AND the NOP letter from SANDAG dated December 9, 2022.

SANDAG,

I appreciate the opportunity to comment on this important subject.

Introductory Comments

Removing the RUC from the 2021 RTP is a major change. As will be shown in this letter, there are many indications that it would be ill-advised. If the SEIR exposes this truth, the SANDAG Board could relent and the SANDAG staff could get on with the work of producing the 2025 RTP, with an improved RUC and implementing the 2021 RTP. The state RUC should be

- a replacement for the state gas tax,
- means based,
- designed to protect privacy,
- value-priced, with a dynamic congestion pricing algorithm to ensure free flow on at least some lanes, and
- implemented as soon as possible, in recognition of our 2030 climate stabilization requirement to significantly reduce per-capita driving (to be shown.)

The 2025 RTP could add in additional charging if needed in coordination with the state. Reference 1 has more information on why we need a RUC. It also describes many of the needed RUC characteristics. Reference 2 shows the strong support from the environmental community for a RUC.

As will be shown, doing a legal SEIR will require that SANDAG learn how to do an RTP that achieves the first-occurring climate stabilization requirement. Learning that will help SANDAG understand that the 5 Big Moves (the 2021 RTP) can be a framework allowing the changes we so desperately need. SANDAG will learn what is important (supporting climate stabilization at a livable level) and how it can be done.

Comments on the Subject (NOP) Letter

Project Description

SANDAG has not taken the physical reality of our climate emergency seriously and has not considered the fact, from the cumulative-effect standpoint (what would happen if all the RTPs did exactly what SANDAG's RTP does), that its work could be, and helping to cause our Earth's climate to destabilize. Climate destabilization is a process that, from a practical, human-survival standpoint, is unbounded in its harm to life on our planet. Human survival requires climate stabilization. That fact is relevant to your work because light-duty vehicles, or LDVs is the category that emits the most GHG, in our County, in our state, and in our nation. This information is not provided in the Project Description section.

Not taking the physical reality of our climate crisis seriously is shown in the letter's ***Project Description*** paragraph because it suggests to the reader (mostly by omission) that all that is important about this project is meeting the SB 375 targets, without even hinting to the reader that failing to reduce emissions from light-duty vehicles (LDVs) enough, in time, would have a potentially disastrous impact on our physical world and the prospect of human survival. That unmentioned impact, climate destabilization, is an "Environmental Impact" and there is no justification for ignoring it. How soon and by how much we must reduce our emissions to avoid climate destabilization is a question that can only be answered by climate scientists. Therefore, SANDAG has the responsibility to find and use the most accurate, fact-based climate stabilization requirements. Note the use of the word "requirement" instead of "target". Systems engineers and other serious problem-solvers write "Requirements Documents." They do not write "Targets Documents". "Targets" specified to ensure human survival should be renamed "requirements", by SANDAG.

Page 6 of Reference 3 shows that the first-occurring climate stabilization requirement is for the year of 2030. The second one occurs in 2045 and it is generally thought to be net-zero emissions. However, what happens in 2045 won't matter if our failure to achieve the 2030 requirement sets off climate-destabilization.

There is no reason to think that the CARB-provided, SB 375 targets support climate stabilization. The current state mandate for 2030 is 40% below our 1990 emission level. However, the state attempted to change this to 65%. That attempt failed in the State Senate by several votes. Reference 3 contains a calculation, based on a unambiguous statement in a reference document signed by our best climate scientists, that shows that the real value is 80%. What is SANDAG's determination

regarding the 2030 requirement? No one knows and that makes SANDAG's work in violation of CEQA law. Recall that the articles in the paper on the COP-25, COP-26, and COP-27 discussions refer to commitments to reduce GHG emissions in 2030. SB 375 is obsolete since its target year is 2035.

SANDAG has been ignoring the critical need to achieve climate stabilization for many years. They should have realized that climate stabilization is important when the State of California sued them in 2011. In Reference 4, the AG of California (Harris) states in Footnote 21:

> ***The DEIR therefore does not find the RTP/SCS's failure to meet the Executive Order's goals to be a significant impact. This position fails to recognize that Executive Order S-3-05 is an official policy of the State of California, established by a gubernatorial order in 2005, and designed to meet the environmental objective that is relevant under CEQA (climate stabilization). SANDAG thus cannot simply ignore it.***

What is relevant here is the point I have been making and that SANDAG has been ignoring: ***The environmental object that is relevant under CEQA is climate stabilization.*** And furthermore, SANDAG thus cannot legally continue to ignore it. In case some reader gains comfort from the fact that S-3-05 was designed, back in 2005, to support climate stabilization, It should be noted that S-3-05 is hopelessly out of date. GHG emission reductions that were hoped for back in 2005 have not taken place and our knowledge about anthropogenic climate change has improved. The S-3-05 requirement for 2050 we now know must now be achieved by the industrialized world by 2030.

How do we achieve climate stabilization? We avoid climate destabilization. And how do we do that? We achieve the climate-stabilization requirements: the one for 2030 and the one for 2045. As a practical matter, SANDAG only needs to focus on the 2030 requirement because the 2045 requirement will be relatively easy if we achieve the 2030 requirement.

EIR Scope

It says that a lead agency, like SANDAG, may prepare a Supplemental EIR when some conditions from CEQA Guidelines (Section 15162) require it, but only if ("and"):

> ***only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation***

The problem here is that SANDAG has kept itself and everyone else in the dark about where the 2021 RTP LDV emissions fall, relative to the 2030 climate-stabilization requirement. Therefore, as far as anyone relying on the current EIR knows, it may be

that removing the RUC causes the LDV emissions to move from less than the 2030 climate-stabilization requirement to more than the 2030 climate-stabilization requirement. If that is true, the cumulative effect principle means that the outcome would go from acceptable (climate stabilization), with the RUC, to catastrophic (destabilization), without the RUC. That would mean that what may have seemed like a minor change to the RTP would cause an enormous and catastrophic change in the environmental outcome. Later in this letter there are many reasons provided to conclude that removing the RUC is a very large and a very environmentally harmful change.

There is also the matter of illegality. The previous EIR ignored any mention of the environmental impact of climate destabilization. No one sued SANDAG over this omission. Does this mean that the previous EIR was legal? I assume that there is a time limit on when a suit can be filed and that the time limit has expired. Therefore, one might be required to act as if the previous EIR was legal. However, the previous EIR is getting changed. Does this mean that the illegal behavior (the behavior of ignoring climate destabilization) that resulted in the FEIR of the project with the RUC is acceptable in the SEIR for the project without the RUC? It is not, based on the words above. Illegal behavior that resulted in the original project cannot be allowed in the changed project, because of the word "adequately". Again, here are the key words from above with the highlight added:

> ***only minor additions or changes would be necessary to make the previous EIR <u>adequately</u> apply to the project in the changed situation***)

Since the environmental impact of destabilization must be considered, an SEIR is not appropriate unless it does an analysis of the project with and without the RUC, considering their impact on climate destabilization. No EIR or SEIR is adequate if it ignores the environmental impact of destabilizing the earth's climate. No one should think that SANDAG's geography is too small to matter to a global outcome. The principle of "cumulative effects" disallows that form of escapism. Like it or not, the SEIR scope must include a full analysis of the changed RTP's impact on climate stabilization.

Any sort of EIR must consider "Environmental Impacts" that are not trivial. Climate destabilization is tremendously impactful. An issue of *Scientific American* said that it would cause a "devastating collapse of the human population". One can reasonably assume that the direct cause of this collapse would be a loss of habitat, resulting in mass starvation, and that many species would suffer the same fate. This is not a trivial environmental impact.

Given all this, there is almost a comical aspect of the list of potential impacts and calling them "environmental resources", on Page 2. There are 19 of them listed, from

"Aesthetics and Visual Resources" to "Wildfire". The eighth one down is "Greenhouse Gas Emissions." That is an odd "environmental resource." More to the point, the listing hides the unique and disastrous outcome of increasing GHG. No other of the "resources" on the list will cause human extinction, except, for some of them, because they will themselves result in more GHG. GHG is a killer, because our current atmospheric CO2 level is 420 PPM, whereas before the industrial revolution started in was at around 280 PPM. We are in very dangerous territory.

This section is another example of how SANDAG is covering up the physical reality of our climate emergency and has apparently not considered the fact, from the cumulative-effect standpoint (what would happen if all the RTPs did exactly what SANDAG's RTP does), that its work could be helping to cause our Earth's climate to destabilize, a process that, from a practical, human-survival standpoint, is unbounded in terms of how bad it would get. Human survival requires climate stabilization.

More Facts About Why SANDAG Must Stop Ignoring Climate Destabilization

Here are some quotes from the Secretary General of the UN about our climate crisis:

1. ***We have a Code Red Climate Emergency***
2. ***We are solidly on a path to an unlivable planet***
3. ***We are driving towards Climate Hell with our foot on the accelerator***
4. ***We are dangerously close to the point of no return***

The "point of no return" refers to a point where a climate destabilizing process gets so large in magnitude that we have no way to stop it. We are "solidly on a path" to having that happen. The only way to get off that path is to achieve the 2030 climate-stabilization requirement. SANDAG needs to do the right thing, from both a moral and a legal standpoint.

Scope: The SEIR Must Correctly Assess the 2021 RTP with the RUC Removed

To adequately evaluate the change (RUC removal), climate destabilization must be considered for both the 2021 RTP with the RUC and for the 2021 RTP without the RUC. Pretending that climate destabilization can be ignored is never adequate and is never legal under CEQA. As clearly stated by the California AG back in 2011, repeated from above:

> ***The environmental object that is relevant under CEQA is climate stabilization.***

This brings up the question of how SANDAG could evaluate the climate stabilization impacts of the 2021 RTP with and without the RUC.

Here's how. To result in climate stabilization, an RTP must conform to a set of enforceable measures that would cause cars and light-duty trucks (LDVs) to achieve the 2030 climate-stabilization requirement. The only way to check such conformity is to have a plan that contains a set of enforceable measures that causes LDVs to achieve the 2030 climate-stabilization requirement and to have the derivation of the plan. The derivation would show the relationships between the measures and the resulting GHG emission level. The plan would also show the derivations of the relationships. No such plan is unique. Using the derivations and the relationships, any proposed RTP could be evaluated to see if it would reduce emissions enough to achieve the 2030 requirement. A plan could also be adjusted to achieve the 2030 requirement. The adjustments could take the form of adding mitigation measures or adjusting the plan's existing measures to increase their emission reductions.

But there is a problem. SANDAG has no such plan and does not know of a set of derivation that would make it relatively easy to evaluate plans for their climate stabilization impact.

If CARB has such a plan and set of derivations, they are not sharing it. They make authoritative statements asserting that electrification of LDVs cannot happen fast enough and that therefore we also need significant reductions in our per-capita driving. However, they do not share their work that makes that conclusion.

I have done the derivation and created a plan that would cause LDVs to achieve the 2030 requirement. It is Reference 3. It is peer reviewed and has been presented at many Air and Waste Management Association Conferences. For example, the following words were emailed to me from the AWMA:

> *On behalf of the Air & Waste Management Association (A&WMA) Technical Council, we are pleased to confirm that your abstract submission #796315, entitled "Deriving a Climate-Stabilizing Solution Set of Fleet-Efficiency and Driving-Level Enforceable Measures for Light-Duty Vehicles in California", has received a favorable review, and is accepted as a platform for presentation at A&WMA's 113th Annual Conference and Exhibition (ACE). The conference will be held June 29-July 2, 2020, in San Francisco, California. Your assigned session is entitled "Transportation Policies for Climate Change" and is preliminarily scheduled for Tuesday, 6/30/2020 between 1:30 pm-3:10 pm.*

Using the derivations, it would not be too difficult for you to evaluate the 2021 plan, both with and without the RUC. It would also show you how the 2025 RTP could be constructed to achieve the 2030 climate-stabilization requirement.

Documenting that the 2021 RTP EIR Did Not Consider the Impact of Climate Stabilization

Incorrect Primary Task

Chapter 1 introduces the 5 “Big Moves,” an approach which seems to reflect a recognition that we need fundamental change. However, before the strategies are identified, a falsehood is suggested. The falsehood it suggests is that the primary task is to enhance mobility while achieving “state and federal requirements”, regarding climate change and air pollution.

It says, regarding the 5 Big Moves (emphasis added in bold type):

> *These interdependent strategies are designed to address the greatest transportation and mobility challenges that we face: safety and traffic congestion, social inequities, and* ***state and federal requirements to reduce greenhouse gas (GHG) emissions and air pollution****.*

That statement shows a fundamental misunderstanding of the climate emergency that we face. By far, our greatest “mobility challenge” is to design and adopt a regional transportation plan (RTP) that will guarantee that the GHG emissions from *cars and light-duty trucks* (the “Light-Duty Vehicle” or “LDV” category called out in SB 375) will meet the climate-stabilizing requirements provided by climate science. The first climate-stabilizing requirement is for LDVs to emit GHG at no more than 80% below the level they emitted in 1990, by no later than the end of 2030 (Reference 3). If we meet the 2030 requirement, the later requirement will be relatively easy. The later requirement is to have LDVs and all other GHG emitters emit no more than what can be offset by carbon sequestration (AKA “net zero). This is the “net zero” emission level of 2045. Often, governments only speak of the “net zero” requirement of 2045 (or 2050, the older value), without mentioning the more-difficult 2030 requirement.

Primary Challenges Misstated

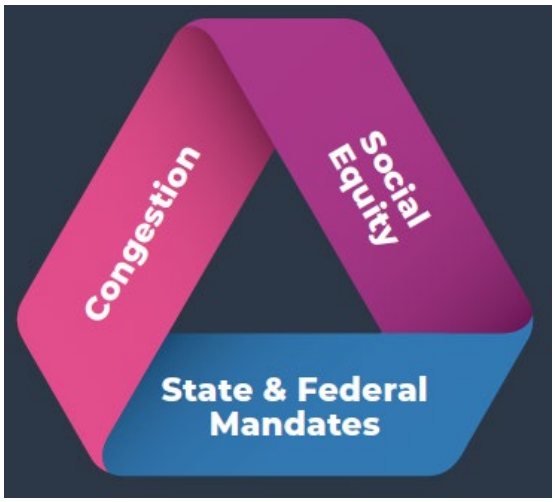
Figure 1 is from Section 1 of the EIR of the 2021 RTP (with the RUC). It is said to show our “three primary challenges”

Our *Code Red Climate emergency* is mankind’s primary challenge. It means that our *Region’s* primary challenge is to do its part to ensure that the emission of GHG from our LDVs in 2030 support climate stabilization. Their emissions must be 80% lower than they were in 1990.

Reference 3 shows how that can be done. We will need to significantly reduce VMT, as proven in Reference 3 and as will be shown in Table 1. When that is done, there will be no congestion and, given that fact, it is not correct to assert that *Congestion* is a primary challenge. *Social Equity* is a goal, like “*Democracy*” or “*Equal Opportunity*” that we must always move towards, as fast as we can. However, when “*Social Equity*” is discussed in the context of our Anthropogenic climate change problem, the harm of living close to pollution caused by our reliance on fossil fuels is often mentioned. That harm will be reduced and, in some cases (refineries will be closed) eliminated, if we meet our climate-change challenge. The largest “*Social Inequity*” would be climate destabilization because it would cause a “devastating collapse of the human population” to quote from the June 2008 issue of *Scientific American’s* article, *Ethics and Economics of Climate Change*. Many reliable sources write that human extinction will be an outcome of climate change failure, which is the path we are on now. This will be the ultimate *inequity* if it happens and make no mistake, it will probably happen.

Climate destabilization, as described in Reference 3, will end most life forms (not microbiology perhaps, however) and almost certainly our own species. This environmental impact must be fully explained in a legal EIR or SEIR. The EIR for the 2021 RTP has no such discussion or explanation.

Figure 1 The DEIR's Erroneous Claim of "Three Primary Challenges", for our Region



Need to Reimagine

Chapter 1's Page 7 statement that there is an "urgent need to reimagine our regional transportation system" is correct.

Reimagine Example Left Out

That is one of the places (Chapter 1's Page 7) where SANDAG should state that we must stop widening freeways. Instead of widening freeways, as called for in the current, fatally flawed, version of the *Transnet* sales tax, we should be reducing the size of our freeways. The well-understood principal of *Induced Traffic Demand* informs us that adding more lanes will not reduce congestion, but it will increase VMT. *Induced Traffic Demand* also informs us that removing lanes will not increase congestion, but it will decrease VMT. As shown in Reference 3 and Table 1 of this letter, we must reduce VMT. The *Transnet Ordinance* can be changed in an emergency. We have an emergency.

Vision, Goals, Strategies, and Actions Are Useless if Our Earth's Climate is Destabilized

Page 13 starts a discussion which seems to be written for some other planet or for some other time on our planet. Climate destabilization would lead to a collapse of our human population and eventual extinction. Therefore, Page 13's

- *Vision, Goals, Strategies, and Actions*

must be replaced with

- *A Requirement, Vision, Goals, Strategies, and Actions*,

The *Requirement* is to ensure that our transportation system supports the climate-stabilization requirement of 2030, as shown in Figure 4 of this letter. Reference 3 shows how this can be done, for LDVs. Most of the fleet-efficiency requirements are shown in Table 1 of this letter. (All of the needed fleet-efficiency requirements are described in Reference 3.) Table 1 also shows the driving reduction that is computed in Reference 3. It is a 32% reduction in per-capita VMT, with respect to year 2005. It's expressed using the SB 375 conventions for expressing driving reductions. Even though SB 375 states that it is about a *GHG* reduction, it is really about a *VMT* reduction, because SB 375 clearly states that the Metropolitan Planning Organizations (MPOs, like SANDAG) can take no credit for GHG reductions accomplished by the state. The state has the fleet-efficiency responsibility. The Metropolitan Planning Organizations (MPOs, like SANDAG) have the responsibility to reduce driving. Therefore, the SB 375 reductions in LDV GHG must be produced by SANDAG measures to reduce LDV VMT. In other words, SANDAG's responsibility is to reduce driving.

The Fatal Flaw of Not Saying What's Important

On Page 13 of Chapter 1 of our 2021 RTP, it says, "The 2021 Regional Plan reduces per capita GHG emissions from cars and light duty trucks by 20% below 2005 by 2035". The document does not say whether-or-not this is enough to support climate stabilization. Tragically, it is *not* enough to support climate stabilization. The 2030 climate-stabilization requirement is derived in Reference 3 and is shown in Figure 4 of this letter.

Similarly, Chapter 1 lists key goals, policies, and Executive Orders that were considered. They are shown here in Figure 2.

The problem is that the document is supposed to be sufficient to support an EIR, which is to say it must report on the environmental impacts of what is being done. The environmental impacts are what will happen in the physical world, not in the legislative or judicial world. To figure out what will happen in the physical world, the resulting emissions need to be compared to what the climate scientist are telling us we must accomplish if we want to stabilize the climate at a livable level.

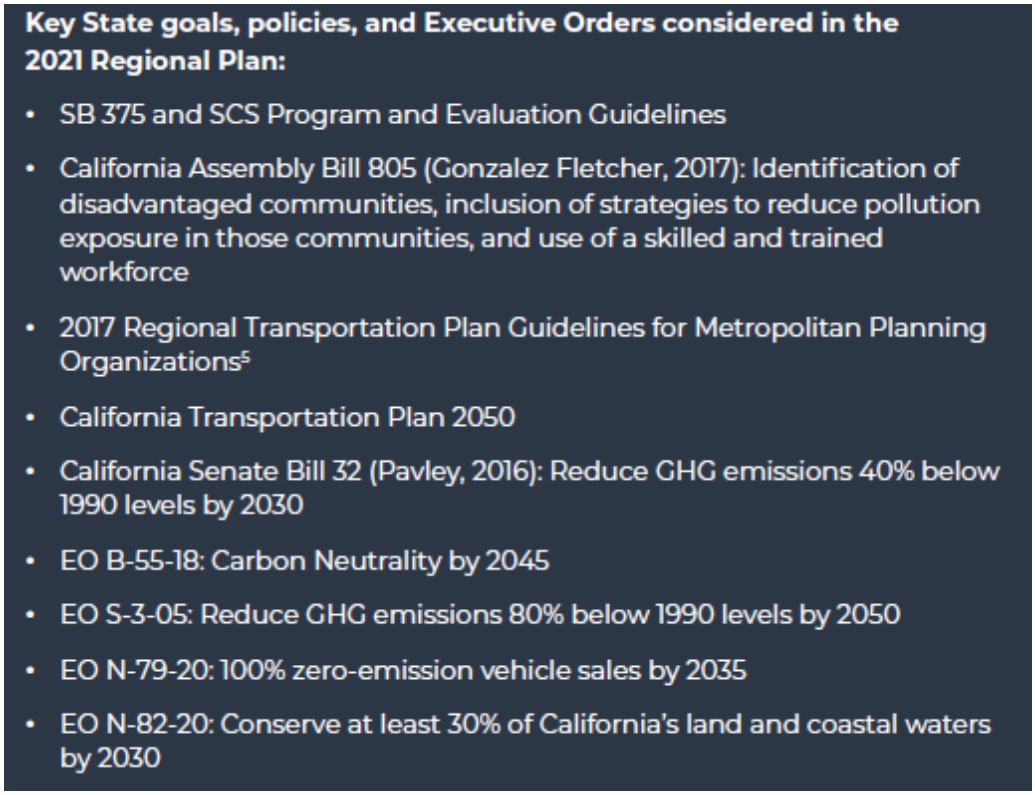
That information is nowhere to be found in the current 2021 RTP or its DEIR. That is clearly illegal because the decision makers and the public need to understand what will happen to our planet if all transportation planning followed the path described by SANDAG as in the "cumulative effects" consideration.

The "cumulative impacts" consideration means that no one can get by using an argument that a discretionary project being considered is "too small to matter".

Figure 2 is an admission of guilt (climate-stabilization failure) because it is described as containing SANDAG's "key goals". No climate-stabilization requirement is listed. SANDAG might be, technically, within CEQA law for the 2045 to 2050 requirement of zero net emissions because this happens to be covered by the EO B-55-18 executive order. However, SANDAG needs to state that zero net emissions by 2045 is our second climate-stabilizing target and that is covered by EO B-55-18. Where SANDAG

clearly is in violation of CEQA law is that it does not state that the industrialized world's first climate-stabilization requirement (target), which is for 2030, is to emit GHG at no more than 80% below what we emitted in 1990, as is derived in Reference 3 and shown on Slides 10 and 11 of Reference 5. SANDAG needs to redo its RTP using a Plan like that shown in Reference 3, besides doing a revised EIR for the 2021 RTP and an SEIR for the 2021 SEIR with the RUC removed.

Figure 2 SANDAG's Admission of Climate-Stabilization Failure Because These Do NOT Cover Achieving the Industrial World's 2030 Climate-Stabilizing Target.



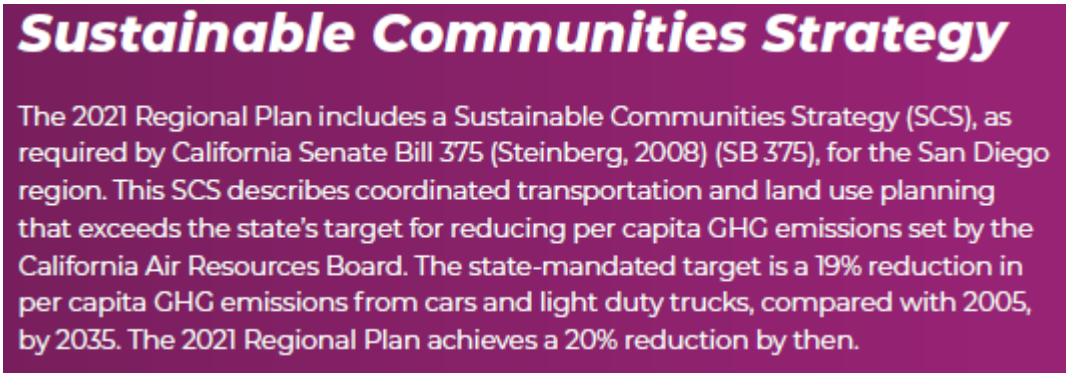
Achieving the industrialized world's 2030 Climate-Stabilizing Requirement would obviously be a "Key policy" and accomplishment for SANDAG. Figure 2 and the stated organization of the DEIR means that there is no need for me to read further to know that SANDAG has made no effort to consider what it would take for the RTP to conform to achieving the 2030, climate-stabilizing requirement. Page 13 of Chapter 1 of the 2021 RTP presents the RTP's Visions and Goals. There is nothing there about stabilizing the climate at a livable level. That is shown in Figure 2, which is taken from Chapter 1 of the RTP.

Also, Chapter 2 is defined by what is written on Page 15 of Chapter 1. It says there that Chapter 2, the Transportation Plan's Regional Sustainable Community Strategy

(SCS, which is required by SB 375), describes “the land use strategies, and programs that will achieve our Vision and Goals.”

Chapter 1 of the 2021 RTP describes SANDAG’s “Vision and Goals”. None of them include achieving the 2030 climate-stabilizing requirement, or “target”.

Figure 3 SANDAG’s Admission of Climate-Stabilization Failure, Because These Statements, From Page 19 of the RTP’s Chapter 2, Show that the SCS Does Not Come Close to Achieving the Industrial World’s 2030 Climate-Stabilizing Target.



The title of this letter’s Figure 3 is true because Reference 3 shows that even with an extremely aggressive schedule of fleet electrification (such as 70% of new car sales be for electric cars, by 2024, as shown in Table 1 of this letter), the per-capita driving reduction needs to be 32% by 2030, which is far larger than the 20% by 2035 documented in Figure 3. Because SANDAG cannot take credit for fleet efficiency improvements, the phrase “GHG Emissions”, used in Figure 3, is actually “VMT”.

The 2021 RTP’s Chapter 3 covers financing. The 30 appendices provide the details and background of how the “Vision and Goals”, which do not include the 2030 climate-stabilizing requirement, are achieved.

How to Design an RTP that Contributes to Climate Stabilization

RTPs that achieve the 2030 requirement must be built using the mathematical relationships that that connect the fleet efficiency in year 2030 and the per-capita driving in 2030 with the 2030 climate-stabilization requirement. The math must also account for the percent of our electricity that is renewable, in 2030.

Therefore, the math must derive the following two items:

- So-called, “fleet efficiency” (CO2 emitted per mile of all the LDVs on the road, for a given year), given the percent of electricity that is from renewables) and
- per-capita driving

that will, taken together, achieve the “80% below 1990 level by 2030” requirement.

The peer-reviewed Reference 3 does this. It shows 4 cases of fleet-efficiency requirements and the per-capita driving that could be allowed, given the 2030, climate-stabilization requirement stated above.

For the benefit of readers that don't want to look at Reference 3, here is Table 1, showing the primary results of 4 cases:

Table 1 4 Cases that Support the 2030 Climate-Stabilizing Requirement

Note: Purple denotes difficult; red, impossible.

	Case Designations			
	Balanced_1	Balanced_2	2005 Driving	Mary Nichols
% Renewable Electricity	85.0%	90.0%	90.0%	90.00%
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	20.0%	15.0%	82.0%	12.35%
% ZEVs, Year 2022	35.0%	25.0%	97.0%	14.76%
% ZEVs, Year 2023	55.0%	45.0%	99.0%	17.18%
% ZEVs, Year 2024	80.0%	70.0%	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	32.0%	32.0%	0%	50.5%

37

We are falling behind in our sales of ZEVs. The plan needs to be updated to reflect on that failure. The problem with having no plan is that we will almost certainly fail since it is always politically easier to do less. Without understanding the consequences, doing less will be selected. The only difference between the "Balanced_1" case and the "Balanced_2" case is that the percentage of electricity that is from renewables goes from 85% to 90%. That improvement allows the per-cent of new cars that are ZEVs to increase at a less-difficult pace.

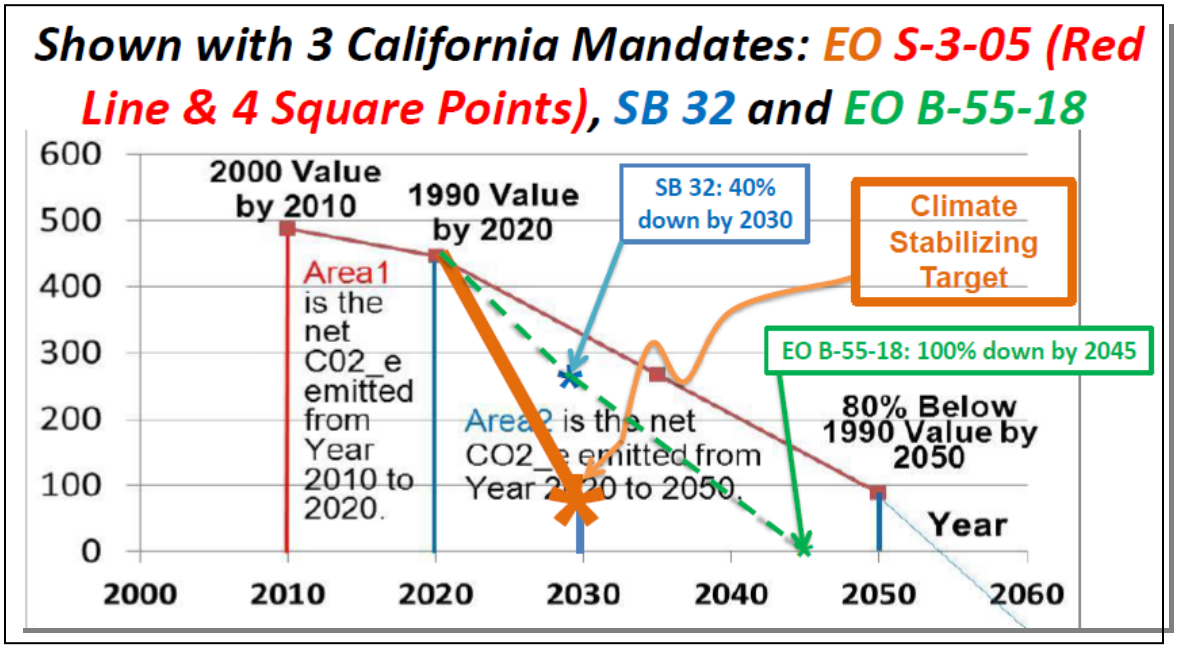
The "2005 Driving" case is done to prove that it is not feasible. It proves that we must reduce driving. CARB now says the same thing, but they do not show how they reached that conclusion.

The Mary Nichols case is based on published statements made by the retired CARB Chair. CARB may not understand the need for the more difficult 2030 requirement of

80% below 1990 by 2030. Therefore, former-Chair Nichols probably did not understand that her fleet-electrification schedule would need per-capita driving to drop 50.5%, which would be very difficult. CARB and the state of California officials working on this problem may have been thinking that if we achieve the net-zero requirement by 2045, the earth's climate will not destabilize. In any case, SANDAG cannot go along with such misinformation.

The derivation of the 2030 climate-stabilizing requirement (target) is shown on Page 6 of Reference 3. Reference 5 is used to present Reference 3. The derivation of the 2030 climate-stabilizing requirement (target) is shown on Slides 11 and 12 of Reference 5. That result is shown here in Figure 4, where it can be contrasted with the inadequate state mandates.

Figure 4 The 2030 Climate Stabilization Target Compared to State Mandates



It should be noted that Reference 3 is exactly what the most important environmental-advocacy organization in California, the California Democratic Party (the CDP, AKA the CADEM), has in its Platform. The Party Platform is their official policy. This can be seen in Reference 6, where it says, "*Demand a state plan specifying how cars and light-duty trucks can meet climate-stabilizing targets by defining enforceable measures to achieve necessary fleet efficiency and per-capita driving limits*."

SANDAG has no such Plan. Given our climate emergency, any project that needs an EIR, that has to do with driving, needs such a Plan. If any discretionary project that has to do with driving needs an EIR, such as the RTPs being considered here (with and without a RUC and perhaps a third which can be shown to achieve the 2030

requirement) cannot be shown to conform to such a Plan, then it must be assumed to be contributing to climate destabilization.

Critical Information for Any Regional Transportation Plan (RTP)

Many of the fatal errors of Chapter 1, and the 2021 RTP/EIR in general, can be attributed to the RTP not accounting for the parameters of humanity's Code Red Climate Emergency, as if those parameters play no role in writing an EIR for the 2021 Regional Transportation Plan, with or without the RUC.

At the front of any 2021 RTP's EIR, the information shown in Figures 4 through 7 should be included and accounted for.

Figure 4 shows the climate-stabilizing target for 2030. Figure 5 shows the rise of the world's atmospheric CO2 over the last 50 years.

Figure 6 shows both the

- atmospheric temperature (averaged over a year and averaged over the earth, derived from an isotope analysis) and
- atmospheric CO2 (from air bubbles in ice-core samples),

over 800,000 years. It could be noted that our species is only around 300,000 years old.

Figure 6 shows that when climate deniers say that climate is always changing and so therefore climate change is natural, they are correct, except for one important fact. There is nothing natural about the outrageous, recent run-up of atmospheric CO2, to over 420 PPM, in such a short time shown on the far-right side of Figure 6. The slope is so steep that it appears to be an instantaneous spike, on the far-right side of Figure 6.

Figure 7 shows just 1% (which is 1,000 years) of the distance on Figure 6, from current time to the first 100,000 years into the past. For Figure 7, the conventions have been switched: the red line is the earth's atmospheric CO2 and temperature is the blue line. Figure 7 shows that the CO2 spike is the result of our combustion of fossil fuels because its beginning coincides with the start of our industrial revolution. Figure 7 covers the time of the development of our civilization. It shows that everything was normal until about 150 years ago, which is the start of our industrial revolution, when we started to burn fossil fuels. By doing extensive calculations, we know how much CO2 we have produced from the combustion of fossil fuels. Then, by directly measuring the atmospheric CO2 and the acidity of the oceans, we know where that CO2 currently resides. We also know that atmospheric CO2 traps heat. There is no doubt that we have an Anthropogenic Global Warming (AGW) catastrophe in the making. We are living in a spike of CO2. Neither the magnitude nor the slope have occurred in millions of years. Achieving climate-stabilizing requirements (targets) is our only hope.

It should also be clearly stated that LDVs, by far, emit more GHG than any other category of emission. Electricity emits the 2nd most. However, there is a good chance that we can achieve the 2030 climate-stabilization requirement that is derived in Reference 3 and 5 (shown in Figure 4) for the category of electricity. Unfortunately,

that cannot be said for LDVs. The implementation of the plan specified in Reference 3, or some other similar plan, is our only hope, for LDVs.

Figure 5 Atmospheric CO2, Increasing Over Recent Decades

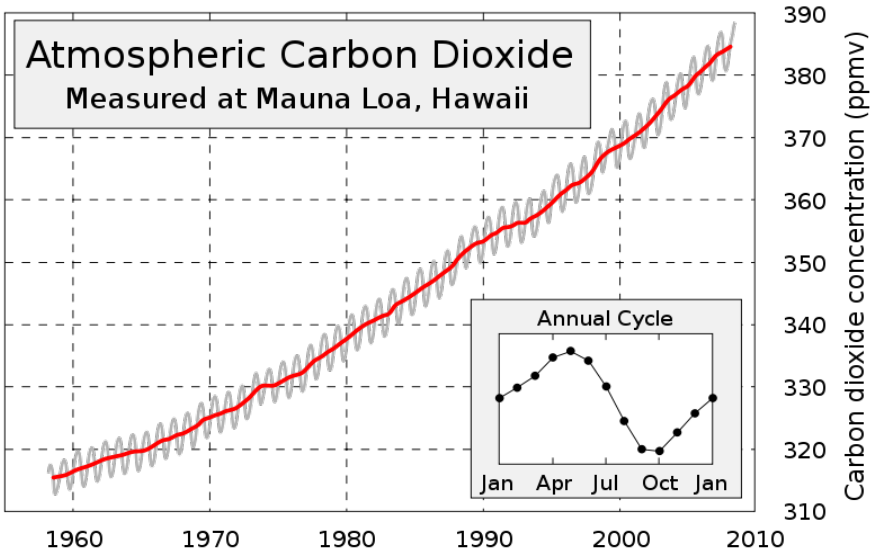


Figure 6 Atmospheric CO2 and Mean Temperature, from 800,000 Years Ago, with Current CO2 Spike

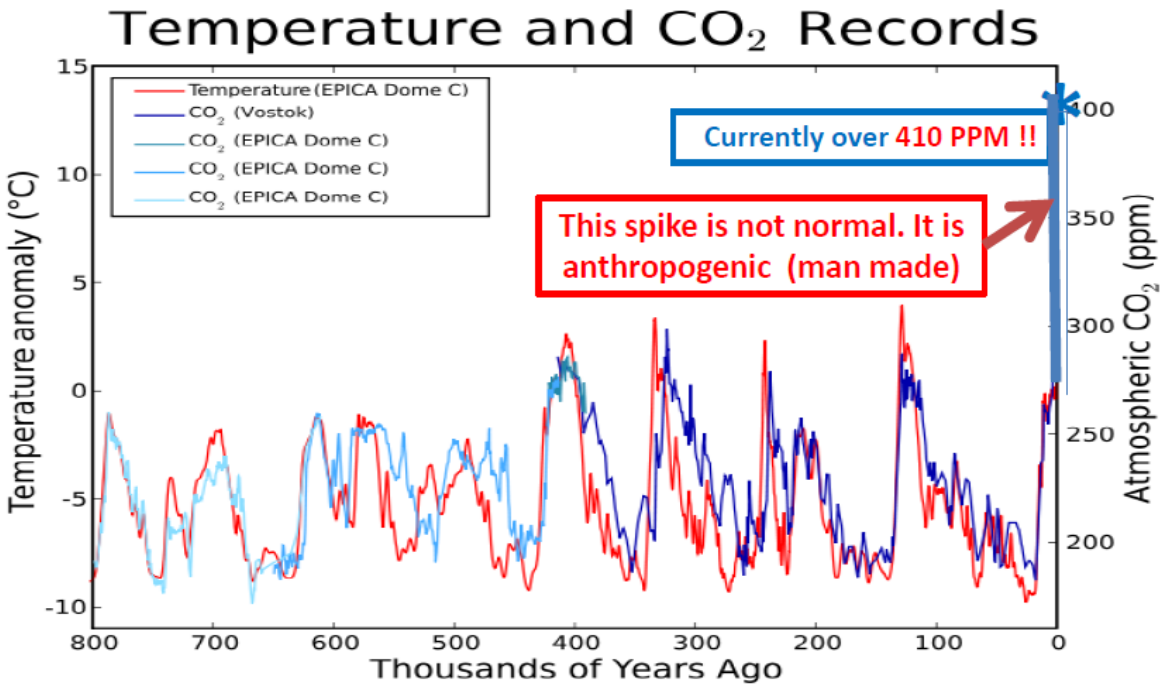
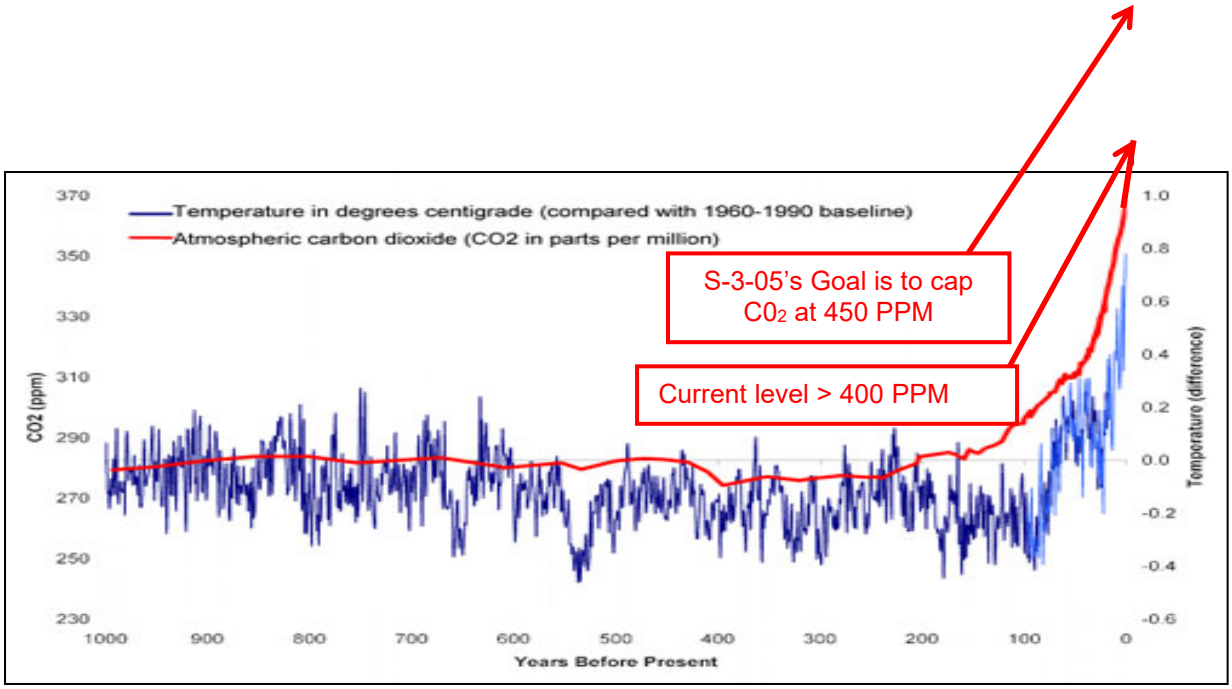


Figure 7 **Atmospheric CO2 and Mean Temperature, Over the Last 1,000 Years**



Measures to Reduce 2030 Driving

The 2030 climate-stabilizing requirement that is shown above in Figure 4 and is described repeatedly in this letter can be achieved by LDVs. To do that requires using a set of aggressive, fleet-efficiency mitigation measures, that are defined in Reference 3, and a set of driving-reduction mitigation measures, that are identified in Table 2 and described in Reference 3.

The first line of Table 2, "Legislated (SB 375) Plans to Reduce Driving" reflects an assumption that the RTPs in California, which are often required to achieve around 19% by 2035, will achieve 12% by 2030.

The second line of Table 2 is a well-done RUC. SANDAG's 2025 RTP should include a state RUC that replaces the state gas tax, is means based, and has the other characteristics that are shown in Reference 1.

The third line of Table 2 is a measure that SANDAG could implement for its own employees, using a third-party vendor that will then work hard to earn the trust of SANDAG employees, so that the vendor can cite that trust and use it to sell the car-parking system to other employers that want to do the best they can for their employees and want to be recognized for their commitment to sustainability. The car parking system would unbundle the cost of parking with a fully automated car parking system that provides earnings to those that are losing money because the parking is being provided or to those for whom the parking is built. The same car parking system

works for all types of parking, although the algorithms that compute earning differ by type, such as on-street, and the various categories of off-street such as employee parking, parking at apartments, parking at shopping centers, parking at mixed use developments, parking at transit station, parking at big box stores and grocery stores, and so on. The parking system is fully described in References 7 and 8.

Table 2 Enforceable Measures to Reduce 2030 Per Capita Driving By 32% With Respect to 2005 Per Capita Driving

California designs and implements this

Local governments do this with a 3rd party vendor

Driving-Reduction Requirments	Per-Cent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Value-Priced Parking (Unbundling the Cost)	8%	0.92
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
*Pay-to-Graduat*e Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		**0.68**
% Reduction		**32%**

Reference 7 defines Table 2's 3rd line's Value-Priced, car-parking system for all types of parking and even includes a congestion-pricing algorithm. Reference 8 describes the system with an emphasis on employee car parking and how the system could earn extra money for all employees. Reference 9 is a Draft *Requirements Document* that would support an RFP process to identify the best 3rd party vendor to design, install, and operate the car-parking system. The selected 3rd party vendor would also be good at financing, building, and operating solar canopies; selling electricity to energy districts; and financing, building, and operating charging stations. These tasks need to be added to Reference 9. SANDAG and other MPOs need to lobby California to identify a vendor to design and implement such a system, ASAP. SANDAG and our municipal governments could have a vendor do this for their employees. The technology is ready. The Executive Director of ACE Parking has reviewed the parking system described in References 7 and 8. Reference 10 documents that he interested in providing this solution.

Consideration of the EIR for the 2021 RTP

If the SEIR is going to be "adequate", it must correct the errors in the EIR that it is building on, before considering the change. This section presents some of the problems with the EIR for the 2021 RTP.

Executive Summary

Table ES-1, *Summary of Environmental Impacts and Mitigation Measures*

The GHG-3 line says:

> ***GHG-3 Conflict with or impede achievement of an at least 30% reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016)***

There are no mitigation measures and yet the "Level of Significance After Mitigation" is shown to be "Less-than-significant impact in 2035."

California did not meet its 2020 EO S-3-05 target, which was our 1990 emission level, until around 2019. (This was a case were California achieved a target early.) Therefore, our emission in 2016 exceeded our 1990 level of emission. Therefore, only achieving a "*30% reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016)*" would be an unmitigated environmental disaster. If other MPOs followed this example, we would be unable to stabilize our climate because we would be well past our (the industrialized world's) 2030 climate-stabilizing requirement, of 80% below our 1990 level.

The line for GHG-5 is too vague, in terms of mitigation measures. To have any hope of achieving significant reductions by 2030, measures need to be mature enough to start soon. The mitigation measures shown in this line are little more than wishful thinking. As San Diego County Superior Court Judge Taylor wrote in a ruling in favor of the plaintiffs in their CEQA complaint against the County's woefully inadequate Climate Action Plan, "enforceable measures are needed now". That ruling was issued 9 years ago. SANDAG too often does not listen to me or others that urge enforceable measures that can be started now.

SANDAG instead seems to like words like (these are also from the GHG-5's, "mitigation measures"):

> *TRA-2 Achieve Further VMT Reductions for Transportation and Development Projects*",

How would that be done? The "measure" is too ill defined to have any value.

Alternative 3 should be improved upon to conform with Reference 3 and then implemented as fast as possible. TRANSNET need to be modified to align with the improved-upon Alternative 3.

The Proposed Plan's 2035 reduction of 20% is so small that it would help to bring about an environmental disaster.

Phased Next OS Network Improvements and Investments, Page 2-66

Considering our 2030 climate-stabilization target and the derivations of Reference 3, the car-parking system described in References 7 through 9 needs to have numerous successful implementations and be well on the way to being widely implemented by 2025. The words “dynamic curb management”, for 2035, is not encouraging. The car-parking system proposed by this letter and since 2010 by this author certainly includes dynamic curb management. However, SANDAG needs to reach out to get help on this important aspect of the Next OS. I hope we can meet soon.

Likewise, on Pages 2-66 to 2-67 and on Page 2-71 to 2-72, there are hopeful signs that SANDAG could help to foster the changes we need. I would love to meet to discuss these topics.

Climate Change Destabilization Could Include our Weather

Page 3-1 has a description of our current climate and how climate change could change our weather. It needs a statement that destabilization of climate systems (such as the melting of our permafrost or unleashing large amounts of methane from beneath our artic region, or burning up an enormous expanse of forests, including our Amazon rain forest) could cause much larger variations if these destabilizing systems accelerate and set off other climate-destabilizing systems. The freeze experienced by Texas and measurement of 120 Degrees in Canada show that, when it comes to climate, we are already in uncharted territory. The description of San Diego County’s “current climate” needs a statement that, given the fact that our atmospheric CO2 is at 420 PPM, when it should be at 280 PPM, we really don’t know what might be possible, in terms of current weather.

Mitigation Measures for *Existing* Development

On Page 4-3, it says, “The EIR includes three broad types of mitigation measures: (1) plan- and policy-level mitigation measures assigned to SANDAG; (2) mitigation measures for transportation network improvements and programs, assigned to SANDAG and other transportation project sponsors; and (3) mitigation measures for development projects implementing regional growth and land use changes, which local jurisdictions implement.”

This will be too little too late, and it is an arbitrary decision to do what is easiest. It does not make sense, given the fact of our Code Red Climate Emergency, as explained in this letter. For example, TDM (Transportation Demand Management) Ordinances need to apply to *existing* developments. SANDAG should provide no help to municipal governments that fail to have a powerful TDM plan for their own employees, to set an example, for other employers. The TDM would include the car-parking system described in Reference 7 through 9. SANDAG should do this for their own employees, ASAP, using Reference 9 to start the generation of a Systems Definition document to support an RFP process to identify a good 3rd party vendor.

4.8’s Paragraph on “Global Climate Change”

This paragraph needs to quantify what we have done to our earth’s atmospheric level of CO2_e. We should be at 280 PPM. We are at 420 PPM. This letter’s Figures 5, 6,

and 7 should be included. The text should make it clear that we are living in a dangerous CO2 spike.

The paragraph should make the difference between climate change (before the spike) and Anthropogenic climate change (within the spike) clear to the reader.

Thank you for including the 280 PPM and 413 PPM (in 2020) levels in the paragraph on Carbon Dioxide. This needs to be elevated to the first paragraph with the plots. The plot of 800,000 years, showing how outrageous it is that we have created the spike of CO2, needs to be shown.

The discussion at the top of Page 4.8-6 should introduce the reader to the concept of "destabilization" or going over a "climate tipping point" or a "climate cliff." It is a lie by omission to not state that we are in line to experience a devastating collapse of the human population, leading to extinction. Our Code Red Climate Emergency should not be hidden. We are in great danger. Some say climate change is an existential threat. In fact, it is a near certainty that anthropogenic climate change will end our existence. Theoretically we could still stabilize the climate at a livable level. We should not give up. However, given what is needed by 2030, along with the public's general disinterest in the details, it is highly unlikely we will avoid climate destabilization, and this will lead to our demise.

Section 4.8: Greenhouse Gas Emissions

4.8.4 Significance

CEQA's Appendix G asks as follows:

> *VII. GREENHOUSE GAS EMISSIONS. Would the project:*
>
> *a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

Considering cumulative effects of the proposed RTP, the answer is yes, especially for LDVs. The next question about conflicting with an applicable plan does not matter, given the result of the "letter a" criterion.

Section XVII also applies because it explicitly mentions cumulative impacts and asks:

> c) *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

Nothing short of a full exchange of nuclear weapons could be worse for people than climate destabilization.

From OPR's Reference 9 with emphasis added:

> Each public agency that serves as a CEQA lead agency should develop its own approach to performing a climate change analysis for projects that generate greenhouse gas emissions. A consistent approach should be applied for the analysis of projects, and the analysis must keep pace

> with scientific knowledge and regulatory schemes. (*Cleveland National Forest Foundation v. San Diego Assn. of Governments*, *supra*, 3 Cal.5th at 519.) For these projects, compliance with CEQA entails three basic steps: identify and quantify the greenhouse gas emissions; determine the significance of those emissions **in the context of climate change**; and if the impact is found to be significant, identify alternatives and/or mitigation measures that will reduce the impact below significance.

"In the context of climate change" means that the climate science must be applied to the situation. From that, to be legal, a project that will have significant impacts on driving, including its feasible (technologically possible and cost effective) mitigation measures, must conform to a plan showing how LDVs can achieve our climate-stabilizing targets, especially our 2030 target because it occurs so soon. This again shows the importance of Reference 3 or some other such Plan.

Thank you for Tables 4.8-7 and 4.8-8 showing the importance of reducing VMT.

Table 4.8-9 is key. However, its results are insufficient to support climate stabilization. Reference 3 shows we need a 32% value by 2030, which is 5 years sooner than 2035.

Figure 8 shows that the DEIR does not consider what the climate scientists are telling us, which is what we must achieve to stabilize the climate at a livable level. The state mandates shown are not enough to achieve our 2030 climate-stabilizing requirement, which is to emit at a level that is no more than 80% below our 1990 emission level.

Figure 8 SANDAG's DEIR Section on GHG Does Not Consider Achieving the Industrial World's 2030 Climate-Stabilizing Target.

7.2.9 GREENHOUSE GAS EMISSIONS

Compared to existing conditions, the proposed Plan's GHG emissions would decrease for all horizon years (2025, 2035, and 2050). Under maximum theoretical buildout conditions, regional growth and land use change would result in some increases in GHG emissions, but there would still be net decreases compared to existing conditions.

Development under the maximum theoretical buildout scenario would likely continue in a similar pattern as under the proposed Plan, which encourages compact development, supporting rather than impeding adopted Climate Cation Plans (CAPs), GHG reduction plans, and/ or sustainability plans relevant to the proposed Plan. Because 2030 GHG emissions under the proposed Plan are higher than the AB 32-based regional reference point, emissions under maximum theoretical buildout are expected to continue to exceed this reference point, which would be a significant impact related to conflicts with AB 32.

Under maximum theoretical buildout, development would likely continue in a similar pattern as under the proposed Plan, which encourages compact development, although per capita GHG emissions from passenger vehicles would somewhat increase. However, the maximum theoretical buildout scenario would likely still achieve, and not conflict with, Senate Bill (SB) 375's per capita GHG emission reduction targets set by the California Air Resources Board (CARB) for the San Diego region.

The proposed Plan would be inconsistent with the State's ability to achieve 2045 and 2050 reference points of net zero and 5.2 million metric tons of carbon dioxide equivalence ($MMTCO_2e$), respectively (based on the goals of Executive Orders S-3-05 and B-55-18). Because GHG emissions would be higher under maximum theoretical buildout, these inconsistencies, which are a significant impact, would be worse. As with the proposed Plan, this would be reduced with the mitigation identified in Section 4.8, *Greenhouse Gas Emissions*, but impacts would remain significant and unavoidable.

The second paragraph states that the 2030 emissions under the proposed Plan are higher than the AB 32-based regional reference point. Figure 4 of this letter shows that this means the 2030 value is worse than the SB 32 value (40% down from the 1990 value) which is much more emission than the climate-stabilizing value of 80% down.

CARB Scoping Plan Comments Regarding the Need to Reduce VMT More Than Specified in SB 375 and The Need for a RUC

The following statements are from the recently completed CARB Scoping Plan https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf . They show that it is very ill-advised to remove the RUC from the 2021 RTP because, as shown in Reference 3, it is critical that we reduce VMT.

Footnotes have been deleted; highlights and notes have been added

> ***Vehicle Miles Traveled***
> ***Transforming the transportation sector goes beyond phasing out combustion technology and producing cleaner fuels. Managing total demand for transportation energy by reducing the miles people need to drive, daily, is also critical as the state aims for a sustainable transportation sector in a carbon neutral economy. Though GHG emissions are declining due to cleaner vehicles and fuels, rising VMT can offset the effective benefits of adopted regulations. Even under full implementation of Executive Order N-79-20 and CARB's Advanced Clean Cars II Regulations, with 100 percent ZEV sales in the light-duty vehicle sector by 2035, a significant portion of passenger vehicles will still rely on ICE technology, as demonstrated in Figure 4-2 above. Accordingly, VMT reductions will play an indispensable role [Bullock's note: Reference 3 shows that the per-capita reduction in VMT, with respect to 2005, the SB 375 reference year, is 32%! Note that our population in 2030 will be considerably more than it was in 2005. We have wasted a lot of money on freeway expansion and have more lanes than we had back in 2005.] in reducing overall transportation energy demand and achieving the state's climate, air quality, and equity goals. [Bullock's note: I wonder if climate stabilization plays a role in setting these "goals". In other words, is human survival valued by CARB?] After a significant pandemic-induced reduction in VMT during 2020, passenger VMT has steadily climbed back up and is now closing in on pre-pandemic levels. Driving alone with no passengers remains the primary mode of travel in California, amounting to 75 percent of the mode share for daily commute trips. Conversely, the transit industry, which was significantly impacted during the lockdown months, and has struggled to recover; ridership only averages two-thirds of pre-pandemic levels, and service levels also lag behind. Sustained VMT reductions have been difficult to achieve for much of the past***

decade, in large part due to entrenched transportation, land use, and housing policies and practices. [Bullock note: widening freeways and the systems used (underpriced and "free") for having drivers pay for road use and pay for parking use are the worst "practices." CARB does not even mention having a concern about "free" parking, EXCEPT in Appendix D and E.] Specifically, historic decision-making favoring single-occupancy vehicle travel has shaped development patterns and transportation policy, generating further growth in driving (and making transit, biking, and walking less viable alternatives). These policies have also reinforced long-standing racial and economic injustices that leave people with little choice but to spend significant time and money commuting long distances, placing a disproportionate burden on low-income Californians, who pay the highest proportion of their wages on housing and transportation. While CARB has included VMT reduction targets and strategies in the Scoping Plan and appendices, these targets are not regulatory requirements, but would inform future planning processes. CARB is not setting regulatory limits on VMT in the 2022 Scoping Plan; the authority to reduce VMT largely lies with state, regional, and local transportation, land use, and housing agencies, along with the Legislature and its budgeting choices. [Bullock note: they could have mentioned that CARB does set requirements for VMT reductions as specified by SB 375.] Appendix E (Sustainable and Equitable Communities) elaborates on reasons for reducing VMT and identifies a series of policies that, if implemented by various responsible authorities, could help to achieve the recommended VMT reduction trajectory included in this Scoping Plan (and related mode share increases for transit and active transportation). These policies aim to advance four strategic objectives:

1. Align current and future funding for transportation infrastructure with the state's climate goals, preventing new state-funded projects from inducing significant VMT growth and supporting an ambitious expansion of transit service and other multimodal alternatives.
2. Move funding for transportation beyond the gasoline and diesel taxes and implement fuel-agnostic pricing strategies [Bullock note: They can't bring themselves to say, "replace the state gas tax with a means-based RUC"?) that accomplish more productive uses of the roadway network [Bullock note: They can't bring themselves to say, "congestion pricing"?) and generate revenues to further improve transit and other multimodal alternatives [Bullock note: the words in red show that CARB does not understand what will not work politically.]
3. Deploy autonomous vehicles, ride-hailing services, and other new mobility options toward high passenger-occupancy and low VMT-

impact service models that complement transit and ensure equitable access for priority populations.
4. Encourage future housing production and multi-use development in infill locations and other areas in ways that make future trip origins and destinations closer together and create more viable environments for transit, walking, and biking.

The pace of change to reduce VMT must be accelerated. [That is not possible if they don't understand the need for good pricing systems. However, Appendix E shows they may understand this.] Certainly, structural reform will be challenging, but California has demonstrated time and again that it possesses the collective leadership and commitment to break away from ideas that no longer represent Californians' values and their aspirations for the many generations to come.

Strategies for Achieving Success:

1. ***Achieve a per capita VMT reduction of at least 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045. [Where is it shown that this will achieve success? Where do they define "success."]***
2. ***Achieve a per capita VMT reduction of at least 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045. [Where is it shown that this will achieve success? Where do they define "success. However, this far exceeds the SB 375 requirements.]***
3. ***Reimagine new roadway projects that decrease VMT in a way that meets community needs and reduces the need to drive. [Bullock's Note: If a roadway project reduces the number of lanes, congestion will return to its former level (due to induced traffic demand, in reverse] but there will be less VMT and GHG.]***
4. ***Invest in making public transit a viable alternative to driving by increasing affordability, reliability, coverage, service frequency, and consumer experience.***
5. ***Implement equitable roadway pricing strategies based on local context and need, reallocating revenues to improve transit, bicycling, and other sustainable transportation choices. [Bad politics and not necessary.]***
6. ***Expand and complete planned networks of high-quality active transportation infrastructure.***
7. ***Channel the deployment of autonomous vehicles, ride-hailing services, and other new mobility options toward high passenger-occupancy and low VMT-impact service models***

that complement transit and ensure equitable access for priority populations.

8. ***Streamline access to public transportation through programs such as the California Integrated Travel Project.***
9. ***Ensure alignment of land use, housing, transportation, and conservation planning in adopted regional plans, such as regional transportation plans (RTP)/ sustainable communities strategies (SCS), regional housing needs assessments (RHNA), and local plans (e.g., general plans, zoning, and local transportation plans), and develop tools to support implementation of these plans.***
10. ***Accelerate infill development and housing production at all affordability levels in transportation-efficient places, with a focus on housing for lower-income residents.***

The Sustainable Communities Section of CARB's Scoping Plan, Appendix E, With the Same Conventions As Above, Showing the Need for a RUC

Appendix E https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-e-sustainable-and-equitable-communities.pdf.pdf

3.2.2 Objectives To achieve this vision, the State should lead efforts to:

1. ***Authorize and implement roadway pricing strategies and reallocate revenues to equitably improve transit, bicycling, and other sustainable transportation choices. Pricing strategies take many forms and can include fees for miles driven, cordon fees for operating vehicles in designated areas, parking fees [OMG, they said "parking".], fees on congestion impact of ride-hailing services, and dynamic fees on highway lanes [They can't just say "dynamic congestion pricing"?] and other strategic roads to manage congestion. Authorizing transportation pricing strategies is essential to promote more efficient use of cars and to further transit and active transportation improvements. Pricing strategies present an opportunity to fund the transportation system in a more equitable and fiscally sustainable way than current funding sources, promote more efficient functioning of existing infrastructure, and fund new transportation options, especially for those who do not own a vehicle or do not drive. Some recent analyses indicate California will not meet its climate goals without implementing equitable roadway pricing [So it is tragic that SANDAG may remove (!) the RUC from its 2021 RTP, at***

great trouble and great expense.] ***strategies as these strategies are projected to achieve up to 27 to 37 percent of the needed per capita VMT reduction. The four largest MPOs have included multiple pricing strategies in their adopted sustainable communities strategies (SCSs) to reduce regional GHG emissions. Pricing strategies would need to be implemented with an emphasis to ensure equitable outcomes, and in accordance with local needs and context. In particular, pricing strategies need to consider the potential travel options available for low income and other disadvantaged populations to ensure they are not unduly impacted by the strategy. Actions: · Permit implementation of a suite of roadway pricing strategies by 2025 in support of adopted SCSs. [Note the 2025 year. I have been telling SANDAG that 2030 is too late because our first-occurring climate stabilization requirement is 2030.]***

2. ***Prioritize addressing key transit bottlenecks and other infrastructure investments to improve transit operational efficiency over investments that increase VMT. Offering high-quality transit services that represent a viable alternative to driving will require multiple coordinated efforts. The proposed investments to expand service capacity and increase frequencies (described in Strategy Area 1) will be ineffective if those transit vehicles end up stuck in traffic or have limited space to operate efficiently. Transit agencies and local jurisdictions across California should come together to identify, plan, and implement strategies to prioritize transit speeds and reliability over general roadway level of service and private car needs. Those strategies, which include capital investments in the strategic redistribution of the right-of-way, signaling, and supportive traffic regulations, should be prioritized in federal and State funding programs and local investment plans.***
   Actions: ·
   1. ***Permit the conversion of general-purpose lanes to transit-only lanes or toll lanes and full facility tolling of state-owned facilities.***
   2. ***Establish requirements to demonstrate that addressing transit bottlenecks and other transit efficiency investments are a priority in local jurisdiction and transit agency investment plans, such as a prerequisite for overall transportation project funding eligibility.***

3. ***Develop and implement a statewide transportation demand management (TDM) framework with VMT mitigation requirements for large employers and large developments. The goal of TDM is to provide people with information, incentives, and other support programs that help them utilize sustainable transportation options such as transit, ridesharing, bicycling, and walking and rely less on cars. A strategic point of focus for TDM program implementation could be large employers (more than 100 employees), which often incentivize driving alone by offering free parking, gas stipends, and similar perks, and do not offer similar levels of support to employees to take transit, ride their bicycle, or walk. Employer-based TDM strategies are needed to achieve widespread implementation for the State to meet its climate goals, including commute trip reduction programs, ride-sharing programs, on-site bicycle facilities, vanpool and shuttle services, transit fare subsidies, and parking cash-out. [Note: parking cash-out is better than "free"; however, it is a half-baked idea. The system proposed in the San Diego County lawsuit against the County's CAP is a fully thought out system that the CEO of ACE parking would like to provide.] Another strategic point of focus for TDM programs could be large developments, particularly new ones, that through decisions such as their location, design, transportation, parking infrastructure, and their treatment and general interaction with their surrounding environment ingrain high or low VMT travel patterns for decades to come.***

Actions:

1. ***End the State's subsidies for employee parking and take additional actions to move away from subsidizing public spaces for car parking more generally while expanding efforts to promote pedestrian, bicycle, and transit travel. As the State of California employs over 200,000 people, it can expand its TDM programs [This is what I have been telling CARB and others, for years.], which currently vary by agency and employee union.***
2. ***Build on existing resources to further support the development and enforcement of local TDM ordinances and help begin developing a statewide TDM framework. ["Help begin"? No, we need to do this ASAP. The Climate Clock ticks!]***

SANDAG Executive Director's Comments, Regarding RUC Removal

Executive Director Ikhrata is recognized as an expert in the field of transportation. What follows was provided by *The Voice of San Diego*, an on-line publication.

> ***Morning Report: Ikhrata Says the State Isn't Serious About Climate if It Approves SANDAG Plan Without Driving Fee***
>
> *SANDAG CEO Hasan Ikhrata said state regulators will tell him a lot when they decide whether a long-term transportation plan for San Diego can comply with California's environmental goals even if it doesn't include a controversial measure he's championed to charge drivers for every mile they drive.*
>
> *The board of SANDAG has told him to strip the driving fee from the region's transportation plan. That plan would eventually need approval from the state's air resources board, certifying that it meets a requirement to slash greenhouse gas emissions.*
>
> *Ikhrata said if the state approves the plan without the fee, it's an indication that the state's climate change regulations are a fantasy.*
>
> *"I will be very happy because that would actually kind of clarify to me that this is not a serious discussion," he said. "I mean, let's face it. If the state wants to go that way, I'm willing to tell my colleagues at the state, 'Thank you. You clarified for me where you really stand.'"*
>
> *Ikhrata made those comments in a new, long-form podcast interview with Voice of San Diego.*
>
> *In the interview, he also said that he would probably not be interested in continuing to lead the agency if they adopt such a plan.*
>
> *He also argued that any board member who claims to support climate change and transit but opposes a driving fee, or a similar alternative, isn't being serious.*
>
> *"It's wishful thinking to think that you're going to have a plan that changes behavior and reduces greenhouse gas emissions for real, without a pricing mechanism," he said.*
>
> *Listen to the full interview here.*

References

The referenced documents were attached to the email sent with this letter. They are all available from Mike Bullock at mike_bullock@earthlink.net

In Closing

Thank you for your leadership in performing your critical work. Thank you for reading this material and for providing the comments and response as required for a comment letter on a DEIR, EIR, or NOP/Scoping letter. Please let me know if you would like to meet to discuss this letter or related topics.

Highest regards,

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054
760 421 9482

Former California Democratic Party Delegate, 76th Assembly District (author of 2 adopted resolutions and 5 Platform changes)
Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee (author of 5 adopted resolutions)

Final title before leaving Aerospace: ***Senior Staff Systems Engineer***

Air and Waste Management Association published and presented papers:
Author, ***The Development of California Light-Duty Vehicle (LDV) Requirements to Support Climate Stabilization: Fleet-Emission Rates & Per-Capita Driving***
Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***
Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

Quotes from the Secretary General of the UN:

1.) We have a Code Red Climate Emergency
2.) We are solidly on a path to an unlivable planet
3.) We are driving towards Climate Hell with our foot on the accelerator
4.) We are dangerously close to the point of no return

.

Resolution 22-01

Resolution of the Oceanside Bicycle and Pedestrian Committee in Support of Replacing the State Gas Tax with a Means-Based Road Use Charge (RUC) that Protects Privacy

WHEREAS, (1) Greenhouse gas (GHG) emissions must be significantly reduced by 2030 to mitigate a climate catastrophe; (2) about 40% of California's GHG is emitted by on-road vehicles; and (3) even given the most ambitious estimates for fleet efficiency and fleet electrification, to support climate-stabilization requirements, it will be necessary to reduce per-capita driving; and furthermore,

WHEREAS, (1) California's current road-use fees (our gas tax, our toll roads and our bridge-use tolls) do not currently cover the full cost of operating and maintaining roads, and gas tax revenues are projected to further decrease as vehicles become more efficient and/or electric powered; (2) having the full cost of motor vehicle road use hidden from users decreases incentives to bicycling and walking, thereby increasing driving and, thus adding significantly to air pollution, congestion, sprawl, and GHG emissions; (3) an assessment conducted by the California Transportation Commission (CTC) found that 58 percent of our state's roads are in need of maintenance, 20 percent of our bridges need major or preventive maintenance, and 6 percent of our bridges require replacement; (4) roads and bridges are our most important cycling infrastructure; and (5) a RUC has been shown to be feasible by the CTC; and finally,

WHEREAS, (1) our gas tax is our most significant road-use fee; (2) state-mandated increases in battery-electric vehicles will reduce gas-tax revenue; (3) a gas tax is inherently regressive because low-income drivers tend to drive older, less fuel-efficient cars; and (4) a gas tax does not account for time, place, driver income, vehicle weight, vehicle pollution level, or instantaneous roadway congestion;

THEREFORE, BE IT RESOLVED, that the Oceanside Bicycle and Pedestrian Committee supports replacing the state gas tax with a road-use charge (RUC) pricing and payout system that (1) would cover all road-use costs; (2) would protect the economic interests of low- and middle-income drivers by use of a progressive price structure that also recognizes the needs of rural drivers; (3) would protect privacy by requiring a search warrant to obtain location or travel information and has built in safeguards against unauthorized data use; (4) would include an instantaneous congestion-pricing algorithm; (5) would ensure that the per-mile price incentive to drive energy-efficient cars would still be sufficient to support necessary fleet electrification; (6) would ensure that cyclists and pedestrians are not charged under the system, given that they contribute no emissions or wear-and-tear on the road system, and they help alleviate congestion.

BE IT FURTHER RESOLVED, that this support be communicated to the City of Oceanside.

Approved by a majority vote of those present at the March 14, 2022 Committee Meeting:

Tom Lichterman — March 14, 2022

Tom Lichterman, Chairman — Date

November 17, 2021

SANDAG Board of Directors
401 B Street
San Diego, CA 92101

RE: Road Use Charges

Dear Chair Blakespear and SANDAG Board Members:

Recently there has been some public discussion of a proposed Road Use Charge (RUC), also known as a Vehicle Miles Traveled Fee (VMTF) included in the funding discussion in the current draft of the Regional Plan. The undersigned members of the Quality of Life Coalition support the concept of a Road Use Charge as part of a funding solution for transportation projects. We believe that a revised RUC would be more effective and equitable than current approaches to transportation funding, as explained below.

First, it is important to acknowledge that we already have a road use charge, known as the gas tax. There are both state and federal excise taxes included in the price we pay for gasoline and diesel fuel. These taxes have been in place for many years. Originally, they covered much of the cost of building and maintaining roads. However, because they were defined as cents per gallon, they failed to keep pace with inflation, and their real value has been steadily declining. They now cover only about one third of the costs of building and maintaining our road network. The rest of the cost must be taken from other tax revenue such as income, property, and sales taxes.

When the gas tax was first imposed, it was a reasonable approximation of road use. People who drove more, or who drove heavier vehicles, paid more. As fuel economy started to improve after the oil price shocks of the 1970's, the gas tax became less equitable as drivers of newer, more efficient cars paid less, and drivers of less efficient cars paid more.

That gradual decline in both equity and effectiveness was accelerated by the introduction of hybrid cars, which saw huge gains in fuel efficiency, and finally completely upended by the introduction of all-electric cars. Drivers of plug-in battery electric cars pay no gas tax at all, although they continue to contribute to wear and tear of the road network.

The current system is patently unfair and unsustainable. Roads are expensive and must be maintained. Gas tax revenue will continue to decline toward insignificance, even as the cost of maintaining our

highway network continues to rise. Drivers of older internal combustion engine (ICE) cars will be paying a larger and larger share of the costs.

Transportation planners at the Federal Government and many states, including California, are looking at potential ways to implement an equitable revenue stream to replace the current falling gas taxes. It is clear that some other form of Road Use Charge will need to be implemented to replace the current Gas Tax RUC.

Various approaches are under consideration, but there is not currently a detailed proposal to replace the existing system. Opponents are citing various "issues" based on speculation about what a system might look like. We believe that it is more important to identify the characteristics that would be desirable in a replacement for the current RUC.

Here are some suggestions about what a replacement RUC should do:

Equity

Low-income drivers tend to drive older, less fuel-efficient cars, and therefore pay for a disproportionate amount of road maintenance and repair. On the other hand, EVs are expensive and inaccessible for many, and will be accessed first by higher-income drivers, who will avoid paying for road maintenance and repair under the current gas tax system.

The RUC should cover a substantial fraction, but not all, of the costs. Everyone benefits from having a network of roads, including people who never drive on them, so some of the cost should be covered by general revenue.

The RUC implementation should allow for adjustments for a variety of factors to ensure fairness.

All road users should pay their fair share of the costs. The RUC should be based on the number of miles driven, and not how the vehicle is powered. Heavier vehicles cause more road wear and damage, so they should pay more.

Local Control

A portion of the RUC should be collected and disbursed locally, not at the whim of politicians in Sacramento or DC. SANDAG is best positioned to collect and distribute local RUC proceeds because they are governed by the Board members, who are accountable to the voters.

For More Information

As you may know, California has conducted a pilot project to learn more about Road Use Charges. Participants:

- Drove more than 37 million miles,
- 73 percent felt that road charging was more equitable than a gas tax,
- 87 percent of participants found the pilot to be easy,
- 85 percent were overall satisfied with the pilot, and,
- 91 percent expressed willingness to participate in another road charge pilot.

Much more information about the pilot program is contained in the final report at:
https://dot.ca.gov/-/media/dot-media/programs/road-charge/documents/rcpp-final-report-a11y.pdf

Caltrans has a web site with information on road use charges at https://caroadcharge.com/about

The Pew Trust reported in September on a new expansion of the pilot program at: https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/09/28/california-expands-road-mileage-tax-pilot-program

For more detailed analysis on Road Use Charges, please see the Information and Technology Innovation Foundation's policy makers guide on Road Use Charges. (https://itif.org/publications/2019/04/22/policymakers-guide-road-user-charges) It concludes with:

"Road user charges are the most viable and sustainable long-term 'user pay' option for the federal government to both raise adequate and appropriate revenues and provide the federal share of funding for the nation's surface transportation system.

David Grubb, Transportation Chair, Sierra Club San Diego

Pam Heatherington, Board Member, The Environmental Center of San Diego

Bee Mittermiller, Transportation Co-Chair, San Diego 350

Steven Gelb, Transportation Co-Chair, San Diego 350

William Rhatigan, Advocacy Manager, San Diego County Bicycle Coalition

Noah Harris, Transportation Policy Advocate, Climate Action Campaign

Deriving a Climate-Stabilizing Solution Set of *Fleet-Efficiency* and *Driving-Level* Requirements, for Light-Duty Vehicles in California

Paper #796315

Mike R. Bullock
Retired Satellite Systems Engineer, 1800 Bayberry Drive, Oceanside, CA 92054

ABSTRACT

An Introduction is provided, including the importance of light-duty vehicles (LDVs: cars and light duty trucks) and the top-level LDV requirements to limit their carbon dioxide ("CO2") emissions.

Climate crisis fundamentals are presented, including its cause, its potential for harm, California mandates, and a greenhouse gas (GHG) reduction road map to avoid disaster.

A 2030 climate-stabilizing GHG reduction target value is calculated, using statements by climate experts. The formula for GHG emissions, as a function of per-capita driving, population, fleet CO2 emissions per mile, and the applicable low-carbon fuel standard is given. The ratio of the 2015 value of car-emission-per-mile to the 2005 value of car-emission-per-mile is obtained.

Internal Combustion Engine (ICE) mileage values from 2000 to 2030 are identified, as either mandates or new requirements. A table is presented that estimates 2015 LDV fleet mileage.

Zero Emission Vehicle (ZEV) parameters are given. Methods are derived to compute equivalent 2030 mileage. Four cases are defined and overall equivalent mileage is computed for each. Those equivalent fleet mileage values are used to compute their corresponding required per-capita driving reductions, with respect to 2005. Measures to achieve the most reasonable per-capita driving reduction are described, with reductions allocated to each measure.

A conclusion is presented.

INTRODUCTION

Humanity's top-level requirement is to stabilize our climate at a livable level. This top-level requirement must flow down to cars and light-duty trucks, also known as Light-Duty Vehicles (LDVs), due to the significant size of their emissions. As an example, LDVs emit 41% of the GHG in San Diego County[1].

From a systems engineering perspective, the needed top-level LDV requirements are an upper bound on greenhouse gas (GHG) emissions per mile driven, applicable to all of the vehicles on the road, in the year of interest, and an upper bound on per-capita driving, given population growth. These two upper bounds must achieve the climate-stabilizing GHG emission target level. This paper will do a calculation of required driving levels, based on calculations of how clean our cars and fuels could be, predicted population growth, and the latest, science-based, climate-

stabilizing target, or requirement. All three categories of LDV emission-reduction strategies will be used: cleaner cars, cleaner fuels, and less driving. Four cases will be considered.

BACKGROUND: OUR CLIMATE PREDICAMENT

Basic Cause

Our climate crisis exists primarily because of these two facts[2]: First, our combustion of fossil fuels puts "great quantities" of CO_2 into our atmosphere; second, atmospheric CO_2 traps heat.

California's Primary CO2_e Emission-Reduction Mandates

California's Governor's Executive Order S-3-05[3] is based on the greenhouse gas (GHG) reduction limits that were recommended by climate scientists, for industrialized nations, in 2005. In 2005, climate scientists believed that if the industrialized nations of the world achieved the reduction-targets of S-3-05 (and other nations did something less), the Earth's climate could be stabilized at a livable level, with a reasonably high level of certainty. More specifically, this executive order aims for an average, over-the-year, atmospheric, temperature rise of "only" 2 degree Celsius, above the preindustrial temperature. It attempts to do this by limiting atmospheric CO_2_e to 450 PPM by 2050 and then reducing emissions further, so that atmospheric levels would come down to more tolerable levels in subsequent years. The S-3-05 emission targets are the 2000 emission level by 2010, the 1990 level by 2020, and 80% below the 1990 level by 2050.

It was thought that if the industrialized world achieved S-3-05 (and the non-industrialized world achieved an easier task), there would be a 50% chance that the maximum temperature rise will be less than 2 degrees Celsius, thus leaving a 50% chance that it would be larger than 2 degrees Celsius. A 2 degree increase would put over a billion people on the planet into a position described as "water stress" and it would mean a loss of 97% of our coral reefs.

There would also be a 30% chance that the temperature increase would be greater than 3 degrees Celsius. A temperature change of 3 degree Celsius is described in Reference 3 as being "exponentially worse" than a 2 degree Celsius increase.

The second California climate mandate is AB 32, the *Global Warming Solutions Act of 2006*. It includes provisions for a cap and trade program, to ensure meeting S-3-05's 2020 target, which is to be emitting at no more than the 1990 level of emissions. AB 32 was to continue after 2020. AB 32 required CARB to always implement measures that achieved the maximum *technologically feasible and cost-effective* (words taken from AB 32) greenhouse-gas-emission reductions.

In 2015 Governor Brown signed B-30-15. This Executive Order established a mandate for 40% below 2020 emissions by 2030, as can be seen by a Google search. If S-3-05 is interpreted as a straight line between its 2020 and its 2050 targets, then the B-30-15 target of 2030 is the same as the S-3-05 implied target of 2035, because 2035 is halfway between 2020 and 2050 and 40% is halfway to 80%. More recently, California adopted SB 32, which made achieving B-30-15 legally binding. Finally, in 2018, the Governors Executive Order B-55-18 established a mandate of zero net emissions by the year 2045.

California achieved the second GHG emission target of S-3-05 (to emit at the 1990 level by 2020) in 2018, which is two years early. However, the world emission levels have, for most years, been increasing, contrary to the S-3-05 trajectory. Because the world has been consistently failing to follow S-3-05's 2010-to-2020 trajectory, if California, still wants to lead the way to human survival, it must do far better than S-3-05, going forward, as will be shown.

Failing to Achieve these Climate Mandates

What could happen if we fail to achieve S-3-05, AB 32, and B-30-15 or if we achieve them but they turn out to be too little too late and other states and countries follow our example or do less?

It has been written[4] that, "A recent string of reports from impeccable mainstream institutions - the International Energy Agency, the World Bank, the accounting firm of PricewaterhouseCoopers - have warned that the Earth is on a trajectory to warm by at least 4 Degrees Celsius and this would be incompatible with continued human survival."

It has also been written[5] that, "Lags in the replacement of fossil-fuel use by clean energy use have put the world on a pace for 6 degree Celsius by the end of this century. Such a large temperature rise occurred 250 million years ago and extinguished 90 percent of the life on Earth. The current rise is of the same magnitude but is occurring faster."

Pictures That Are Worth a Thousand Words

Figure 1 shows (1) atmospheric CO_2 (in blue) and (2) averaged-over-a-year-then-averaged-over-the surface-of-the-earth, atmospheric temperature (in red). This temperature is with respect to a recent preindustrial revolution value. The data starts 800,000 years ago. It shows that the current value of atmospheric CO_2, which is over 410 PPM, far exceeds the values of the last 800,000 years. It also shows that we might expect the corresponding temperature to eventually be over 12 degrees above preindustrial temperatures. This would bring about a human disaster[3, 4, 5].

Figure 2 shows the average yearly temperature (in blue) with respect to the 1960-to-1990 baseline temperature. It also shows atmospheric levels of CO_2 (in red). The CO2 spike of Figure 1 is seen on Figure 2 to be an accelerating ramp up, starting at the time of our industrial revolution. The S-3-05 goal of 450 PPM is literally "off the chart", in Figure 2. Figure 2 shows that, as expected, temperatures are starting to rise along with the rising levels of CO_2. The large variations in temperature that are observed are primarily due to the random nature of the amount of solar energy being received by the earth.

FURTHER BACKGROUND: CALIFORNIA'S SB 375 AND AN IMPORTANT DATA SET

As shown in the Introduction, LDVs emit significant amounts of CO_2. The question arises: will driving need to be reduced or can cleaner cars and cleaner fuels arrive in time to avoid such behavioral change? Steve Winkelman, of the Center for Clean Air Policy (CCAP), worked on this problem and his results probably inspired California's SB 375.

SB 375, the *Sustainable Communities and Climate Protection Act of 2008*

Under SB 375, the California Air Resources Board (CARB) has given each Metropolitan Planning Organization (MPO) in California driving-reduction targets, for the years 2020 and 2035. "Driving" means yearly, per capita, vehicle miles travelled (VMT), by LDVs, with respect to 2005. The CARB-provided values are shown at this Wikipedia link, http://en.wikipedia.org/wiki/SB_375. It is important to note that although this link and many other sources show the targets to be "GHG" and not "VMT", SB 375 clearly states that the reductions are to be the result of the MPO's Regional Transportation Plan (RTP), or, more specifically, the Sustainable Communities Strategy (SCS) portion of the RTP. Nothing in the SCS will improve average mileage. That will be done by the state and federal governments by their Corporate Average Fleet Efficiency (CAFÉ) standards and any other laws or regulations that they might adopt. The SCS can only reduce GHG by reducing VMT.

Figure 1 Atmospheric CO_2 and Mean Temperature from 800,000 Years Ago

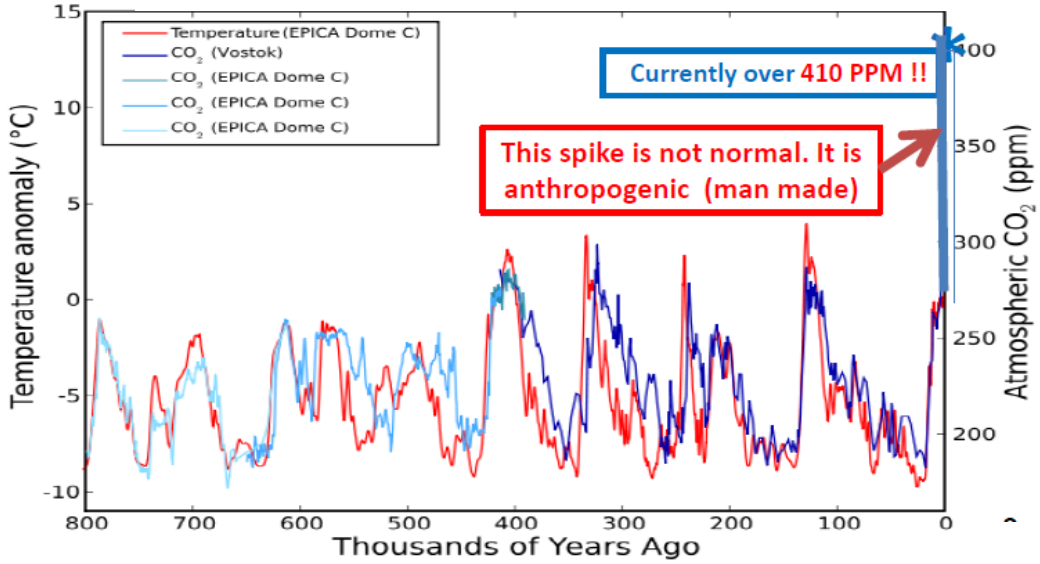
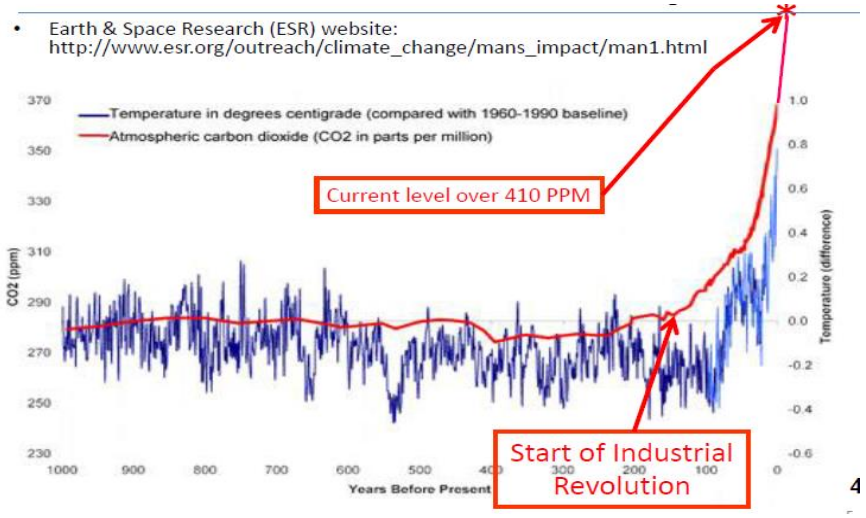


Figure 2 Atmospheric CO_2 and Mean Temperature, Over the Last 1,000 Years



Under SB 375, every Regional Transportation Plan (RTP) must include a section called a Sustainable Communities Strategy (SCS). The SCS must include driving reduction predictions corresponding to the CARB targets. Each SCS must include only *feasible* transportation, land use, and transportation-related policy data. If the SCS driving-reduction predictions fail to meet the CARB-provided targets, the MPO must prepare an Alternative Planning Strategy (APS). An APS uses *infeasible* transportation, land use, and transportation-related policy assumptions. The total reductions, resulting from both the SCS and the APS, must at least meet the CARB-provided targets.

Useful Factors from Steve Winkelman's Data

Figure 3[6].shows 5 variables as a percent of their 2005 value and also the 1990 emission value (turquoise) related to the 2005 CO2 emission value (the blue line). All of the variables are for LDVs. The year 2005 is the baseline year of SB 375. The red line is the Caltrans prediction of VMT. The purple line is California's current mandate for a Low Carbon Fuel Standard (LCFS). The LCFS also can be used to get the equivalent mileage from the actual mileage by dividing the actual mileage by the LCFS. The LCFS can be used to get the equivalent CO2 per mile driven by multiplying the actual CO2 per mile driven by the LCFS. As shown, by 2020, fuel in California must emit 10% less per gallon than in 2005. As written above, the turquoise line is the 1990 GHG emission in California. As shown, it is 12% below the 2005 level. This is important because S-3-05 specifies that in 2020, state GHG emission levels must be at the 1990 level. The green line is the C02 emitted per mile, as specified by AB 1493, also known as "Pavley 1 and 2" named after Senator Fran Pavley. The values shown do not account for the LCFS. The yellow (or gold) line is the S-3-05 mandate, referenced to 2005 emission levels. The blue line is the product of the red (miles), the green (CO2 per mile), and the purple line (LCFS, which reduces emission per mile) and is the percentage of GHG emissions compared to 2005. Since VMT is not being adequately controlled, the blue line is not achieving the S-3-05 line. Figure 3 shows that driving must be reduced. For this reason, Steve Winkelman can be thought of as the true father of SB 375.

Figure 3 **The S-3-05 Trajectory (the Gold Line) AND the CO_2 Emitted from Personal Driving (the Blue Line), where that CO_2 is a Function (the Product) of the California-Fleet-Average CO_2 per Mile (the Green Line), The Predicted Driving (VMT, the Red Line), and the Low-Carbon Fuel Standard (the Purple Line)**

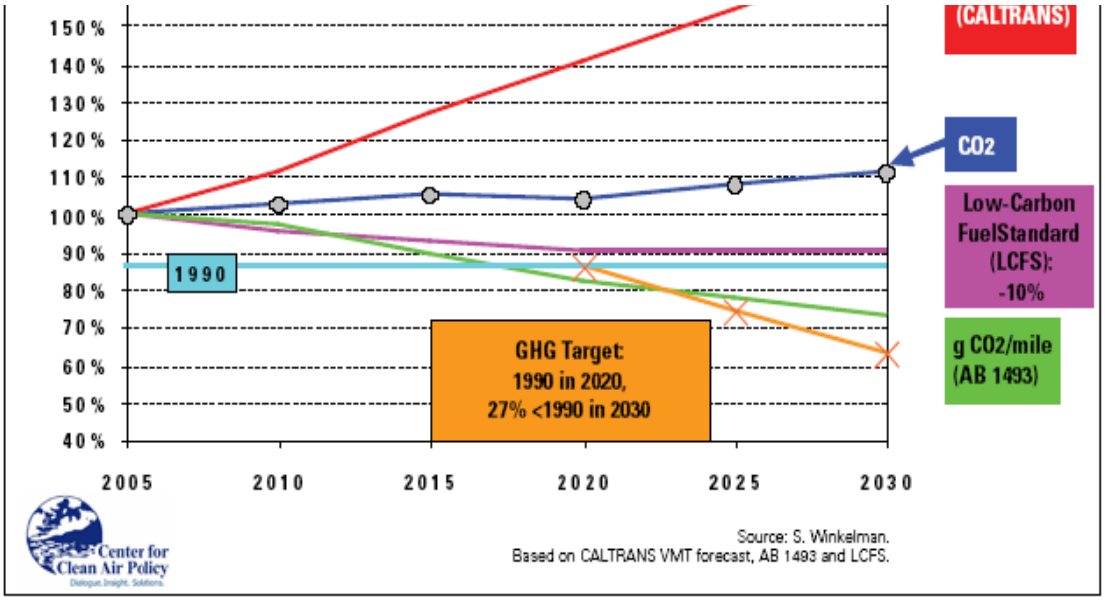


Figure 3 provides inspiration for a road map to climate success for LDVs. Climate-stabilization targets must be identified (from the climate scientists) and achieved by a set of requirements that will increase fleet efficiency and another set that will reduce per-capita driving.

THE DERIVATION OF CALIFORNIA'S TOP-LEVEL LDV REQUIREMENTS TO SUPPORT CLIMATE STABILIZATION

It is clear that more efficient (less CO2 emitted per mile) LDVs will be needed and this can be achieved with appropriate requirements. Significant improvements in efficiency will be needed if driving reductions are going to remain within what many people would consider politically achievable. Mileage and equivalent mileage will need to be specified. A significant fleet-fraction of Zero-Emission Vehicles (ZEVs, either Battery-Electric LDVs or Hydrogen Fuel Cell LDVs) will be needed. Since mileage and equivalent mileage are more heuristic than CO2 emissions per mile, they will be used in the derivations. CO2 per mile driven will not appear in the final equations.

Since the SB-375 work used 2005 as the reference year, that convention will be used. It will be assumed that cars last 15 years.

GHG Emission Target to Support Climate Stabilization

The primary problem with S-3-05 is that California's resolve and actions have been largely ignored by other states, our federal government, and many countries. Therefore, rather than achieving 2000 levels by 2010 (the first target of S-3-05) and 1990 levels by 2020 (the 2nd target of S-3-05), world emission has been increasing for nearly all of the years since 2010. (California, on the other hand achieved its 1990 emission level in 2018. This is two years sooner than the 2nd target of the S-3-05 requirement.) Reference 7 states on Page 14 that the required rate of reduction, if commenced in 2020, would be 15%. That rate means that the factor of 0.85 must be achieved, year after year. If this were done for 10 years, the factor would be $(0.85)^{10} = 0.2$, by 2030. This reduction of 80% down from the 2020 value matches the 2050 target requirement of S-3-5, which is 80% below the 1990 value. According to S-3-05, the 2020 emission value should be the same as the 1990 emission value. As noted above, the S-3-05 emission of 2050 was designed to support capping atmospheric CO2 at 450 PPM[3]. "Capping" means that the sum of all emissions (anthropogenic and natural) equals the sum of all sequestration (mostly photosynthesis.) Therefore, the author of the Reference 7 statement wanted the world to achieve the third target of S-3-05 to get the atmospheric CO2 to stop going up 20 years sooner than what S-3-05 was written to achieve. This shows the urgent nature of our climate crisis. Therefore, if California wants to do its part by setting an example for the world, the correct requirement for California is to achieve emissions that are reduced to 80% below California's 1990 value by 2030. The world's reduction rate is not anywhere near the needed 15% as we move towards the end of 2020. Therefore, the target, of 80% below 1990 levels by 2030 is considered to be correct for California. Reference 7 also calls into question the advisability of aiming for a 2 degree Celsius increase, given the possibilities of positive feedbacks that would increase warming. This concern for positive feedbacks is another reason that this paper will work towards identifying LDV requirement sets that will support LDVs achieving 80% below the 1990 value by 2030.

Thinking that LDVs can, for some reason, fail to achieve this target is dangerous thinking. As stated above, LDVs emit, by far, the most CO2 of all categories.

Notes on Methods

The base year is 2005. An intermediate year of 2015 is used. The car efficiency factor of 2015 with respect to 2005 is taken directly from Figure 3. The car efficiency factor of 2030 with respect to 2015 is derived herein, resulting in a set of car-efficiency requirements.

It is assumed that cars last 15 years. This is equivalent to assuming that the effect of the cars that last more than 15 years, thus increasing emissions, will be offset by the effect of the older cars that don't last as long as 15 years, thus reducing old-car emissions. As will be seen, there will also have to be some sort of an additional action to remove many of the older Internal Combustion Engine cars that are 15, through just 8 years old. Natural attrition will take care of some of this since as cars get older the probability that they will be taken out of service increases. However, some sort of "cash for gas guzzlers" program will be needed. How this is done is not covered in this paper. This is not unique. As another example, the car manufacturers will have to figure out how to produce the needed cars and batteries.

Primary Variables Used

Table 1 defines the primary variables that are used.

Fundamental Equations

The emissions are equal to the CO2 per mile driven multiplied by the per-capita driving multiplied by the population, since per-capita driving multiplied by the population is total driving. This is true for any given year.

Future Year k: $$\boldsymbol{e_k = c_k * d_k * p_k}$$ **(Eq. 1)**

Base Year i: $$\boldsymbol{e_i = c_i * d_i * p_i}$$ **(Eq. 2)**

Dividing both sides of Equation 1 by equal values results in an equality. The terms on the right side of the equation can be associated as shown here:

$$\boldsymbol{\frac{e_k}{e_i} = \frac{c_k}{c_i} * \frac{d_k}{d_i} * \frac{p_k}{p_i}}$$ **(Eq. 3)**

Table 1 Variable Definitions

Variable Definitions	
$\boldsymbol{e_k}$	**LDV Emitted C02, in Year "*k*"**
$\boldsymbol{L_k}$	**Low Carbon Fuel Standard (LCFS) Factor that reduces the Per-Gallon CO2 emissions, in Year "*k*"**
$\boldsymbol{C_k}$	**LDV CO2 emitted per mile driven, average, in Year "*k*", not accounting for the Low Carbon Fuel Standard (LCFS) Factor**
$\boldsymbol{c_k}$	**LDV CO2 emitted per mile driven, average, in Year "*k*", accounting for the Low Carbon Fuel Standard (LCFS) Factor**

p_k	**Population, in Year "k"**
d_k	**Per-capita LDV driving, in Year "k"**
D_k	**LDV Driving, in Year "k"**
M_k	**LDV Mileage, miles per gallon, in Year "k"**
m_k	**LDV Equivalent Mileage, miles per gallon, in Year "k" accounting for Low Carbon Fuel Standard (LCFS) Factor, so this is M_k/L_k**
N	**Number of pounds of CO2 per gallon of fuel but not accounting for the Low Carbon Fuel Standard (LCFS) Factor**

Since CO2 per mile ("c") is a constant (use "A", noting that it is equal to about 20 pounds per gallon) multiplied by the number of Gallons ("G") and since number of gallons is distance (use "D") divided by mileage (use "m"), then c = A*D/m. this shows that the ratio of the "c" values in different years is going to be equal to the reciprocal of the "m" values in those different years because the other variables will cancel out. Therefore:

To work with mileage: $$\frac{m_i}{m_k} = \frac{c_k}{c_i}$$ **(Eq. 4)**

Putting Equation 4 into Equation 5 results in the following equation:

$$\frac{e_k}{e_i} = \frac{m_i}{m_k} * \frac{d_k}{d_i} * \frac{p_k}{p_i}$$ **(Eq. 5)**

Showing the base year of 2005, the future year of 2030, introducing the intermediate year of 2015 and the year of 1990 (since emissions in 2030 are with respect to the 1990 value) results in Equation 6.

$$\frac{e_{2030}}{e_{1990}} * \frac{e_{1990}}{e_{2005}} = \frac{c_{2030}}{c_{2015}} * \frac{c_{2015}}{c_{2005}} * \frac{d_{2030}}{d_{2005}} * \frac{p_{2030}}{p_{2005}}$$ **(Eq. 6)**

The ratio on the far left is the climate-stabilizing target, which is the factor of the 2030 emission to the 1990 emission. It has been shown that this is 0.20 or 80% less. The next ratio is the emission of 1990 compared to 2005. It is the turquoise line of Figure 3, which is 0.87. The first ratio on the right side of the equation is the fleet emission per mile in 2030 compared to the value in 2015. This ratio will be derived in this report and it will result in a set of car-efficiency requirements. Moving to the right, the next ratio is the car efficiency in 2015 compared to 2005. It can obtained by multiplying the purple line 2015 value times the green line 2015 value, which is 0.90 * 0.93. The next term, still going from right to left, is the independent variable. It is the per-capita driving reduction required, with respect to the 2005 level of driving. The final term on the far right is the ratio of the population in 2030 to the population in 2005. Reference 8 shows that California's population in 2005 was 35,985,582. Reference 9 shows that California's population in 2030 is predicted to be 42,263,654. Therefore,

$$p_{2030}/p_{2005} = 42263654 \div 35985582 = 1.17446076$$ **(Eq. 7)**

Putting in the known values results in Equation 8:

$$0.20 * 0.87 = \frac{c_{2030}}{c_{2015}} * 0.90 * 0.93 * \frac{d_{2030}}{d_{2005}} * 1.17446076 \quad \textbf{(Eq. 8)}$$

Combining the values, solving for the independent variable (the per-capita driving ratio), and changing from emission-per-mile to equivalent-miles-per-gallon results in the following:

$$\frac{d_{2030}}{d_{2005}} = 0.177004896 * \frac{m_{2030}}{m_{2015}} \quad \textbf{(Eq. 9)}$$

With the coefficient being so small, it is doubtful that we can get the equivalent mileage in 2030 to be high enough to keep the driving ratio from falling below one. The mileage of the 2015 fleet will be based on the best data we can get and by assuming cars last 15 years. The equivalent mileage in 2030 will need to be as high as possible to keep the driving-reduction factor from going too far below 1, because it is difficult to reduce driving too much. The equivalent mileage will be dependent on the fleet-efficiency requirements in the near future and going out to 2030. Those requirements are among the primary results of this report.

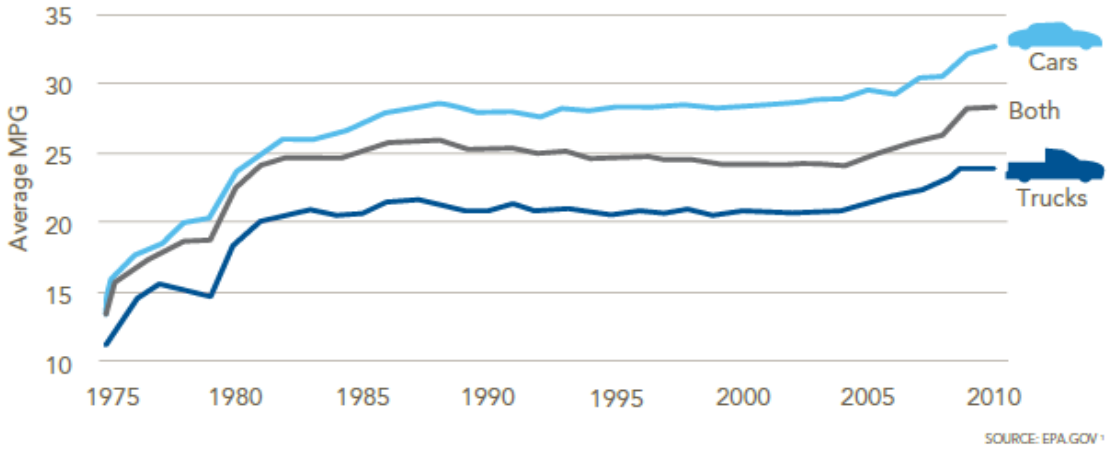
Internal Combustion Engine (ICE) Mileage, from Year 2000 to Year 2030

The years from 2000 to 2011 are taken from a plot produced by the PEW Environment Group,

http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Fact_Sheet/History%20of%20Fuel%20Economy%20Clean%20Energy%20Factsheet.pdf

The plot is shown here as Figure 6. The "Both" values are used.

Figure 4 **Mileage Values From the PEW Environment Group**



The values from 2012 to 2025 are taken from the US Energy Information Agency (EIA) as shown on their website, http://www.c2es.org/federal/executive/vehicle-standards#ldv_2012_to_2025. They are the LDV Corporate Average Fleet Efficiency (CAFÉ) values enacted into law in the first term of President Obama. From 2025 to 2030, it is assumed that the yearly ICE improvement in CAFÉ will be 2.5 MPG.

Overall Mileage of California's LDV Fleet in 2015

Table 2 uses these values of the Internal Combustion Engine (ICE) LDV mileage to compute the mileage of the LDV fleet in 2015. It assumes that the fraction of ZEVs being used over these years is small enough to be ignored. The 100 miles driven, nominally, by each set of cars, is an arbitrary value and inconsequential in the final calculation, because it will divide out. It is never-the-less used, so that it is possible to compare the gallons of fuel used for the different years. The "f" factor could be used to account for a set of cars being driven less. It was decided to not use this option by setting all of the values to 1. The Low Carbon Fuel Standard (LCFS) values are taken from Figure 3. The gallons of fuel are computed as shown in Equation 10, using the definition for L_k that is shown in Table 2.

$$\boldsymbol{Gallons\ Used\ per\ f * 100\ miles} = \frac{\boldsymbol{fx100}}{(\boldsymbol{CAFE\ MPG})/\boldsymbol{L_k}} \qquad \textbf{(Eq. 10)}$$

As shown in Table 2, using the definitions in Eq. 9:

$$\boldsymbol{m_{2015} = 27.63}$$

If it is deemed acceptable to have per-capita driving in 2030 be reduced 32% with respect to 2005 driving, then the left side of Eq. 9 becomes 0.68 and it is possible to use Eq. 9 to solve for the 2030 mileage as:

$$\boldsymbol{m_{2030} = (27.63) * 0.68 * \left(\frac{1}{0.177004896}\right) = 106.1462} \qquad \textbf{(Eq. 11)}$$

Likewise if it is decided that the per-capita driving in 2030 should equal the per-capita driving in 2005 then:

$$\boldsymbol{m_{2030} = (27.63) * 1.00 * \left(\frac{1}{0.177004896}\right) = 156.0974} \qquad \textbf{(Eq. 12)}$$

These values will provide the targets for the tables that compute the mileage values for 2030.

How ICE Mileage Values Will Be Used with ZEV Equivalent Mileage Values

To have LDVs achieve our climate-stabilizing target, after 2015, the net (computed using both ICE and ZEV vehicles) mileage values for each year will need to greatly improve by having a significant fraction of ZEVs. The ICE CAFÉ standards are used in this report as just the ICE contribution to fleet MPG. The ICE MPG values are inadequate by themselves and will therefore need to become less important; the ZEVs sales will need to overtake the ICE sales.

Federal requirements will need to change significantly. Currently, federally-mandated corporate average fuel efficiency (CAFÉ) standards have been implemented, from 2000 to 2025. These standards require that each corporation produce and sell their fleet of cars and light-duty trucks in the needed proportions, so that the combined mileage of all of the cars they sell (total miles driven in all cars sold in the year of interest divided by the total gallons used by all those cars, for any arbitrary distance) at least meets the specified mileage.

Table 2 Calculation of the Fleet MPG for 2015

LDV Set	Years Old	Model Year	CAFE MPG	LCFS Factor L_{Year}	Factor Driven f	Gallons Used Per f*100 Miles
1	14-15	2001	24.0	1.0	1.0	4.17
2	13-14	2002	24.0	1.0	1.0	4.17
3	12-13	2003	24.0	1.0	1.0	4.17
4	11-12	2004	24.0	1.0	1.0	4.17
5	10-11	2005	25.0	1.0	1.0	4.00
6	9-10	2006	25.7	.9933	1.0	3.87
7	8-9	2007	26.3	.9867	1.0	3.75
8	7-8	2008	27.0	.9800	1.0	3.63
9	6-7	2009	28.0	.9733	1.0	3.48
10	5-6	2010	28.0	.9667	1.0	3.45
11	4-5	2011	29.1	.9600	1.0	3.30
12	3-4	2012	29.8	.9533	1.0	3.20
13	2-3	2013	30.6	.9467	1.0	3.09
14	1-2	2014	31.4	.9400	1.0	2.99
15	0-1	2015	32.6	.9333	1.0	2.86
					Sum of Gallons:	54.29
					Miles = 100*Sum(f's):	1500
					MPG = Miles/(Sum of Gallons):	27.63

The car companies want to maximize their profits while achieving the required CAFÉ standard. In California, the car companies are already be required to sell a specified number of electric vehicles, which have a particularly-high, equivalent-value of miles-per-gallon. If the laws are not changed, this situation will allow companies to take advantage of their ZEV vehicles to sell more low-mileage, high-profit cars and light-duty trucks, and still achieve the federal CAFÉ standard.

It will be better to apply the CAFÉ standards to only the ICEs and then require, in addition to the CAFÉ standards, that the fleet of LDVs sold achieve some mandated fraction of ZEVs. The ZEVs will get ever-improving equivalent mileage, as our electrical grid is powered by a larger percent of renewable energy. In other words, their equivalent mileage is not fixed, but will improve over the years. Requirements developed here are for 2030. Therefore a high percentage of all the electricity generated in the state, including both the "in front of the meter" (known as the "Renewable Portfolio Standard" or "RPS") portion and the "behind the meter" portion is assumed to come from sources that do not emit CO2. The values of 85% and 90% are assumed. The values become one of the important fleet-efficiency requirements for cases that are considered. Hopefully these assumptions are reasonable. San Diego's Climate Action Plan (CAP) was the first to specify 100% renewable energy by 2035. Many other cities have followed San Diego's lead in this regard.

How to Compute the ZEV Equivalent Mileage Values

To calculate the equivalent mileage of the 2030 fleet of LDVs, it is necessary to derive a formula to compute the equivalent mileage of ZEVs, as a function of the percent of electricity that is generated without emitting CO2 (the mixed case), the equivalent ZEV mileage if the electricity is from 100% fossil fuel (the "West Virginia" case), and the equivalent ZEV mileage if the electricity is from 100% renewable sources (the ideal case), which is not infinity because it is assumed that the manufacturing of the car emits CO2. The variable definitions in Table 3 are used.

Table 3 Variables Used in the Calculation of ZEV Equivalent Mileage

Variable	Definition
m_z	ZEV Equivalent mileage
m_{zr}	ZEV Equivalent mileage if the electricity is from renewables
m_{zf}	ZEV Equivalent mileage if the electricity is from fossil fuels
r	fraction of electricity generated from renewable sources
G	Gallons of equivalent fuel used
D	Arbitrary distance travelled
Num	$m_{zr} * m_{zf}$
Den	$r * m_{zf} + (1 - r) * m_{zr}$

The derivation of the equation for equivalent ZEV mileage is based on the notion that the ZEV can be imagined to travel "r" fraction of the time on electricity generated from renewables and "(1-r)" fraction of the time on fossil fuel. If the vehicle travels "D" miles, then, using the definitions shown in Table 4, the following equation can be written.

$$G = \frac{r*D}{m_{zr}} + \frac{(1-r)*D}{m_{zf}} \quad \textbf{(Eq. 13)}$$

$$m_z = D/G = D/\left(\frac{r*D}{m_{zr}} + \frac{(1-r)*D}{m_{zf}}\right) \quad \textbf{(Eq. 14)}$$

Dividing the numerator and the denominator by D and multiplying the numerator and the denominator by the product of the two equivalent mileage values (m_{zr} and m_{zf}) results in Equations 31.

$$m_z = m_{zr} * m_{zf}/\left(r * m_{zf} + (1 - r) * m_{zr}\right) \quad \textbf{(Eq. 15)}$$

Using the definitions in Table 3:

$$m_z = Num/(Den) \quad \textbf{(Eq. 16)}$$

Table 4 shows 3 assignments of assumed values in which the fraction of electricity generated from renewables is varied and the results, using Equations 15 and 16, results in the three values of ZEV equivalent mileage. This shows the urgent need to move towards cleaner electricity.

Table 4 Variable Assignment and the Resulting ZEV Mileages

m_{zr}	m_{zf}	r	1-r	Num	Den	m_z
5000	70	0.80	0.20	350000.00	1056.00	331.44
5000	70	0.85	0.15	350000.00	809.50	432.37
5000	70	0.90	0.10	350000.00	563.00	621.67

Additional Variables Needed to Compute the Overall Equivalent Mileage in 2030, Taking Into Account Bothe ICEs and ZEVs

Table 5 shows the additional definitions that will be used in the calculation of 2030 overall mileage.

Table 5 Additional Variables Used in the Calculation of 2030 LDV Mileage

Variable	Definition
D_i	Distance travelled by ICE vehicles
D_z	Distance travelled by ZEV vehicles
G_i	Gallons of equivalent fuel used by ICE vehicles
G_z	Gallons of equivalent fuel used by ZEVs

Computing an LDV Overall Equivalent Fleet Mileage, for the *Balanced_1* Case

Table 6 shows the calculation for the overall equivalent mileage for all the cars on the road, in the year of 2030, for the *Balanced_1* case.

The name, *Balanced_1*, comes from the attempt to *balance* the difficulty of achieving the fleet efficiency-related requirements with the difficulty of achieving the driving-reduction related requirements. The *Balanced*_1 case assumes that electricity is 85% renewable, which is also difficult.

There will also be a *Balanced*_2 case that assumes that electricity is 90% renewable. Both the *Balanced_1* and the *Balanced_ 2* cases assume that it is reasonable to have per-capita driving in 2030 reduced 32%, with respect to 2005 per-capita driving. That assumption, along with the 85% renewable electricity assumption, was used to select the ***z*** values of Table 6 to result in the Equation 11 value of overall 2030 mileage, which is 106.1263 Miles Per Gallon (MPG). From Table 4, 85% renewable electricity results in a ZEV equivalent mileage of 432.37 MPG. That value of equivalent ZEV mileage in 2030, when electricity is 85% renewable, is used for all of the ZEV model years, for

this case. Note that this is overlooking the fact that not all BEVs are equally efficient. In order to simplify this analysis, the Table 4 values of m_{zr} and m_{zf} are considered to be applicable to all the ZEV models. Therefore, the 432.37 MPG value can be divided into each D_z value to compute the corresponding G_z value, in all of the model years being considered.

To reduce the miles driven in poor-mileage ICE's, the "f" factor is used. For example, if "f" is set to 0.30, as it is in 2016, then the miles driven is reduced by 70%. Achieving the required "f" values may require some type of "cash-for-gas-guzzlers" program. However, it could also be noted that when older cars are second or third cars in multi-car families in which family members have the luxury of choosing which car to drive, family members will usually choose the car that is cheaper to operate, thus making the "f" factors easier to achieve. Finally, the Low Carbon Fuel Standard (LCFS) is assumed to continue to improve from the currently mandated value of 0.9 by the end of 2019. This is another method of reducing the CO2 emissions of the ICE vehicles.

For the ICE vehicles, the G_i values are computed as the D_i value divided by the equivalent MPG value. The equivalent MPG is the CAFÉ MPG divided by the LCFS factor.

It is arbitrarily assumed that the cars, for each year being considered (the models for that year, both ZEVs and ICEs), go a total of 100 miles. Although this is an extremely small fraction of the actual miles that will be driven, it doesn't change the result because the number of gallons of equivalent gasoline is always proportional to miles. The fraction of cars that are ZEVs (***z***) is used to divide up this value of 100 Miles. However, the factor "f" reduces the miles driven by the ICE vehicles and this brings down the total miles driven for the years in which the "f" term is less than 1. For each year, the total miles per gallon (MPG) is computed as the total miles driven divided by the total gallons used. However, this value is not used in the calculation of the entire fleet equivalent mileage. The overall equivalent mileage is computed as the total miles driven divided by the total gallons used, where these quantities are summed over all of the 15 categories (years) of LDVs.

The following formulas are used to compute the overall equivalent mileage in 2030, of all of the LDVs on the road.

For the ICE calculations, for 2016, where

- "L_k" is defined in Table 1 (LCFS factor for year "k") and is the value in the "LCFS" column of Table 6 and
- "**z**" is from the "**z**" column and is the fraction of cars sold in the year that are ZEVs and
- "m_i" is the value from the CAFÉ MPG column:

$$\boldsymbol{D_i = 100 * f * (1 - z)} \qquad \textbf{(Eq. 17)}$$

$$\boldsymbol{G_i = D_i / (m_i \,/\, L_{2016})} \qquad \textbf{(Eq. 18)}$$

For the ZEV calculations:

$$\boldsymbol{D_z = 100 * z} \qquad \textbf{(Eq. 17)}$$

$$\boldsymbol{G_z = D_z / (432.37)} \qquad \textbf{(Eq. 18)}$$

In updating this report from its 2015 version, the fleet fraction of ZEVs ("***z***"), from 2015 to 2019, had to be reduced to approximate the low values that actually occurred from 2015 to 2019. However,

in 2020, it is assumed that the fraction will be at least as large as 8%, which is not such a trivial value. If it is actually larger than 8%, then there will be some margin built into the requirements derived in this report.

Table 6 Calculation of 2030 LDV Mileage Assuming the *Balanced_1* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	29.4	0.7943	.02	2	.005	31.40	0.7989	39.30
2017	35.1	.9200	38.15	.4	39.2	1.0275	.02	2	.005	41.20	1.0321	39.92
2018	36.1	.9133	39.53	.5	48.5	1.2271	.03	3	.007	51.50	1.2340	41.73
2019	37.1	.9067	40.92	.6	57.6	1.4077	.04	4	.009	61.60	1.4169	43.47
2020	38.3	.9000	42.56	.7	64.4	1.5133	.08	8	.019	72.40	1.5318	47.26
2021	40.3	.8500	47.41	.8	64.0	1.3499	.20	20	.046	84.00	1.3961	60.17
2022	42.3	.8000	52.88	.9	58.5	1.1064	.35	35	.081	93.50	1.1873	78.75
2023	44.3	.8000	55.38	1.0	45.0	0.8126	.55	55	.127	100.00	0.9398	106.40
2024	46.5	.8000	58.13	1.0	20.0	0.3441	.80	80	.185	100.00	0.5291	188.99
2025	48.7	.8000	60.88	1.0	6.0	0.0986	.94	94	.217	100.00	0.3160	316.48
2026	51.2	.8000	64.00	1.0	3.0	0.0469	.97	97	.224	100.00	0.2712	368.70
2027	53.7	.8000	67.13	1.0	2.0	0.0298	.98	98	.227	100.00	0.2565	389.93
2028	56.2	.8000	70.25	1.0	1.0	0.0142	.99	99	.229	100.00	0.2432	411.17
2029	58.7	.8000	73.38	1.0	1.0	0.0136	.99	99	.229	100.00	0.2426	412.20
2030	61.2	.8000	76.50	1.0	1.0	0.0131	.99	99	.229	100.00	0.2420	413.15
Sum of Miles and then Gallons of Equivalent Fuel:										**1235.60**	**11.64**	
Equivalent MPG of LDV Fleet in 2030:										***106.17***		
Sum of ZEV Miles = **795**. Fraction of Miles Driven by ZEVs = **64.3%**												

There is probably some margin from the 2016 to 2019 values as well. The difficult values are for 2022, 2023, and 2024, with 2024 requiring that ZEV sales are 80% of all the cars purchased in California. The purple color of the ***z*** values denotes difficulty. This shows that the government will need to require that the car companies achieve the **z** values or buy credits from a company such as Tesla, which sells 100% ZEVs.

The Table 6 ***z*** values were put into an EXCEL spread sheet that looks like Table 6. It produced the values shown in Table 6. The values were selected to try to get to the 106.1462 value that was computed in Eq. 11.

Using the result of 106.17 MPG into Equation 9, gives the following result:

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}} = 0.17700 * \frac{106.17}{27.63} = 0.68016 \qquad \textbf{(Eq. 19)}$$

This is the 32% reduction desired. It will be difficult to achieve. However, the required schedule of ZEV adoption is also difficult. The values of *z* from the years 2021 to 2025 will be at least as difficult as achieving the 32% reduction. This situation motivates the next case. If electricity could be made cleaner sooner, the years from 2021 to 2025 could be less difficult.

Computing an LDV Overall Equivalent Fleet Mileage, for the *Balanced_2* Case

The *Balanced_2* case is shown in Table 7.

The *Balanced_2* case is the same as the *Balanced_1* case except it includes an assumption that electricity is 90% renewable in 2030 instead of 85%. Table 7 shows the results using that assumption, which becomes a requirement for this case. For the *Balanced_2* case, the values of *z* are once again assigned to achieve the desired driving-reduction value of 32%.

From the second line of Table 4, this means that the equivalent mileage of the ZEV vehicles is 621.67 MPG.

Eq. 18 becomes:

$$G_z = D_z/(621.67) \qquad \textbf{(Eq. 20)}$$

This is used to compute the gallons of equivalent fuel from the distance, for the ZEV vehicles in Table 7.

The Table 7 ***z*** values were put into an EXCEL spread sheet that looks like Table 7. It produced the values shown in Table 7. The *z* values were selected to try to get to the 106.1462 value that was computed in Eq. 11.

Using the Table 7 result of 106.22 MPG into Equation 9, gives the following result:

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}} = 0.17700 * \frac{106.22}{27.63} = 0.68045 \qquad \text{(Eq. 21)}$$

Table 7 Calculation of 2030 LDV Mileage Assuming the *Balanced_2* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.927	37.01	.3	29.4	0.7943	.02	2	.003	31.40	.7975	39.37
2017	35.1	.920	38.15	.4	39.2	1.0275	.02	2	.003	41.20	1.0307	39.97
2018	36.1	.913	39.53	.5	48.5	1.2271	.03	3	.005	51.50	1.2319	41.81
2019	37.1	.907	40.92	.6	57.6	1.4077	.04	4	.006	61.60	1.4141	43.56
2020	38.3	.900	42.56	.7	64.4	1.5133	.08	8	.013	72.40	1.5262	47.44
2021	40.3	.850	47.41	.8	68.0	1.4342	.15	15	.024	83.00	1.4584	56.91
2022	42.3	.800	52.88	.9	67.5	1.2766	.25	25	.040	92.50	1.3168	70.25
2023	44.3	.800	55.38	1.0	55.0	0.9932	.45	45	.072	100.00	1.0656	93.84
2024	46.5	.800	58.13	1.0	30.0	0.5161	.70	70	.113	100.00	.6287	159.05
2025	48.7	.800	60.88	1.0	5.0	0.0821	.95	95	.153	100.00	.2349	425.62
2026	51.2	.800	64.00	1.0	3.0	0.0469	.97	97	.156	100.00	.2029	492.84
2027	53.7	.800	67.13	1.0	2.0	0.0298	.98	98	.158	100.00	.1874	533.52
2028	56.2	.800	70.25	1.0	1.0	0.0142	.99	99	.159	100.00	.1735	576.42
2029	58.7	.800	73.38	1.0	1.0	0.0136	.99	99	.159	100.00	.1729	578.45
2030	61.2	.800	76.50	1.0	1.0	0.0131	.99	99	.159	100.00	.1723	580.31
Sum of Miles and then Gallons of Equivalent Fuel:										**1233.60**	**11.61**	
Equivalent MPG of LDV Fleet in 2030:										***106.22***		
Sum of ZEV Miles = **761**. Fraction of Miles Driven by ZEVs = **61.7%**												

This is the 32% reduction desired. It will be difficult to achieve. However, the required schedule of ZEV adoption is also difficult. The values of $\boldsymbol{z}$ from the years 2021 to 2025 will be at least as difficult as achieving the 32% reduction. However, they are easier to achieve than the values needed in the *Balanced_1* Case. This quantifies the benefit of increasing the renewable fraction of electricity from 85% to 90%.

Computing an LDV Overall Equivalent Fleet Mileage, for the *2005_Driving* Case

When climate change and transportation policies are discussed, the opinion that we should simply electrify our fleet as soon as possible is often expressed. The idea is that the per-capita driving level does not have to be reduced, if we electrify our fleet fast enough. The relationships developed in this paper enable an analysis to see how this would work. This gives rise to the *2005_Driving* Case. For this case, it is assumed that electricity is 90% renewable.

From the third line of Table 4, this means that the equivalent mileage of the ZEV vehicles is 621.67 MPG. Therefore, the relationship shown in Eq. 20 is used.

The *2005_Driving* case is shown in Table 8.

For the *2005_Driving* case, the values of *z* are assigned to achieve the overall equivalent mileage (MPG) value computed in Eq. 12, which is 156.0974, because that value was computed for there being no change in the per-capita driving from the 2005 value.

Using the result of 155.99 MPG into Equation 9, gives the following result:

$$\frac{\boldsymbol{d_{2030}}}{\boldsymbol{d_{2005}}} = \mathbf{0.17700} * \frac{\boldsymbol{m_{2030}}}{\boldsymbol{m_{2015}}} = \mathbf{0.17700} * \frac{\mathbf{155.99}}{\mathbf{27.63}} = \mathbf{0.99930} \qquad \textbf{(Eq. 22)}$$

This is the 0% reduction desired. However, the required schedule of ZEV adoption is not possible. Jumping from 8% in 2020 to 82% in 2021 defies reason. It appears that our best bet, to do our part to avoid human extinction, is to proceed with the assumption (and thus requirement) that we are going to have to reduce per-capita driving, as shown in either the *Balanced_1* or the *Balance_2* case.

Computing an LDV Overall Equivalent Fleet Mileage, for the *Mary_Nichols* Case

Mary Nichols was first appointed to the California Air Resource Board (CARB) in 1975 and became Chair in 1979. After leaving CARB, she founded the Los Angeles Chapter of the Natural Resources Defense Council (NRDC) in 1989. She was reappointed to the position of Chair of

CARB in 2007 by Governor Arnold Schwarzenegger and she is still serving in that position today.

Table 8 Calculation of 2030 LDV Mileage Assuming the *2005_Driving* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	29.4	.7943	.02	2.0	.003	31.40	0.7975	39.37
2017	35.1	.9200	38.15	.4	39.2	1.0275	.02	2.0	.003	41.20	1.0307	39.97
2018	36.1	.9133	39.53	.5	48.5	1.2271	.03	3.0	.005	51.50	1.2319	41.81
2019	37.1	.9067	40.92	.6	57.6	1.4077	.04	4.0	.006	61.60	1.4141	43.56
2020	38.3	.9000	42.56	.7	64.4	1.5133	.08	8.0	.013	72.40	1.5262	47.44
2021	40.3	.8500	47.41	.8	14.4	.3037	.82	82.0	.132	96.40	0.4356	221.29
2022	42.3	.8000	52.88	.9	2.7	.0511	.97	97.0	.156	99.70	0.2071	481.42
2023	44.3	.8000	55.38	1.0	1.0	.0181	.99	99.0	.159	100.00	0.1773	563.99
2024	46.5	.8000	58.13	1.0	1.0	.0172	.99	99.0	.159	100.00	0.1765	566.72
2025	48.7	.8000	60.88	1.0	1.0	.0164	.99	99.0	.159	100.00	0.1757	569.23
2026	51.2	.8000	64.00	1.0	1.0	.0156	.99	99.0	.159	100.00	0.1749	571.84
2027	53.7	.8000	67.13	1.0	1.0	.0149	.99	99.0	.159	100.00	0.1741	574.23
2028	56.2	.8000	70.25	1.0	1.0	.0142	.99	99.0	.159	100.00	0.1735	576.42
2029	58.7	.8000	73.38	1.0	1.0	.0136	.99	99.0	.159	100.00	0.1729	578.45
2030	61.2	.8000	76.50	1.0	1.0	.0131	.99	99.0	.159	100.00	0.1723	580.31
Sum of Miles and then Gallons of Equivalent Fuel:										**1254.20**	**8.04**	
Equivalent MPG of LDV Fleet in 2030:										***155.99***		
Sum of ZEV Miles = **990.0** Fraction of Miles Driven by ZEVs = **78.9%**												

The following quote[13] inspires the *Mary_Nichols* Case:

Regulations on the books in California, set in 2012, require that 2.7 percent of new cars sold in the state this year be, in the regulatory jargon, ZEVs. These are defined as battery-only or fuel-cell cars, and plug-in hybrids. The quota rises every year starting in 2018 and reaches 22 percent in 2025. Nichols wants 100 percent of the new vehicles sold to be zero- or almost-zero-emissions by 2030

The mathematical relationships developed in this paper make it possible to determine the driving reduction that would be required if it is desired to stabilize the climate at a livable level, assuming the schedule of fleet electrification implied by the above quote. Electricity is required to be 90% renewable. The results of the *Mary_Nichols* Case are shown in Table 9.

The corresponding driving reduction is computed using Eq. 9.

$$\frac{d_{2030}}{d_{2005}} = 0.177005 * \frac{m_{2030}}{m_{2015}} = 0.177055 * \frac{77.24}{27.63} = 0.495 \quad \textbf{(Eq. 14)}$$

This means that the per-capita driving will need to be about 50% less in 2030 than in year 2005. It is not known if CARB understands this.

The official policy of the California Democratic Party (CDP) is expressed in its Platform. A statement that applies to this report and to CARB can be viewed by looking at the California Democratic Party (CDP) website, then select "About Us", "Standing Committees", "Platform Committee", "2020 Platform", and finally "Energy and Environment Plank". In that Plank, the following statement is found

- *Demand a state plan specifying how cars and light-duty trucks can meet climate-stabilizing targets by defining enforceable measures to achieve necessary fleet efficiency and per-capita driving limits;*

However, your author's efforts to get CARB to do such a "state plan", or to convince a state legislator to write legislation to direct CARB to do such a plan, have not been successful.

If CARB would do such a plan or would consider the results of this report, they would perhaps decide to push for a more ambitious fleet electrification schedule and would also push for state legislation and regulation to enact measures to reduce VMT.

Preliminary Conclusions Drawn from the Results of the Four Cases Run

Table 10 is a summary showing the most important results of the four cases considered. The purple-colored entries denote difficult requirements; red denotes nearly impossible.

Considering the *Balance_1* and the *Balanced_2* cases and the fleet electrification schedules for each, it is first concluded that California needs to work to get its electricity to be at least 85% renewable by 2030 and furthermore that getting it to be 90% from renewables by 2030 would make the electrification schedule much easier.

Table 9 Calculation of 2030 LDV Mileage Assuming the *Mary_Nichols* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	29.2	.7886	.027	2.7	.004	31.89	0.7930	40.22
2017	35.1	.9200	38.15	.4	38.9	1.0201	.027	2.7	.004	41.62	1.0245	40.63
2018	36.1	.9133	39.53	.5	47.4	1.2003	.051	5.1	.008	52.56	1.2086	43.49
2019	37.1	.9067	40.92	.6	55.5	1.3560	.075	7.5	.012	63.01	1.3681	46.06
2020	38.3	.9000	42.56	.7	63.0	1.4814	.099	9.9	.016	72.98	1.4974	48.74
2021	40.3	.8500	47.41	.8	70.1	1.4790	.124	12.4	.020	82.47	1.4988	55.02
2022	42.3	.8000	52.88	.9	76.7	1.4509	.148	14.8	.024	91.48	1.4746	62.03
2023	44.3	.8000	55.38	1.0	82.8	1.4957	.172	17.2	.028	100.00	1.5233	65.65
2024	46.5	.8000	58.13	1.0	80.4	1.3834	.196	19.6	.032	100.00	1.4149	70.67
2025	48.7	.8000	60.88	1.0	78.0	1.2813	.220	22.0	.035	100.00	1.3167	75.95
2026	51.2	.8000	64.00	1.0	62.4	0.9750	.376	37.6	.060	100.00	1.0355	96.57
2027	53.7	.8000	67.13	1.0	46.8	0.6972	.532	53.2	.086	100.00	0.7828	127.75
2028	56.2	.8000	70.25	1.0	31.2	0.4441	.688	68.8	.111	100.00	0.5548	180.25
2029	58.7	.8000	73.38	1.0	15.6	0.2126	.844	84.4	.136	100.00	0.3484	287.05
2030	61.2	.8000	76.50	1.0	0.0	0.0000	1.000	100.0	.161	100.00	0.1609	621.67
Sum of Miles and then Gallons of Equivalent Fuel:										**1236.00**	**16.00**	
Equivalent MPG of LDV Fleet in 2030:											***77.24***	
Sum of ZEV Miles = **457.9**. Fraction of Miles Driven by ZEVs = **37.0%**												

Certainly, achieving a 32% reduction in driving in 2030 compared to the 2005 level will be difficult. However, increasing the rate of fleet electrification, from what is shown in the *Balanced_1* and *Balanced_2* cases (**z**, in Tables 6 and 7) would be even more difficult.

Table 10 **Four-Case Summary of Requirements**

	Case Designations			
	Balanced_1	**Balanced_2**	**2005 Driving**	**Mary Nichols**
% Renewable Electricity	**85.0%**	**90.0%**	**90.0%**	**90.00%**
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	**20.0%**	15.0%	**82.0%**	12.35%
% ZEVs, Year 2022	**35.0%**	25.0%	**97.0%**	14.76%
% ZEVs, Year 2023	**55.0%**	**45.0%**	99.0%	17.18%
% ZEVs, Year 2024	**80.0%**	**70.0%**	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	**32.0%**	**32.0%**	0%	**50.5%**

Besides that, it should be recognized that California alone cannot stabilize our earth's climate. California's best hope is to set an example for other states and other countries. Taking too many of the world's production of electric vehicles will not work. For a more specific example, lithium batteries may be in short supply and so it may be counterproductive for California to have more than its fair share, thus preventing other states and countries from electrifying their fleet at the required rate. The rates of electrification shown for the *Balanced_1* and the *Balanced_2* cases are aggressive enough, as shown by the purple-colored entries.

California needs to adopt a set of requirements to achieve the 32% reduction. If CARB wants to work to have California legislate requirements to achieve the *Mary Nichol*'s case of a 50% reduction in driving, that would also work and allow more electric cars to go to other states and countries. However the 50% reduction in per-capita driving might be politically impossible at this time.

Since the 32% reduction seems prudent, it begs the question as to what this means in terms of roadway congestion.

The net (as opposed to the per-capita) driving change, going from 2005 to 2030 can be computed by multiplying the per-capita driving factor corresponding to the 32% reduction, which is 0.68, by the population factor of 1.1744, computed in Equation 7. The product of these two values is 0.7986. This means that, even with the 17% increase in California's population, the net driving will have to drop by the factor of about 0.80, or by 20%. If this LDV-driving-reduction requirement (of 0.68) is selected, all of California's transportation money can be used to improve transit, improve active transportation (mainly walking and biking), and maintain, but not expand, roads. There can be little or no congestion because California highway capacity now is larger than it was in 2005 while the state's net driving must drop by 20%.

ACHIEVING THE REQUIRED DRIVING REDUCTION OF THE *BALANCED_1* AND THE *BALANCED_2* CASES

As shown in Equation 19, for the *Balanced_1* case, and in Equation 21 for the *Balanced_2* Case, in 2030, the per-capita driving will need to be 32% below the 2005 value. As shown in this link, https://en.wikipedia.org/wiki/Sustainable_Communities_and_Climate_Protection_Act_of_2008 , California's Metropolitan Planning Organizations (MPOs) are adopting Region Transportation Plans (RTPs) that will achieve reductions in year 2020 and 2035. The convention adopted in this report for these reductions, specifically the per-capita driving reduction with respect to the per-capita driving in 2005, matches the SB 375 convention. As shown in the link, the targets, for year 2035, range from 0% for the Shasta MPO to 16% for Sacramento Area Council of Governments. However, it may be true that some of the 2035 requirements have been revised upwards, to be as large as 19% for some MPOs. Since the climate stabilization target year here is 2030 instead of 2035, and to be reasonably conservative, it is assumed here that the state (this is for all MPOs) will achieve a 12% reduction in per-capita driving, in 2030, compared to 2005. This leaves approximately 20% to be achieved by new requirements.

The title of each of the following subsections contains the estimated per-capita driving reduction each strategy will achieve, by 2030.

Reallocate Funds Earmarked for Highway Expansion to Transit and Consider Transit-Design Upgrades (2%)

San Diego County has a sales tax measure called "TransNet", which allocates approximately one-third for highway expansion, one-third for transit, and one-third for road maintenance. It has a provision that allows for a reallocation of funds, if supported by at least two-thirds of SANDAG Board members, including a so-called weighted vote, where governments are given a portion of 100 votes, proportional to their population. This requirement would be to reallocate the TransNet amount, earmarked for highway expansion, to transit and to do similar reallocations throughout California.

This money could be used to fund additional transit systems; improve transit operations; and/or fund the redesign and implementation of the redesign of existing transit systems. The redesign could include electrification and automation (including automation of fare collection and such features as screening passengers to prevent them from boarding if they have a fever or are in a "test positive" database) or even upgrading to a different transit technology.

A Comprehensive Road-Use Charge (RUC) Pricing and Payout System to Unbundle the Cost of Operating Roads (10%)

Comprehensive means that pricing would be set to cover all costs (including road maintenance and externalities such as harm to the environment and health); that privacy and the interests of low-income drivers doing necessary driving would be protected; that the incentive to drive fuel-efficient cars would be at least as large as it is under the current fuels excise tax; and finally, as good technology becomes available, congestion pricing is used to protect critical driving from congestion.

The words *payout* and *unbundle* mean that some of the money collected would go to people that are losing money under the current system.

User fees (gas taxes and tolls) are not enough to cover road costs[10] and California is not properly maintaining its roads. Reference 10 shows that in California user fees amount to only 24.1% of what is spent on roads. Besides this, the improved mileage of the ICEs and the large number of ZEVs mean that gas tax revenues will drop precipitously.

This RUC system could be used to help reduce the ICE LDV miles driven in 2016 to 2022, as shown in the "f" column of Tables 6 through 9. This system could probably be implemented in less than 2 years if the urgency of our climate crisis is recognized..

Unbundling the Cost of Car Parking (8%)

Unbundling the cost of car parking[11] throughout California is conservatively estimated to decrease driving by 8%, based on Table 1 of Reference 11. That table shows driving reductions that occur in response to introducing a price, for 10 cases. Its average reduction in driving is 25% and its smallest reduction is 15%. However, these numbers are for individual cases whereas the 8% is the decrease in driving in California, due to introducing value pricing where there is a zero price today, or where the price is below its value price. These concepts are explained in Reference 11.

The first such systems should be installed by a (RFP is Request for Proposal) RFP-process-identified, third-party vendor, such as Google, Qualcomm, Uber, or Lime Bicycle, for municipal government employees, as part of the government's Climate Action Plan. The system would be operated for the financial gain of the employees, with a hard requirement in the RFP that even

employees that continue to drive every day would at least break even. The winning third-party vendor would be skilled at monetizing parking whenever it is not being used by the employees and skilled at monetizing data. The parking system would be fully automated, like Uber, except with a more useful phone app that would find the best parking at the user-specified price and walk-distance. The parking would be available to all drivers driving a car registered in the system. Briefly stated, the system is value priced, shared, automated, and provides earnings to all the people that are effectively losing wages or paying higher costs because the parking is being provided. The vendor would also be good at expanding the system both geographically and over all types of uses, in an economically disruptive way; as Uber and Lyft did to the taxi cab industry. The system would be as easy to use as "free" parking, once the car is registered. It would utilize congestion pricing to protect the desired maximum-occupancy rate.

Good Bicycle Projects

The best criterion for spending money for bicycle transportation is the estimated reduction in driving per the amount spent. The following strategies may come close to maximizing this parameter.

Projects to Improve Bicycle Access (1%)

All of the smart-growth neighborhoods, central business districts, and other high-trip destinations or origins, both existing and planned, should be checked to see if bicycle access could be substantially improved with either a traffic calming project, a "complete streets" project, more shoulder width, or a project to overcome some natural or made-made obstacle. For example, in some cases, long stretches of freeways cut off bicycle passage on surface streets that are perpendicular to the freeway. In some of these cases, a bicycle bridge over the freeway would be cost effective.

League-of-American-Bicyclist-Certified (LCI) Instruction of "Traffic Skills 101" (1%)

Most serious injuries to bike riders occur in accidents that do not involve a motor vehicle[12]. Most car-bike accidents are caused by wrong-way riding and errors in intersections; the clear-cut-hit-from-behind accident is rare[12].

After attending *Traffic Skills 101*, students that pass a rigorous written test and demonstrate proficiency in riding in traffic and other challenging conditions, in passing an on-road-riding test, would be paid for their time and effort.

As an example of what could be done in San Diego County, if the average class size was 3 riders per instructor and each rider passes both tests and earns $100 and if the instructor, with overhead, costs $500 dollars, for a total of $800 for each 3 students, that would mean that $160M could teach $160M/$800 = 200,000 classes of 3 students, for a total of 600,000 students. The population of San Diego County is around 3 million.

Eliminate or Greatly Increase the Maximum Height and Density Limits Close to Transit Stops that Meet Appropriate Service Standards (2%)

As sprawl is reduced, more compact, transit-oriented development (TOD) will need to be built. This strategy will incentivize a consideration of what level of transit service will be needed, how it can be achieved, and what levels of maximum height and density are appropriate. Having no limits at all is reasonable if models show that the development can function without harming the existing adjacent

neighborhoods, given the level of transit service and other supporting transportation policies (such as car parking that unbundles the cost and supports the full sharing of parking[12]) that can be assumed.

Complete Streets (Streets designed for all users), "Road Diets", and "Traffic Calming", Such as Replacing Signalized Intersections with Roundabouts (1%)

These projects will encourage active transportation, such as bicycling and walking. These projects also fit well with the addition of TOD and increasing density. They will reduce speeds and therefore reduce noise. The noise reduction and increased safety will encourage people to want to live on and around the redesigned arterials where they would not want to have lived before. People will also be more inclined to shop and to work in such surroundings.

Net Driving Reduction from All Identified Strategies

By 2030, the sum of these strategies should be realized as shown in Table 11.

CONCLUSION

The urgency of our climate crisis dictates that California should develop plans such as the cases considered in this paper for a climate-stabilizing target year of 2030. The state needs to select a case and move forward with legislation and implementation. The cases considered in this paper indicate that California should achieve electricity that is at least 85% from renewable sources and a per-capita driving reduction of at least 32% with respect to 2005 driving levels. The eight driving-reducing requirements described in this paper are an example of how this could be done.

Table 11 Requirements to Achieve a 32% Reduction in 2030 Per-Capita Driving, with Respect to 2005

Driving Reduction Requirements	Percent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Value-Priced Parking (Unbundling the Cost)	8%	0.92
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
*Pay-to-Graduat*e Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		0.68
% Reduction		**32%**

ABREVIATIONS AND ACRONYMS

AB 1493	California's Assembly Bill 1493
AB 32	California's Assembly Bill 32
APS	Alternative Planning Strategy
CAFE	Corporate Average Fleet Efficiency
CARB	California Air Resources Board
CBD	Center for Biological Diversity
CEQA	California Environmental Quality Act
CCAP	Center for Clean Air Policy
CNFF	Cleveland National Forest Foundation
SB 375	California's Senate Bill 375
CO_2	Carbon Dioxide
CO_2_e	Carbon Dioxide Equivalent GHG
EHM	"Extra Heroic Measures" LDV Case
GEO	Governor's Executive Order
ICE	Internal Combustion Engine LDV
kW-h	Kilo Watt-hour
LCFS	Low Carbon Fuel Standard
LDV	Light-Duty Vehicle
MPO	Metropolitan Planning Organization
Pavley	Senator Pavley's AB 1493
PPM	Parts per Million
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
S-3-05	Governor's Executive Order S-3-05
SANDAG	San Diego Association of Governments
SCS	Sustainable Community Strategy
TransNet	San Diego County sales tax

GHG	Greenhouse gas	**URL**	Universal Resource Locator
GW-h	Giga Watt-Hours	**VMT**	Vehicle Miles Travelled
HM	"Heroic Measures" LDV Case	**ZEV**	Zero Emission Vehicle LDV

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KEYWORDS

Driving, climate, mandates, S-3-05, SB 375, RTP, CEQA, Unbundled, GHG, CAFÉ, ZEVs

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September 16, 2011

Honorable Jerome Stocks
Chair, Board of Directors
San Diego Association of Governments
401 B Street, Suite 700
San Diego, CA 92101

RE: **Draft Environmental Impact Report for 2050 Regional Transportation Plan and Sustainable Communities Strategy**

Dear Chairman Stocks and Honorable Members of the Board:

Attorney General Kamala D. Harris submits the following comments on the Draft Environmental Impact Report (DEIR) prepared for the San Diego Association of Governments' (SANDAG) 2050 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS).[1] While we recognize the difficulty of SANDAG's task – to prepare the first SCS in the State as required by SB 375[2] – our review of the DEIR for the RTP/SCS has revealed some significant legal problems, as set forth below. We believe that SANDAG has the ability to correct these problems and improve the RTP/SCS, which will benefit not only the San Diego region, but will help to set the standard for other Metropolitan Planning Organizations across California.

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[1] The Attorney General submits these comments pursuant to her independent power and duty to protect the environment and natural resources of the State from pollution, impairment, or destruction, and in furtherance of the public interest. (See Cal. Const., art. V, § 13; Gov. Code, §§ 12511, 12600-12612; *D'Amico v. Bd. of Medical Examiners* (1974) 11 Cal.3d 1, 14-15.) This letter is not intended, and should not be construed, as an exhaustive discussion of the DEIR's compliance with the California Environmental Quality Act (CEQA).

[2] Senate Bill 375 (Chapter 728, Statutes of 2008).

Comments on the DEIR

Localized Air Pollution

The SANDAG region has some of the most serious local air quality problems in the State and the nation – in substantial part caused by vehicle emissions. The harm from these pollutants is not necessarily distributed equally throughout the region, but may be more concentrated in communities immediately adjacent to large-scale industrial and commercial development and major transportation corridors, and may more particularly affect certain segments of the population. As discussed below, our review of the DEIR indicates that SANDAG has set too low a bar for determining whether the air quality impacts of its RTP/SCS are significant, and, further, has failed to analyze the impacts of projected increases in pollution on communities that are sensitive or already overburdened with pollution, in violation of CEQA.

Background: Pollutants of Concern in the San Diego Air Basin

It is well established that "[t]he significance of an activity depends upon the setting." (*Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 718 [citing Cal. Code Regs., tit. 14, § 15064, subd. (b)]; see also *id.* at 721.) Accordingly, the significance of any added pollutant emissions must be judged in the context of an air basin that already exceeds health-based federal air quality standards. (See *ibid.*) The San Diego area was ranked by the American Lung Association this year as having the seventh worst ozone problem, and the fifteenth worst particulate pollution problem, in the nation.[3] Pollutants of concern in the San Diego air basin include ozone, the chemical commonly called "smog," which may permanently decrease lung function;[4] and particulate matter, which impairs lung function and can exacerbate asthma. Small particulate matter (2.5 microns in size or less), a component of diesel exhaust, is of particular concern, because it can penetrate deeply into the lungs, bypassing the body's defenses, and can carry carcinogens on the surface of the particles.

The seriousness of the localized air pollution problem as it exists today in the region can hardly be overstated. The area exceeded the health-based federal ozone standard on 24 days in 2009, and it exceeded the federal particulate standard on 4 days. The basin exceeded the more stringent California standard for ozone on 127 days in 2009, and the fine-particulate standard on 78 days. The area has a history of failing to meet applicable air quality objectives. The San Diego Air Pollution Control District (APCD) stated in its 2009 Regional Air Quality Strategy (RAQS) that it has not consistently met the Health and Safety Code's 5% per year ozone reduction target during any year during the 2003-2006 time period, and that the APCD expects reductions of only about 3% per year during the 2006-2009 time period. (San Diego APCD 2009-RAQS, p. 2.)

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[3] American Lung Association, *State of the Air 2011*, at pp. 11, 13.
[4] Gauderman, et al., *The Effects of Air Pollution on Lung Development from 10 to 18 Years of* Age (Sept. 9, 2004) 351 The New England Journal of Medicine 1057-1068.

SANDAG's Focus on "Conformity" with the State Air Pollution Plans Fails Adequately to Address the Region's Serious Air Quality Problems.

Where an area exceeds federal air quality standards for air pollutants, federal law allows funding of the individual transportation projects listed in an RTP only if the RTP "conforms" to a federally approved state plan to meet those federal standards. The DEIR's analysis of whether localized air pollution resulting from the RTP/SCS is significant under CEQA focuses almost exclusively on whether such conformity is achieved. There are significant problems with this limited approach, which substitutes a determination of whether certain federal laws are met for SANDAG's obligation under CEQA to conduct a thorough analysis of the actual effects on the air and on public health that will result from the addition of the many hundreds of miles of highway expansion and extensions that are in the RTP/SCS.

California's most recent federally approved plan was prepared in 2007, and therefore does not reflect current conditions. The DEIR acknowledges that the federal EPA is expected to soon reclassify the San Diego Air Basin as in "serious" nonattainment of the federal ozone standard, a designation that requires attainment of the federal standard by June of 2013. (DEIR, p. 4.3-6.) Demonstrating conformity with the 2007 plan emissions budgets does not, by itself, show that relevant health effects created by the new pollution generated by the RTP/SCS have been analyzed and disclosed, or even that the relevant federal standards will be met. Instead, EPA's reclassification of the air basin as having worse air quality, and the imposition of such a short deadline for meeting the federal ozone standard, indicates a more serious air pollution problem that may require more stringent control measures to protect the public health.[5]

In addition, the DEIR fails to analyze whether the California standard for ozone, more stringent than the federal standard, will be met during the life of the RTP/SCS, or what the RTP/SCS's contribution to current or future violations of that standard will be. The DEIR appears to rely solely on the RAQS to meet the state ozone standard. (See DEIR at p. 4.3-29-30.) Yet, as noted, the region has not consistently met the RAQS 5% per year ozone reduction target. The fact that U.S. EPA is expected to reclassify the Basin as in "serious" nonattainment of the less stringent federal ozone standard would indicate that the RAQS standards have not been enough to prevent deteriorating air quality. Thus, any assumption that the RAQS will consistently achieve the 5% reduction target in the future is unsupported, and any assertion that the RAQS will attain the state ozone standard at a time certain unfounded. A full analysis is

[5] Even if conformity with federal standards in state-approved plans were an appropriate benchmark for significance under CEQA, the DEIR does not contain a quantitative analysis, using the most recent available air quality measurements as the baseline, to determine whether the federal air quality standards will actually be met, and what the public health consequences would be of adding the expected pollutant load from the RTP/SCS to existing conditions. (DEIR, at p. 4.3-14.)

needed to show that the emissions caused by the RTP/SCS at different time points during its life will not contribute significantly to violations of the state ozone standard in the San Diego Air Basin.

SANDAG Has Failed Adequately to Address Impacts to Public Health and Communities Already Burdened with Pollution.

We commend SANDAG for including in its DEIR a chapter entitled "Environmental Justice." (DEIR, ch. 4.06.) That section appears to focus primarily on the RTP/SCS's effect on access to transit by traditionally underserved communities. SANDAG has, however, failed to analyze other equally, if not more, significant effects of the RTP/SCS on communities currently experiencing environmental injustice. The principal omission of the DEIR is the lack of any discussion of the impacts of the increased air pollution that will result from carrying out the RTP/SCS on communities already severely impacted by air pollution. As noted, CEQA requires that the significance of environmental impacts be considered in context. (*Kings County Farm Bureau, supra,* 221 Cal.App.3d at 718.) Such context may appropriately include (1) whether the region includes communities or subpopulations that may be particularly sensitive to increases in pollution; and (2) whether such communities or groups are already at or near their capacity to bear any additional pollution burden.

The DEIR does not identify whether the area affected by the RTP/SCS includes particularly sensitive communities that will be affected disproportionately by the acknowledged increase in pollution. "[A] number of studies have reported increased sensitivity to pollution, for communities with low income levels, low education levels, and other biological and social factors. This combination of multiple pollutants and increased sensitivity in these communities can result in a higher cumulative pollution impact." (Office of Environmental Health Hazard Assessment, *Cumulative Impacts: Building a Scientific Foundation* (Dec. 2010), Exec. Summary at p. ix.)[6] Research in other parts of California has shown that disadvantaged and minority communities are often exposed to unhealthful air more frequently and at higher levels than other groups.[7] Identifying these communities is an essential part of describing the relevant CEQA setting.

Once such communities are identified, SANDAG must analyze how the health of the residents in these communities would be expected to be particularly affected. As discussed, residents already are experiencing serious air pollution that is impacting health and welfare, and it is reasonable to assume that these effects currently are more concentrated in certain areas of the region, for example, in communities adjacent to large-scale industrial or commercial operations or transportation corridors used by heavy-duty trucks. In addition, viewed at the individual community scale, there may be synergistic adverse effects. For example, research

[6] Available at http://oehha.ca.gov/ej/cipa123110.html.
[7] Hall and Brajer, *The Benefits of Meeting Federal Clean Air Standards in the South Coast and San Joaquin Valley Air Basins* (2008) at 22-23.

has shown that increases in greenhouse gas emissions may result in localized ozone increases; such increases have been observed in California.[8]

We believe that particulate pollution may be of special concern to already burdened communities. As discussed, diesel particulate emissions have serious health effects, since they impact respiratory function and can exacerbate asthma. Further, diesel particulates are known to the State of California to cause cancer,[9] and have been listed by the Air Resources Board (ARB) as a toxic air contaminant.[10] The DEIR shows that particulate matter pollution will increase over the life of the RTP/SCS. (DEIR, Table 4.3-5, p. 4.3-25.) It also reports that the ARB estimated in 2000 – over a decade ago – that a subset of particulate pollution, fine particulates emitted by diesel vehicles, created an additional cancer risk of 720 cancer cases per one million persons exposed in the San Diego Air Basin. (DEIR, p. 4.3-8.) For comparison purposes, a private business must provide a warning if it exposes individuals to a chemical that poses an increased cancer risk of ten cases in one million people exposed. (Cal. Code Regs, tit. 27, § 25703(b).)

Despite this high cancer risk, and the DEIR's own recognition that particulate pollution will increase over the life of the RTP/SCS, the DEIR does not analyze what public health effects the increase in particulate matter will cause. Nor does it estimate what portion of the increase in particulate pollution will be carcinogenic diesel particulate matter, and disclose the public health effects that increase may cause. Such an analysis is required under CEQA, so that both the decision maker and the public can know the full consequences of the decision being made. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1219-1220.) We are especially concerned that no analysis is presented either of the current risk from particulate pollution, nor of the impact of the projected increase in particulate pollution, on already overburdened or sensitive communities. Given the increase in particulate emissions shown in the DEIR, given the emphasis in the RTP/SCS on the Goods Movement Strategy for the San Diego region (RTP/SCS, Chapter 6), and given the DEIR's recognition that much of this goods movement will be accomplished by diesel trucks (DEIR, p. 4-16-8; see, also, RTP/SCS, Tech. Appdx. 4, p. 4 [estimating that roads and truckways will carry 90% by volume of goods through the region]), it is incumbent on SANDAG to fully analyze the public health consequences of the RTP/SCS in general, and of the Goods Movement Strategy, in particular.[11]

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[8] Jacobson, *Enhancement of Local Air Pollution by Urban CO2 Domes* (2010) Environ. Sci. Technol. 2497-2502. This phenomenon is of concern because, as discussed, under the RTP/SCS, vehicle miles travelled (VMT) trends up as the total number of vehicles on the road increases. (DEIR, pp. 4.12-16, 4.12-21, 4.12-24; contrast with Table TA 3.1, showing an overall decrease of 1% in VMT by 2050.) Increases in VMT cause increased emissions of greenhouse gases, which may in turn exacerbate localized pollution.

[9] Cal. Code Regs., tit. 27, § 27001.

[10] Cal. Code Regs., tit. 17, § 93000.

[11] See *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1219-1220, cited above.

The goal of an RTP/SCS is a sustainable community, and no community can be sustainable unless its public health is protected. Thus, while the inclusion of a separate chapter of the DEIR on environmental justice is commendable, the current analysis is deficient, and should be redone and expanded to disclose the full scope of the air pollution and public health consequences of the RTP/SCS, and to propose mitigation measures for those consequences that are proportional to the seriousness of the impacts. (*City of Marina v. Board of Trustees of the California State University* (2006) 39 Cal.4th 341, 361-62.) We would be happy to work with SANDAG in making this part of the DEIR more meaningful.

SANDAG Has Failed Adequately to Consider Feasible Mitigation for Localized Air Quality Impacts.

Although it finds the RTP/SCS's impacts on localized air pollution to be significant, the DEIR proposes almost no mitigation measures to reduce or offset these impacts. Instead, the DEIR states that "mitigation measures at the program level is [sic] infeasible" for ozone precursors and carbon monoxide, and defers all mitigation for these pollutants to individual project-level CEQA processes. (DEIR, pp. 4.3-46, 4.3-47, 4.3-48.) CEQA requires that project changes or mitigation either be adopted or shown through substantial evidence to be infeasible; the DEIR, however, does not make such a showing.

The DEIR offers virtually no evidence that program-level mitigation is actually infeasible, and the mitigation measures it does propose lack certainty and are incomplete. For example, compliance with future local land use plans (the scope of which is not now known) is identified as the only feasible mitigation for ozone-related impacts. (DEIR, p. 4.3-48.) Mitigation for fine particulate matter is not discussed separately from mitigation for coarse particulates, despite their different sizes, health impacts, and sources. The dust control measures in the DEIR are not shown to be effective against fine particulates, which come more from industrial processes and fuel combustion than from ground disturbance. The DEIR's treatment of mitigation for conventional air pollution does not comply with CEQA's substantive mandate to mitigate all significant impacts. (Pub. Resources Code, §§ 21002, 21081(a).)

It is vital for the health of the San Diego region's public that all feasible mitigation be adopted and carried out to prevent further deterioration of the already unhealthy air, and it is also vital for the region's economy. Research shows consistently that the costs of reducing pollution are far outweighed by clean-air benefits such as increased worker productivity, increased agricultural outputs, and reductions in mortality and illness that result from cleaner air.[12] The research cited above -- finding minority communities more severely affected by air pollution -- also calculated the significant costs associated with polluted air in other air basins. Costs ranged

[12] On a nationwide basis, the Office of Management and Budget has estimated that the benefits of clean air regulations outweigh the costs by a ratio of about four to one. OMB, "Informing Regulatory Decisions: 2003 Report to Congress on the Coasts and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities."

from $1,250 per person per year in the South Coast Air Basin to $1,600 per person per year in the San Joaquin Valley Air Basin, due to increased health care costs and emergency room visits, missed work and school days, and even premature deaths.[13] CEQA mandates that SANDAG improve its analysis of the feasibility of localized air pollution mitigation, and the economic benefits of cleaner air and healthier communities must be considered in the feasibility calculus.

Climate Change Impacts: Greenhouse Gas Emissions

Before discussing the DEIR's treatment of GHG emissions, it is important first to establish the relevant context for evaluating significance. The climate is affected by the concentration of GHGs in the atmosphere. The concentration of carbon dioxide, the primary GHG, has increased from approximately 280 parts per million (ppm) in pre-industrial times to well over 380 ppm, according to the National Oceanic and Atmospheric Administration's (NOAA) Earth Systems Research Laboratory.[14] Almost all of the increase is due to human activities (such as fossil fuel use).[15] The current rate of increase in carbon dioxide concentrations is about 1.9 ppm/year; present carbon dioxide concentrations are higher than any time in at least the last 650,000 years.[16] GHGs persist in the atmosphere for decades and in some cases millennia.[17]

The atmosphere and the oceans are reaching their capacity to absorb GHGs without significantly (and perhaps abruptly) changing the Earth's climate. California is already seeing the effects of climate change. As the Resources Agency observed in its 2009 report, we already are experiencing sea level rise, coastal erosion, increased average temperatures, more extreme hot days and increased heat waves, fewer shifts in the water cycle, and increases in the frequency and intensity of wildfires. (Resources Agency, *2009 Climate Adaptation Strategy* at p. 3.)[18] These effects are expected to increase with rising GHG levels in the atmosphere.

The burdens of climate change will not be shared equally. Future climate scenarios are expected to disproportionately affect, for example, the urban poor, the elderly and children, traditional societies, agricultural workers and rural populations. (Office of Environmental Health Hazard Assessment, *Indicators of Climate Change in California: Environmental Justice Impacts* (Dec. 2010) at p. 2.)[19]

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[13] Hall and Brajer, at 5.
[14] See http://www.epa.gov/climatechange/science/recentac.html.
[15] *Id.*
[16] *Id.*
[17] Intergovernmental Panel on Climate Change, *Frequently Asked Questions*, FAQ 10.3 (2007), available at www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-faqs.pdf.
[18] Available at http://www.climatechange.ca.gov/adaptation/.
[19] Available at http://oehha.ca.gov/multimedia/epic/epic123110.html.

In order to stabilize the climate and avoid the most catastrophic outcomes of climate change, we must substantially reduce our annual GHG emissions over time, achieving a low-carbon future by midcentury. California has memorialized this overarching environmental objective in law. Under AB 32[20], by 2020, California must reduce its total statewide greenhouse gas emissions to the level they were in 1990. (Health & Saf. Code, § 38550). To achieve AB 32's 2020 target, total statewide greenhouse gas emissions must be reduced by approximately 15 percent from current (2008) levels. AB 32 implements Executive Order S-03-05 (2005),[21] which set the statewide 2020 target as an interim step to reducing statewide emission levels, by 2050, to 80 percent below 1990 levels. "The 2020 goal was established to be an aggressive, but achievable, mid-term target, and the 2050 greenhouse gas emissions reduction goal represents the level scientists believe is necessary to reach levels that will stabilize climate." (Air Resources Board (ARB), Scoping Plan at p. 4.)[22]

The emissions reductions required to reach our statewide climate objective are substantial. In the longer term, we must reduce our total GHG emissions by approximately four percent per year between 2020 and 2030, and our per capita emissions by slightly less than five percent per year during the 2020 to 2030 period, with continued reductions required through midcentury. (These reductions required are graphically illustrated by the chart from ARB's Scoping Plan, attached to this letter as Exhibit A.) One of the prime objectives of SB 375, a law supporting and complementary to AB 32, and of the requirement for Sustainable Communities Strategies, is to create a long-term downward trajectory for GHG emissions in California through transportation and land use strategies.

Given the seriousness of the climate change problem, and the enormity of our GHG reduction task, we are greatly concerned that, when viewed in context, the RTP/SCS seems to be setting the region on a course that is inconsistent with the State's climate objectives. Specifically, per capita GHG emissions from cars and light-duty trucks increase as compared to the previous year after 2020 (see RTP, Table 301 at p. 3-3), while AB 32 requires that we must aggressively and steadily reduce total per capita GHG emissions during this time period. (See Exhibit A.) Moreover, the total number of vehicle miles travelled (VMT) driven in the San Diego region will steadily increase over the life of the RTP/SCS over the 2010 baseline by 10%, 32% , and 51% in 2020, 2035, and 2050, respectively. (DEIR, pp. 4.12-16, 4.12-21, 4.12-24;

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[20] Cal. Health and Safety Code, § 38,500, *et seq.*

[21] The DEIR states that the Executive Order "does not constitute a 'plan' for GHG reduction, and no state plan has been adopted to achieve the 2050 goal." (DEIR, pp. 4.8-29 to 4.8-30.) The DEIR therefore does not find the RTP/SCS's failure to meet the Executive Order's goals to be a significant impact. This position fails to recognize that Executive Order S-3-05 is an official policy of the State of California, established by a gubernatorial order in 2005, and designed to meet the environmental objective that is relevant under CEQA (climate stabilization). SANDAG thus cannot simply ignore it.

[22] Available at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. The Scoping Plan was readopted by ARB on August 24, 2011.

contrast with Table TA 3.1.) Under the most optimistic figures presented in the DEIR, total VMT will drop only 1% over current levels by 2050. Moreover, the DEIR predicts that the 14.33 million metric tons of greenhouse gases (expressed as MMT of carbon dioxide equivalent) emitted by cars and light duty trucks in 2010 (DEIR, p. 4.8-5) will fall to 12.04 MMT in 2020 (DEIR, p. 4.8-20), based largely on statewide tailpipe and fuel standards, but will then begin rising again, to 12.94 MMT in 2035 and 14.74 MMT in 2050. (DEIR, pp. 4.8-23, 4.8-25, respectively.) Thus, although SANDAG will meet the SB 375 goals for per capita GHG targets for cars and trucks set for it by ARB in 2020 and 2035, the DEIR shows that total GHG emissions from cars and light-duty trucks in 2050 will increase over the 2010 emissions level.

The DEIR finds the impact of the RTP/SCS on GHG emissions to be not significant in 2020 (DEIR, p. 4.8-20), significant in 2035 (DEIR, p. 4.8-23), and significant in 2050 (DEIR, p. 4.8-25). SANDAG must, however, make a determination whether the project as a whole has significant climate change impacts. We believe strongly that it does. What the DEIR shows is that the suite of strategies relied on by SANDAG, which include a heavy reliance on roadway expansion projects, does not deliver GHG reductions that are sustainable in the long term. In fact, infrastructure and land use decisions made in the early years of the RTP/SCS may lock in transportation inefficiencies and preclude any realistic possibility of meeting the Executive Order's goal of an 80% reduction in GHG emissions. The DEIR states that "[t]otal land-use based GHG emissions in 2050 are projected to be 21.85 MMT CO2e, or 50 percent greater than GHG emissions in 2010 (Table 4.8-11)." (DEIR at p. 4.8-24.) The DEIR should address the impact of the draft RTP/SCS on this important long-term policy in greater detail.

The DEIR is legally deficient for the additional reason that it does not analyze potential changes to the project design or specific mitigation measures for the GHG emissions impacts from land use; it makes only a generalized promise to prepare future RTPs "to incorporate policies and measures that lead to reduced GHG emissions." (DEIR, p. 4.8-35.) Further, the DEIR proposes some mitigation measures for GHG emissions attributable to transportation, but does not include any transportation mitigation that relates to land use, nor does it show that any such measures would be infeasible. We believe that CEQA requires much more analysis of potential mitigation measures, and that postponing this discussion and analysis until future RTP/SCS's and individual projects is a violation of CEQA's substantive provisions. (Public Res. Code §§ 21002, 21081(a); see *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 89-96.) SANDAG has the authority to approve the RTP/SCS even if it will have substantial environmental impacts, and CEQA will not second-guess the wisdom of that choice, so long as substantial evidence supports SANDAG's findings. (Public Res. Code § 21081(b).) However, SANDAG may not approve an environmentally damaging project until and unless it has adopted all feasible mitigation measures or shown that further mitigation – including land use mitigation – is infeasible. The DEIR does not yet do so.

We recognize that this is the first SCS prepared in California, and that SANDAG is charting new territory. However, the legal requirements of CEQA, including the requirement to mitigate significant impacts to the extent feasible, are not satisfied simply because the RTP/SCS meets the targets contained in SB 375 for 2020 and 2035. CEQA demands a full analysis and all

feasible mitigation of every significant impact resulting from the implementation of the RTP/SCS, throughout the full life of the Plan. The DEIR does not now provide this for GHG emissions.

Comments on RTP/SCS

Although we are not commenting directly on the legal adequacy of the RTP/SCS under SB 375, we concur in the comments submitted to SANDAG by the California Office of Planning and Research (OPR). As discussed above, we are particularly concerned that per capita greenhouse gas (GHG) emissions associated with cars and light-duty trucks (and associated co-pollutants like particulate matter) begin to rise after 2020. (See OPR comment letter at pp. 3-4; Draft RTP at p. 3-3, Table 3.1; see also DEIR at Tables 4.3-5, p. 4.3-25.) As OPR notes, this "implies that future growth will be unavoidably less transportation efficient, which counters SB 375's underlying purpose." (OPR comment letter at p. 3.) If the RTP/SCS in fact runs counter to SB 375's purpose to reduce transportation-related GHG emissions over time, this would bear on whether the effects of the plan should be considered significant under CEQA.

In addition, OPR's comments discuss a failure of the DEIR and RTP/SCS to fully disclose the methodology by which VMT was projected, making it difficult or impossible for the lay public to determine for itself whether the information presented in the two documents is accurate and supported by substantial evidence. This lack of transparency is also a crucial flaw under CEQA, a statute whose purposes include accountability as to governmental decisions that affect the environment. (*Laurel Heights Improvement Ass'n v. Regents of the University of California* (1989) 47 Cal.3d 376, 392 [holding that "the EIR . . . is a document of accountability" for the public officials who certify it].)

Conclusion

We appreciate the difficulty of preparing the first SCS in California. We believe that SANDAG has not yet prepared a DEIR on the RTP/SCS that fully satisfies CEQA's requirements, and urge SANDAG to redo several parts of the DEIR, as described in our comments herein. This RTP/SCS presents SANDAG with an opportunity to integrate transportation and land-use planning in a way that reduces GHG emissions and harmful air pollution, and that produces other benefits such as increased mobility and better public health for all the region's residents, particularly its sensitive and already overburdened communities. We

would be happy to work with SANDAG to take the additional steps needed to take full advantage of this opportunity. We appreciate your consideration of our comments.

Sincerely,

Timothy R. Patterson by SLD

TIMOTHY R. PATTERSON
Supervising Deputy Attorney General

Susan L Durbin

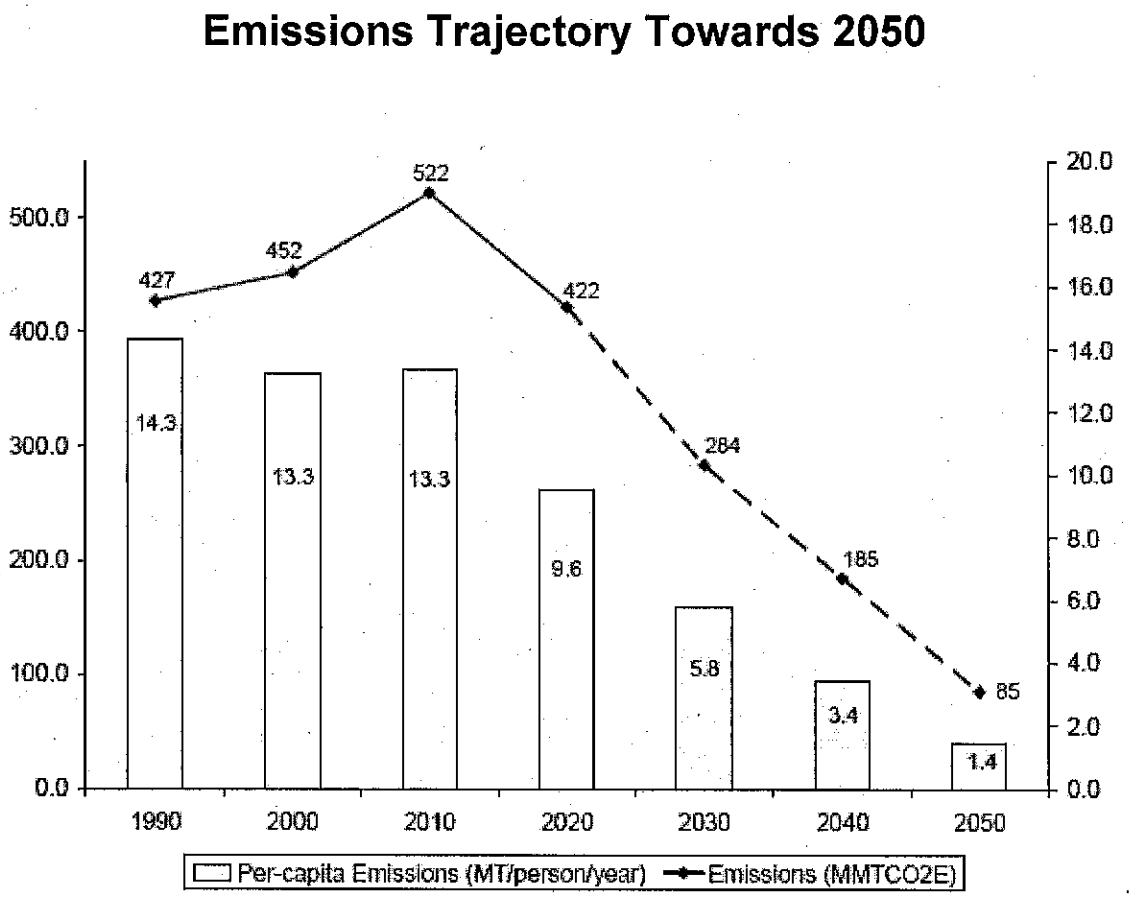
SUSAN DURBIN
Deputy Attorney General

For KAMALA D. HARRIS
Attorney General

cc: Gary Gallegos, Executive Director, San Diego Association of Governments
Julie D. Wiley, General Counsel, San Diego Association of Governments

Attachment

EXHIBIT A



(ARB, Scoping Plan, Figure 6, at p. 118.)

Deriving a Climate-Stabilizing Solution Set of Fleet-Efficiency and Driving-Level Requirements, for Light-Duty Vehicles in California

AWMA Paper 796315

Mike R. Bullock

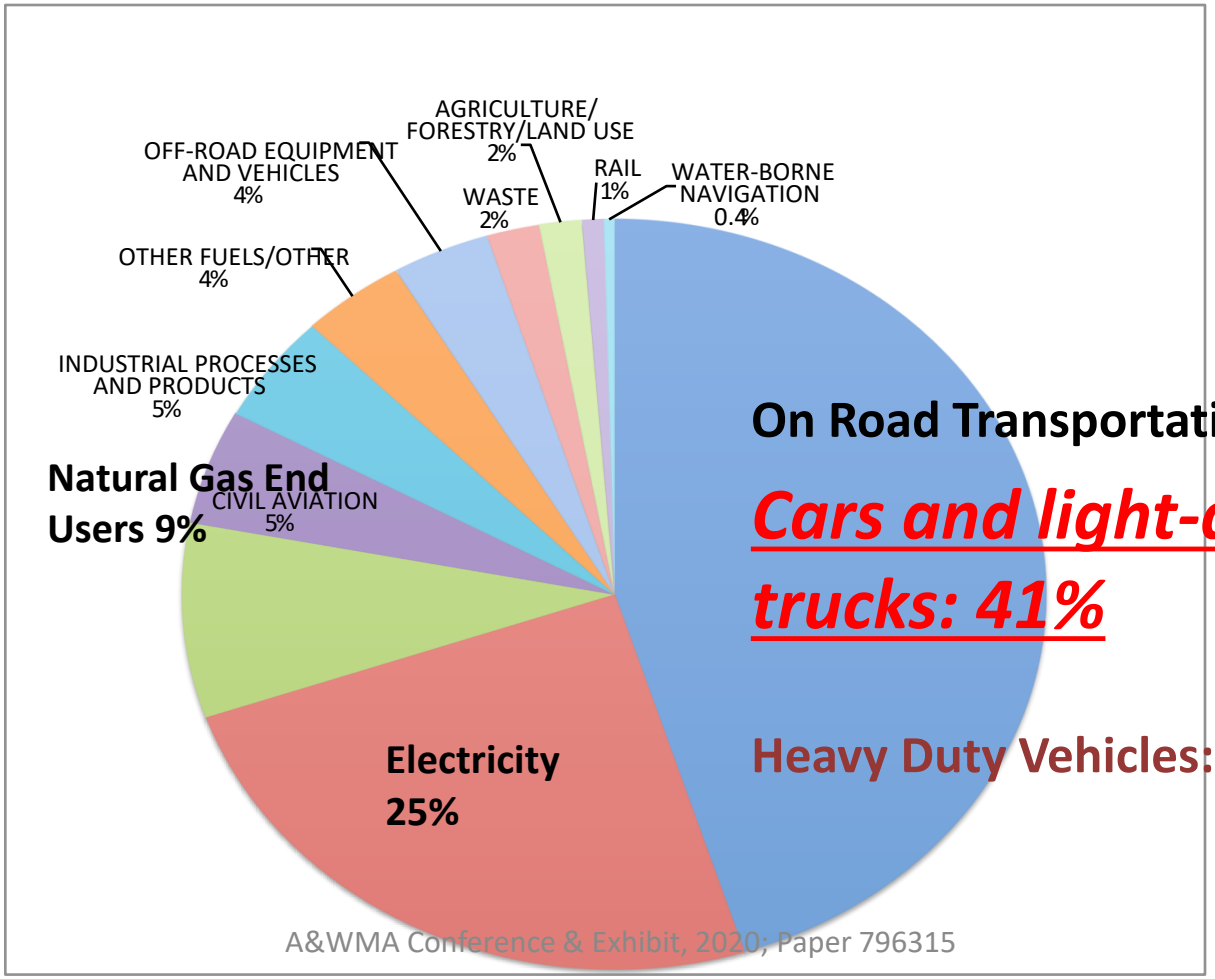
mike_bullock@earthlink.net

Why pick on cars?

Greenhouse Gas (GHG) Emissions, SD County

Source: Energy Policy Initiatives Center (EPIC, USD)

http://www.sandiego.edu/EPIC/ghginventory/GHG-On-Road1.pdf.pdf



Why is there a Climate Problem?

Any Earth Science text book* contains the following facts:

- **Atmospheric CO2 traps heat**
  - CO2 Molecules absorb and then emit, in a random direction, infrared radiation, heat given off by the Earth's surface
  - This effect is significant
- **Combustion of fossil fuels adds great quantities of CO2 to our Earth's atmosphere**
  - The amount of C02 in the atmosphere is well known
  - Our yearly emissions are well known

*** For example, Page 539 of *Earth Science*, Tarbuck and Lutgens, Tenth Edition, published by Prentice Hall, 2003.**

How Bad Could It Get?

- *Scientific American* June 2008 issue
  - 550 PPM CO2 possible in several decades
  - This could (5% probability) lead to 8 Deg. Celsius of warming
  - 8 Deg. Celsius could lead to "a devastating collapse of the human population, perhaps even to extinction"
- December 24/31 2012 Issue of Nation magazine:

A recent string of reports from impeccable mainstream institutions-the International Energy Agency, the World Bank, the accounting firm of PricewaterhouseCoopers-have warned that the Earth is on a trajectory to warm by at least 4 Degrees Celsius

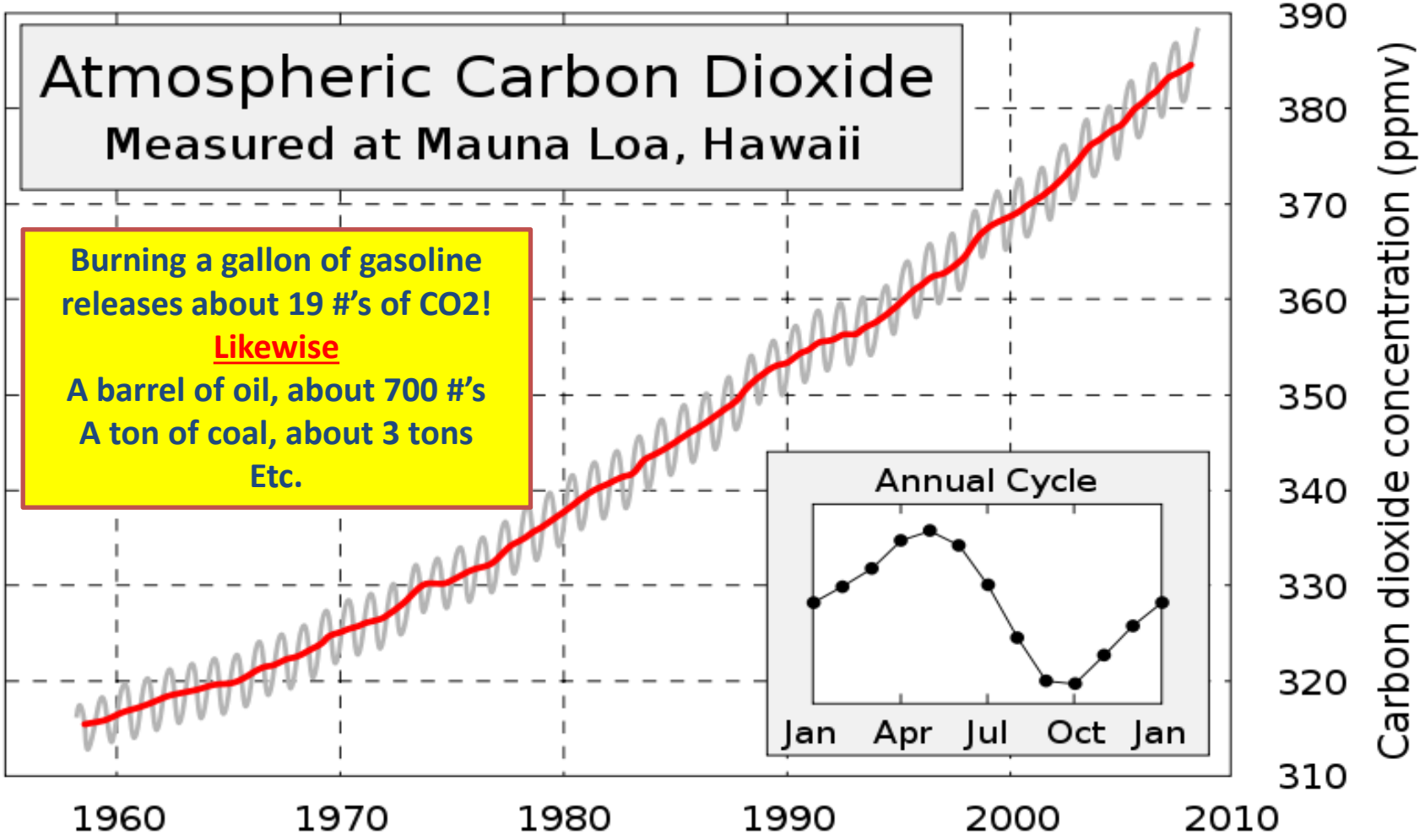
[4 Degrees Celsius] would be *incompatible with continued human survival*.

Winter, ***UU World*** magazine (p. 57) " Lags in the replacement of fossil-fuel use by clean energy use have put the world on a pace for 6 degree Celsius by the end of this century. Such a large temperature rise occurred 250 million years ago and extinguished 90 percent of the life on Earth. The current rise is of the same magnitude but is occurring faster. We must reduce or eliminate all uses of fossil fuels.

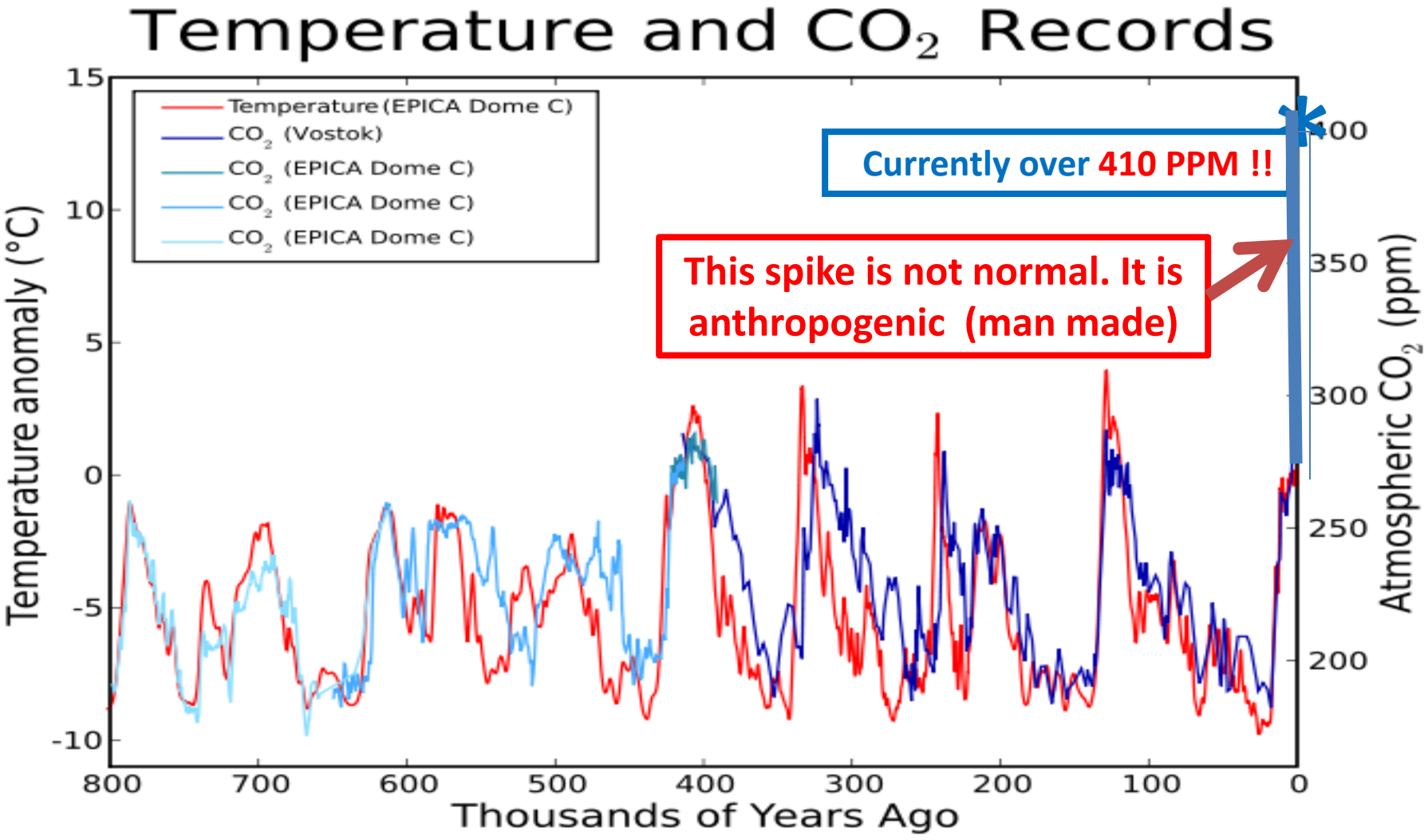
Climate Data

Currently around 415 PPM! *

- Keeling Curve:
  http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis

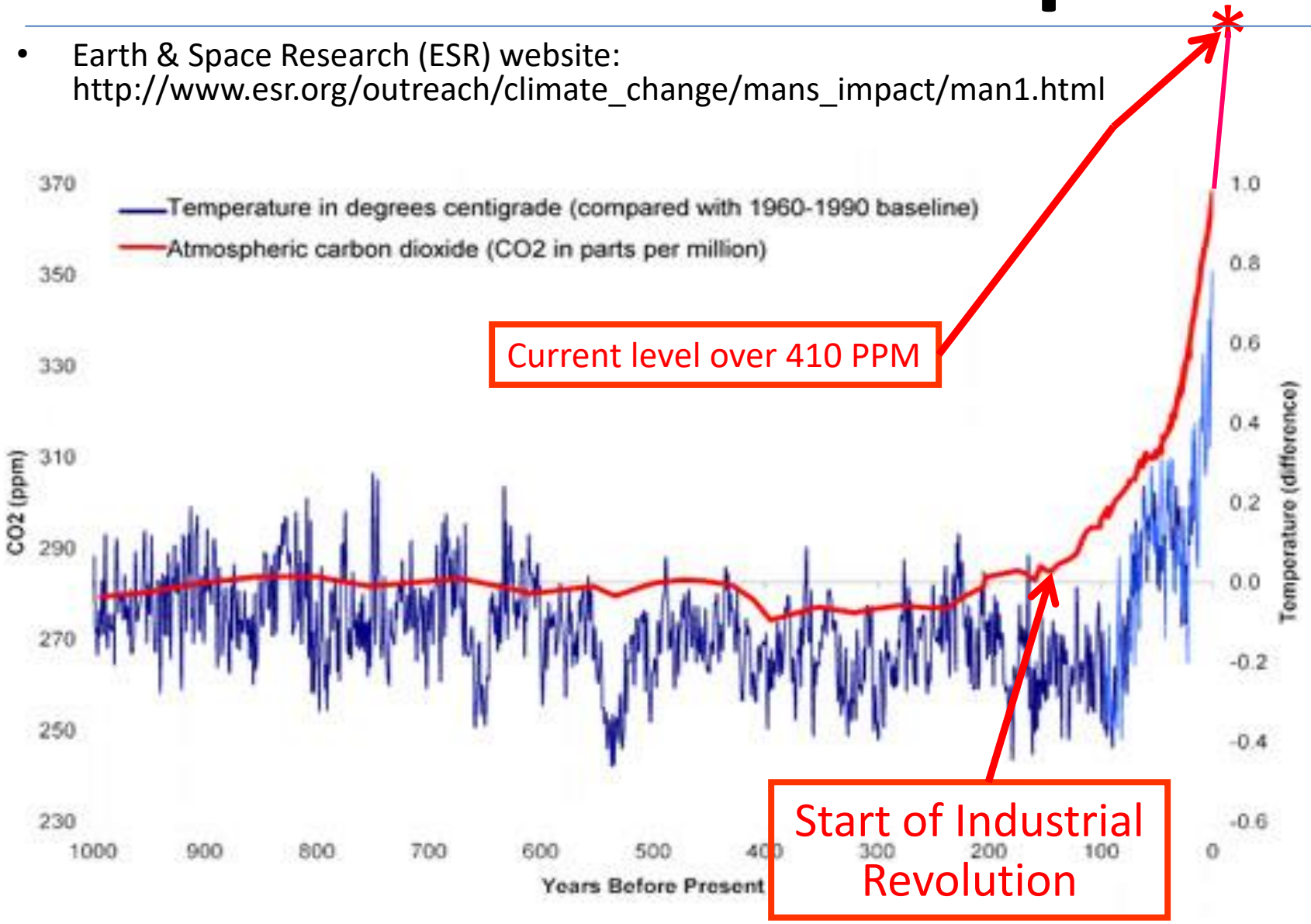


Climate Change, Mostly Normal



Let's Zero In on that Spike

- Earth & Space Research (ESR) website: http://www.esr.org/outreach/climate_change/mans_impact/man1.html



Fixing the Problem

We must stabilize the value of the earth's atmospheric CO2_e

CO2_e Emissions | **Sequestration (Photosynthesis)**

$E_N + E_A + E_{WFB}$ > → Positive Slope

$E_N + E_A + E_{WFB}$ = → Zero Slope

$E_N + E_A + E_{WFB}$ < → Negative Slope

S

Natural: rotting, fire, digestion. respiration

Anthropogenic: combustion of fossil fuel, methane, other

Warming **F**eed **B**ack: such as methane from melting permafrost

Growth of plants on Earth

The Warming Feed Back term, E_{WFB}, is the wild card. It must not become dominant.

Fixing the Problem page 2 of 2

We must stabilize the value of the earth's atmospheric CO2_e. Here is Step 1:

If Anthropogenic emissions were sufficiently low, the slope would be zero, thus capping the value of the Earth's atmospheric CO2_e. To achieve this, industrialized nations must limit their emissions to 80% below their 1990 levels.

Warning: The Warming Feed Back terms must not become dominant.

BRIEF OF SCIENTISTS AMICUS GROUP AS *AMICI CURIAE* IN SUPPORT OF PLAINTIFFS-APPELLANTS SEEKING REVERSAL

DANIEL M. GALPERN
Law Offices of Charles M. Tebbutt, P.C.
941 Lawrence St. Eugene, OR 97401-2815

USCA Case #13-5192 Document #1465822 Filed: 11/12/2013

A. Parties and *Amici*. Except for the following, all parties, intervenors, and *amici* appearing before the district court and in this Court are listed in the Brief for Plaintiffs-Appellants. **James Hansen**, David Beerling, Paul J. Hearty, Ove Hoegh-Guldberg, Pushker Kharecha, Valérie Masson-Delmotte, Camille Parmesan, Eelco Rohling, Makiko Sato, Pete Smith, and Lise Van Susteren are *amici curiae* in this appeal (referred to hereinafter as "Amici Scientists.").

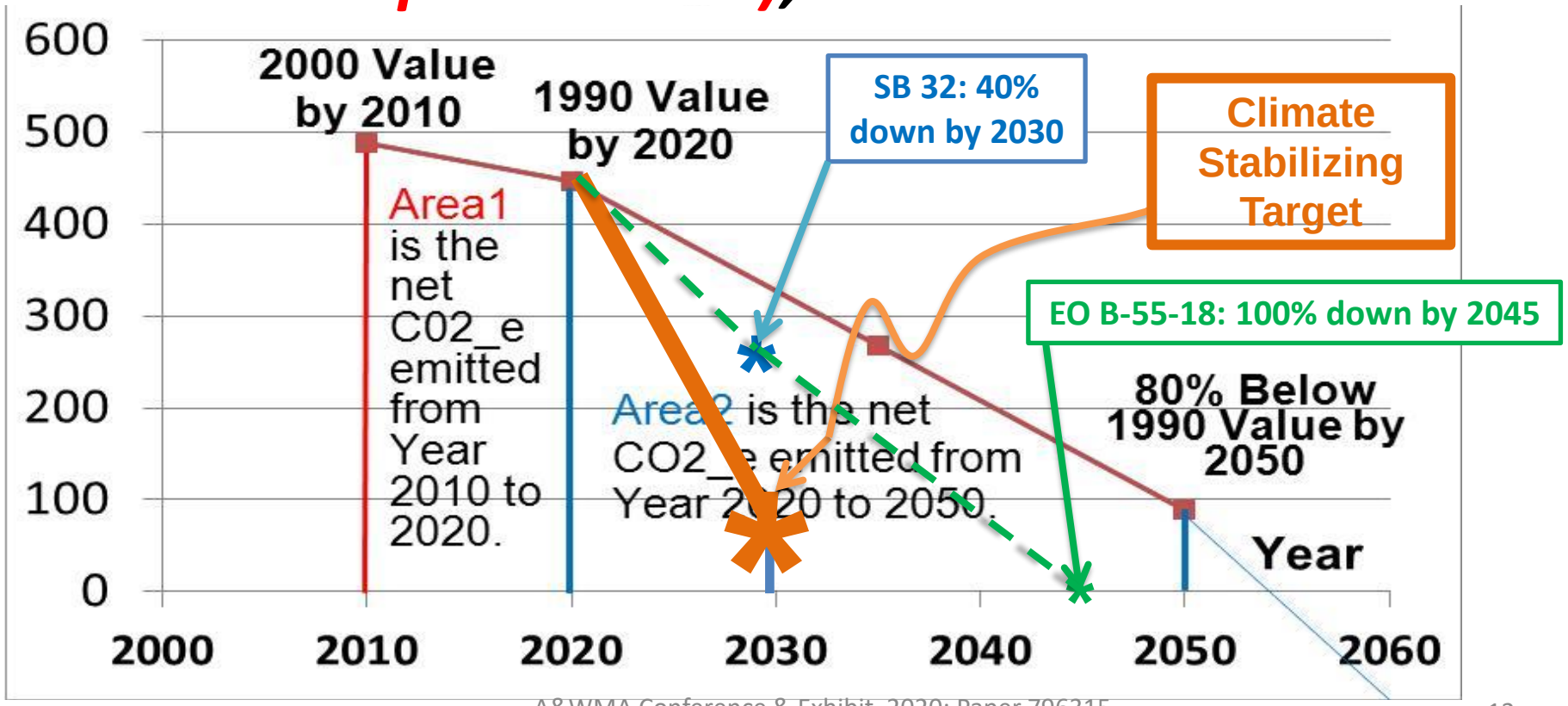
From the Climate Scientists

From Page 21: . . . the required rate of emissions reduction would have been about 3.5% per year if reductions had started in 2005, ***while the required rate of reduction, if commenced in 2020, will be approximately 15% per year.***

- My math:
  - 15% means a factor of 0.85, year after year
  - Consider the 10 years from 2020 to 2030
  - $(.85)^{\mathbf{10}} = .20$, which is 80% down
  - Other articles, describing Hansen's work: "**decarbonization by 2030**"

New Climate-Stabilization Prescription

Shown with 3 California Mandates: EO S-3-05 (Red Line & 4 Square Points), SB 32 and EO B-55-18



***How*, for LDVs:**

Deriving a Climate-Stabilizing Solution Set of Fleet-Efficiency and Driving-Level Requirements, for Light-Duty Vehicles in California

We have the climate scientist's target. We must now derive the LDV Requirements.

Notes on Methods

- Base year 2005
- Intermediate year 2015
- Car Efficiency Factor from 2005 to 2015
  - Steve Winkelman's data
  - http://www.nrdc.org/globalWarming/sb375/files/sb375.pdf
- Car Efficiency Factor, 2015 to 2030
  - Derived in paper (and here)
  - Results in car-efficiency requirements
- Cars last 15 years

From a California law (***SB 375***) giving per-capita driving reduction targets to be achieved in Regional Transportation Plans

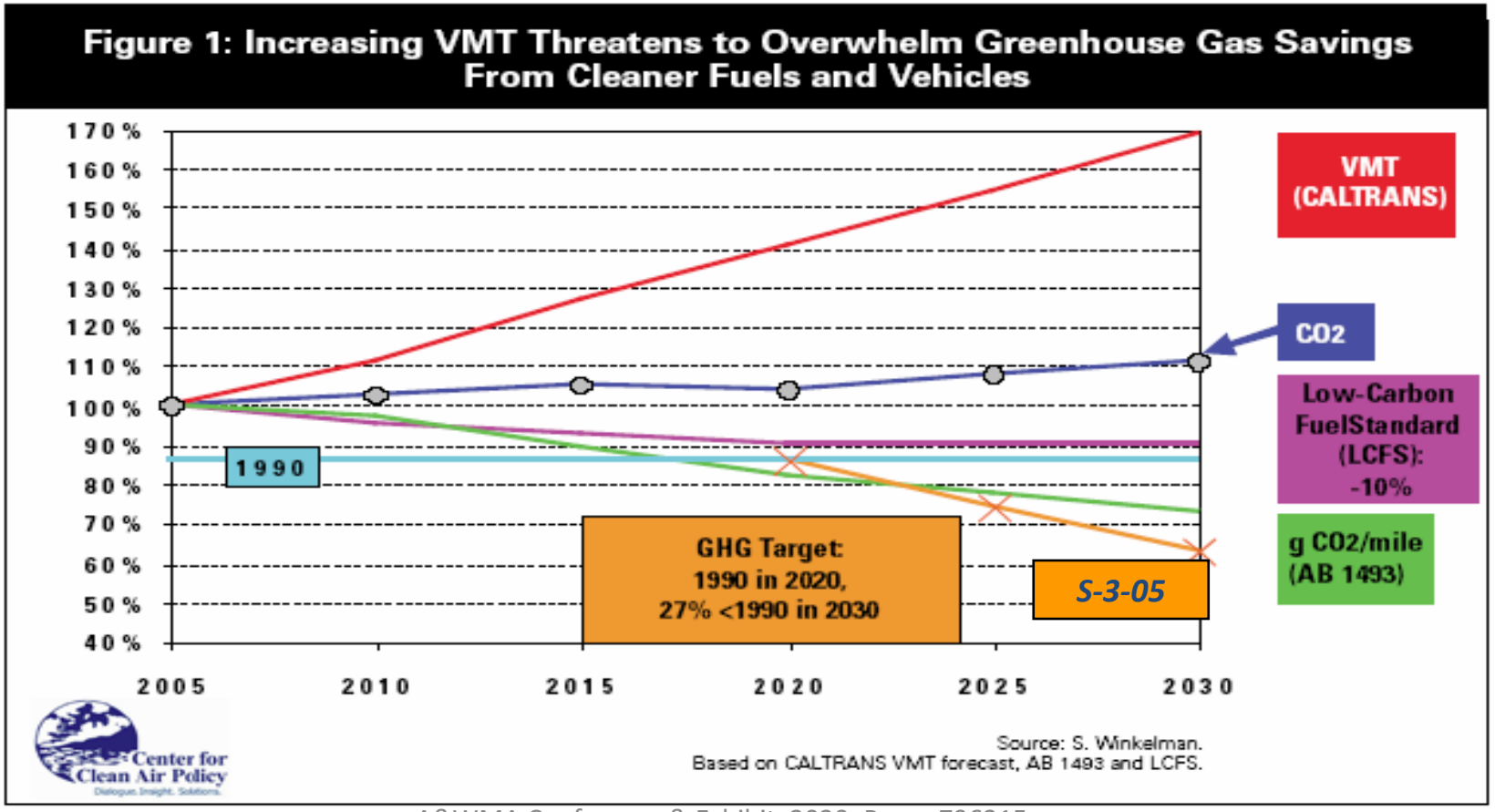
Report on ***SB 375*** See its Table 1.

Cars that survive beyond 2030 are balanced out by those that don't survive to 2030.

Data Relating 1990, 2005, & 2015 Data

Purple (Low carbon fuel), Green (C02/Mile), & Gold (S-3-05)

Figure 1, from: http://www.ecovote.org/sites/default/files/pdf/sb375.pdf



Variables

Definitions	
e_k	LDV Emitted C02, in Year "k"
L_k	Low Carbon Fuel Standard (LCFS) Factor that reduces the Per-Gallon CO2 emissions, in Year "k" (k is denotes Year 2030)
C_k	LDV CO2 emitted per mile driven, average, in Year "k", not accounting for the Low Carbon Fuel Standard (LCFS) Factor
c_k	LDV CO2 emitted per mile driven, average, in Year "k", accounting for the Low Carbon Fuel Standard (LCFS) Factor
p_k	Population, in Year "k"
d_k	Per-capita LDV driving, in Year "k"
D_k	LDV Driving, in Year "k"
M_k	LDV Mileage, miles per gallon, in Year "k"
m_k	LDV Equivalent Mileage, miles per gallon, in Year "k" accounting for the Low Carbon Fuel Standard (LCFS) Factor, so this is M_k/L_k
N	Number of pounds of CO2 per gallon of fuel but not accounting for the Low Carbon Fuel Standard (LCFS) Factor

Fundamental Equations

Future Year k: $\boldsymbol{e_k} = c_k * d_k * p_k$

Base Year i: $\boldsymbol{e_i} = c_i * d_i * p_i$

$$\frac{\boldsymbol{e_k}}{\boldsymbol{e_i}} = \frac{\boldsymbol{c_k}}{\boldsymbol{c_i}} * \frac{\boldsymbol{d_k}}{\boldsymbol{d_i}} * \frac{\boldsymbol{p_k}}{\boldsymbol{p_i}}$$

To work with mileage: $\dfrac{\boldsymbol{m_i}}{\boldsymbol{m_k}} = \dfrac{\boldsymbol{c_k}}{\boldsymbol{c_i}}$

Solution Overview

"k" denotes Year 2030
"i" denotes Year 2005

Car Efficiency Factor
From existing mileage requirements and the ***requirements defined herein***

From existing and predicted population

$$\frac{e_k}{e_i} = \frac{m_i}{m_k} * \frac{d_k}{d_i} * \frac{p_k}{p_i}$$

From the known 1990-to-2005 factor and the **Climate-Stabilizing-Target, which is the factor of 2030 emissions to 1990 emissions**

The Independent Variable
It becomes the ***required per-capita driving reduction with respect to 2005 driving***

A&WMA Conference & Exhibit, 2020; Paper 796315

Solution Using Intermediate Year of 2015

From the **Climate-Stabilizing-Target**, **which is the factor of 2030 emissions to 1990 emissions**

Car Efficiency Factor
From existing mileage requirements and the ***requirements defined herein***

From Winkelman. It is the product of the factor from the green line and the purple line.

From known and predicted populations

$$\frac{e_{2030}}{e_{1990}} * \frac{e_{1990}}{e_{2005}} = \frac{c_{2030}}{c_{2015}} * \frac{c_{2015}}{c_{2005}} * \frac{d_{2030}}{d_{2005}} * \frac{p_{2030}}{p_{2005}}$$

Taken from the Winkelman data: the known 1990-to-2005 factor of emissions (the light blue line)

The Independent Variable
It becomes the ***required 2030 per-capita driving reduction with respect to 2005 driving***

Putting In the Easy-to-Get Values

From the **Climate-Stabilizing-Target**, **which is the factor of 2030 emissions to 1990 emissions ("80% down")**

Car Efficiency Factor
From existing mileage requirements and the ***requirements defined herein***

From Winkelman. It is the product of the factor from the green line and the purple line. There is less CO2 per mile, thanks to the LCFS

From known and predicted populations

$$0.20 * 0.87 = \frac{c_{2030}}{c_{2015}} * 0.90 * 0.93 * \frac{d_{2030}}{d_{2005}} * 1.17446$$

Taken from the Winkelman data: the known 1990-to-2005 factor of emissions (the light blue line)

This ratio is the Independent Variable.
It is the *required per-capita 2030 driving reduction with respect to 2005 driving*

Combining the Easy-to-Get Values, Solving for the Independent Variable, and Changing the 2015-to-2030 Car Efficiency from CO2-Per-Mile to Equivalent-Miles-Per-Gallon

$$0.17700 = \frac{c_{2030}}{c_{2015}} * \frac{d_{2030}}{d_{2005}}$$

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{c_{2015}}{c_{2030}}$$

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}}$$

Equivalent Mileage in 2030 is what we make it. **It better be as high as possible, because a large driving reduction will be difficult.**
= "NUMERATOR MILEAGE"

The required per-capita 2030 driving with respect to 2005 driving

2015 Fleet Mileage is computed
= "DENOMINATOR MILEAGE"

Some Requirements Defined to Achieve 2030 Fleet Equivalent-Mileage

- Low-Carbon Fuel Standards (LCFS)
- Corporate Average Fuel Efficiency (CAFÉ) Standards from 2015 to 2030
- Driving Reduction Factors (f_n) for bad-mileage years (Year n)

Both California's existing and extended, "L_k"

Existing, to 2025
Specified to 2030

- For example, 0.75 means 25% less driving
- ***Cash for Gas-guzzlers?***

Three More Requirements

Defined to Achieve 2030 Fleet Equivalent-Mileage

- CAFÉ Standards only apply to Internal Combustion Engine (ICE) LDVs
- New Requirement: Fraction of fleet sold that must be ***Zero Emission Vehicles*** (ZEVs)
- In 2030, only 15%, or (the other case) 10% of electricity is from fossil fuels

Define "z" to be the fraction of fleet sold that must be ZEVs

Fleet Mileage for Intermediate Year 2015

LDV Set	Years Old	Model Year	CAFE MPG	LCFS Factor L_{Year}	Factor Driven f	Gallons Used Per f*100 Miles
1	14-15	2001	24.0	1.0	1.0	4.17
2	13-14	2002	24.0	1.0	1.0	4.17
3	12-13	2003	24.0	1.0	1.0	4.17
4	11-12	2004	24.0	1.0	1.0	4.17
5	10-11	2005	25.0	1.0	1.0	4.00
6	9-10	2006	25.7	.9933	1.0	3.87
7	8-9	2007	26.3	.9867	1.0	3.75
8	7-8	2008	27.0	.9800	1.0	3.63
9	6-7	2009	28.0	.9733	1.0	3.48
10	5-6	2010	28.0	.9667	1.0	3.45
11	4-5	2011	29.1	.9600	1.0	3.30
12	3-4	2012	29.8	.9533	1.0	3.20
13	2-3	2013	30.6	.9467	1.0	3.09
14	1-2	2014	31.4	.9400	1.0	2.99
15	0-1	2015	32.6	.9333	1.0	2.86
					Sum of Gallons:	54.29
					Miles = 100*Sum(f's):	1500
					MPG = Miles/(Sum of Gallons):	27.63

Computed DENOMINATOR MILEAGE

ZEV Derivation Variables

Variable	Definition
m_z	ZEV Equivalent mileage (miles per equivalent gallon)
m_{zr}	ZEV Equivalent mileage if the electricity is from 100% renewables
m_{zf}	ZEV Equivalent mileage if the electricity is from 100% fossil fuels
r	fraction of electricity generated from sources not emitting CO2
G	Gallons of equivalent fuel used
D	Arbitrary distance travelled
Num	$m_{zr} \times m_{zf}$
Den	$r \times m_{zf} + (1 - r) \times m_{zr}$

ZEV Derivation

$$G = \frac{r \times D}{m_{zr}} + \frac{(1-r) \times D}{m_{zf}}$$

$$m_z = D/G = D/\left(\frac{r \times D}{m_{zr}} + \frac{(1-r) \times D}{m_{zf}}\right)$$

$$m_z = m_{zr} \times m_{zf} / \left(r \times m_{zf} + (1-r) \times m_{zr}\right)$$

$$m_z = Num/(Den)$$

m_{zr}	m_{zf}	r	1-r	Num	Den	m_z
5000	70	0.80	0.20	350000.00	1056.00	331.44
5000	70	0.85	0.15	350000.00	809.50	432.37
5000	70	0.90	0.10	350000.00	563.00	621.67

Four Variable Definitions & Selecting a Target Numerator Mileage Value

Variable	Definition
D_i	Distance travelled by ICE vehicles
D_z	Distance travelled by ZEV vehicles
G_i	Gallons of equivalent fuel used by ICE vehicles
G_z	Gallons of equivalent fuel used by ZEVs

This previously-derived equation was used.

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}}$$

The driving reduction, $\frac{d_{2030}}{d_{2005}}$, was set to 0.68, corresponding to a 32% reduction in driving.

Then, using the previously-computed $\mathbf{m_{2015}}$ = 27.63 mile per gallon (MPG), the ***Numerator Mileage (m_{2030})*** was computed to be around **106 MPG**.

Finally, the ***z*** values were selected in the following table, by trial and error, to get the ***Numerator Mileage (m_{2030})*** to be close to that **106 MPG** value.

"Balanced_1", 85% Renewable Electricity

			ZevMileage =	432.37	So $G_z = D_z$ / 432.37						
	ICE Parameters and Calculations						ZEVs			Yearly Totals		
Year	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.9267	37.01	0.3	29.4	0.7943	0.02	2	0.005	31.40	0.7989	39.30
2017	35.1	0.9200	38.15	0.4	39.2	1.0275	0.02	2	0.005	41.20	1.0321	39.92
2018	36.1	0.9133	39.53	0.5	48.5	1.2271	0.03	3	0.007	51.50	1.2340	41.73
2019	37.1	0.9067	40.92	0.6	57.6	1.4077	0.04	4	0.009	61.60	1.4169	43.47
2020	38.3	0.9000	42.56	0.7	64.4	1.5133	0.08	8	0.019	72.40	1.5318	47.26
2021	40.3	0.8500	47.41	0.8	64.0	1.3499	0.20	20	0.046	84.00	1.3961	60.17
2022	42.3	0.8000	52.88	0.9	58.5	1.1064	0.35	35	0.081	93.50	1.1873	78.75
2023	44.3	0.8000	55.38	1.0	45.0	0.8126	0.55	55	0.127	100.00	0.9398	106.40
2024	46.5	0.8000	58.13	1.0	20.0	0.3441	0.80	80	0.185	100.00	0.5291	188.99
2025	48.7	0.8000	60.88	1.0	6.0	0.0986	0.94	94	0.217	100.00	0.3160	316.48
2026	51.2	0.8000	64.00	1.0	3.0	0.0469	0.97	97	0.224	100.00	0.2712	368.70
2027	53.7	0.8000	67.13	1.0	2.0	0.0298	0.98	98	0.227	100.00	0.2565	389.93
2028	56.2	0.8000	70.25	1.0	1.0	0.0142	0.99	99	0.229	100.00	0.2432	411.17
2029	58.7	0.8000	73.38	1.0	1.0	0.0136	0.99	99	0.229	100.00	0.2426	412.20
2030	61.2	0.8000	76.50	1.0	1.0	0.0131	0.99	99	0.229	100.00	0.2420	413.15
Sum of Miles and then Gallons of equivalent fuel:										1235.60	11.64	
Equivalent MPG of LDV Fleet in 2030: 106.17												
ZEV Miles Driven = 795.0							Fraction of Miles Driven by ZEVs =			64.3%		

Computed NUMINATOR MILEAGE

Computing the Ratio of Per-Capita 2030 Driving to Per-Capita 2005 Driving

Equivalent Mileage in 2030 = "**NUMERATOR MILEAGE**"

$$\frac{d_{2030}}{d_{2005}} = .1770 * \frac{106.17}{27.63} = .68$$

2015 Fleet Mileage was computed before **=** "**DENOMINATOR MILEAGE**"

The factor of 0.68 means there is a 32% reduction in per-capita driving, from 2005 to 2030.

Again, for the next case, the ***z*** values were selected by trial and error, to get the 106 MPG value, corresponding to a 32% decrease in driving.

"Balanced_2", 90% Renewable Electricity

ZevMileage = 621.67 So $G_z = D_z / 621.67$

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.927	37.01	0.3	29.4	0.7943	0.02	2	0.003	31.40	0.7975	39.37
2017	35.1	0.920	38.15	0.4	39.2	1.0275	0.02	2	0.003	41.20	1.0307	39.97
2018	36.1	0.913	39.53	0.5	48.5	1.2271	0.03	3	0.005	51.50	1.2319	41.81
2019	37.1	0.907	40.92	0.6	57.6	1.4077	0.04	4	0.006	61.60	1.4141	43.56
2020	38.3	0.900	42.56	0.7	64.4	1.5133	0.08	8	0.013	72.40	1.5262	47.44
2021	40.3	0.850	47.41	0.8	68.0	1.4342	0.15	15	0.024	83.00	1.4584	56.91
2022	42.3	0.800	52.88	0.9	67.5	1.2766	0.25	25	0.040	92.50	1.3168	70.25
2023	44.3	0.800	55.38	1.0	55.0	0.9932	0.45	45	0.072	100.00	1.0656	93.84
2024	46.5	0.800	58.13	1.0	30.0	0.5161	0.70	70	0.113	100.00	0.6287	159.05
2025	48.7	0.800	60.88	1.0	5.0	0.0821	0.95	95	0.153	100.00	0.2349	425.62
2026	51.2	0.800	64.00	1.0	3.0	0.0469	0.97	97	0.156	100.00	0.2029	492.84
2027	53.7	0.800	67.13	1.0	2.0	0.0298	0.98	98	0.158	100.00	0.1874	533.52
2028	56.2	0.800	70.25	1.0	1.0	0.0142	0.99	99	0.159	100.00	0.1735	576.42
2029	58.7	0.800	73.38	1.0	1.0	0.0136	0.99	99	0.159	100.00	0.1729	578.45
2030	61.2	0.800	76.50	1.0	1.0	0.0131	0.99	99	0.159	100.00	0.1723	580.31
Sum of Miles and then Gallons of equivalent fuel:										1233.60	11.61	

Equivalent MPG of LDV Fleet in 2030: 106.22

ZEV Miles Driven = 761.0 Fraction of Miles Driven by ZEVs = 61.7%

Computed NUMINATOR MILEAGE

Selecting a Target Numerator Mileage Value to Get a 0% Reduction in Driving

This previously-derived equation was used.

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}}$$

The driving reduction, $\frac{d_{2030}}{d_{2005}}$, was set to 1.00, corresponding to a 0% reduction in driving.

Then, using the previously-computed $\mathbf{m_{2015}}$ = 27.63 mile per gallon (MPG), the ***Numerator Mileage (m_{2030})*** was computed to be around **156 MPG**.

Finally, the ***z*** values were selected in the following table, by trial and error, to get the ***Numerator Mileage (m_{2030})*** to be close to that **156 MPG** value.

"2005 Driving Case", 90% Renewable Electricity

Zev mileage = 621.67 So $G_z = D_z / 621.67$

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.9267	37.01	0.3	29.4	0.7943	0.02	2.0	0.003	31.40	0.7975	39.37
2017	35.1	0.9200	38.15	0.4	39.2	1.0275	0.02	2.0	0.003	41.20	1.0307	39.97
2018	36.1	0.9133	39.53	0.5	48.5	1.2271	0.03	3.0	0.005	51.50	1.2319	41.81
2019	37.1	0.9067	40.92	0.6	57.6	1.4077	0.04	4.0	0.006	61.60	1.4141	43.56
2020	38.3	0.9000	42.56	0.7	64.4	1.5133	0.08	8.0	0.013	72.40	1.5262	47.44
2021	40.3	0.8500	47.41	0.8	14.4	0.3037	0.82	82.0	0.132	96.40	0.4356	221.29
2022	42.3	0.8000	52.88	0.9	2.7	0.0511	0.97	97.0	0.156	99.70	0.2071	481.42
2023	44.3	0.8000	55.38	1.0	1.0	0.0181	0.99	99.0	0.159	100.00	0.1773	563.99
2024	46.5	0.8000	58.13	1.0	1.0	0.0172	0.99	99.0	0.159	100.00	0.1765	566.72
2025	48.7	0.8000	60.88	1.0	1.0	0.0164	0.99	99.0	0.159	100.00	0.1757	569.23
2026	51.2	0.8000	64.00	1.0	1.0	0.0156	0.99	99.0	0.159	100.00	0.1749	571.84
2027	53.7	0.8000	67.13	1.0	1.0	0.0149	0.99	99.0	0.159	100.00	0.1741	574.23
2028	56.2	0.8000	70.25	1.0	1.0	0.0142	0.99	99.0	0.159	100.00	0.1735	576.42
2029	58.7	0.8000	73.38	1.0	1.0	0.0136	0.99	99.0	0.159	100.00	0.1729	578.45
2030	61.2	0.8000	76.50	1.0	1.0	0.0131	0.99	99.0	0.159	100.00	0.1723	580.31
Sum of Miles and then Gallons of equivalent fuel:										1254.20	8.04	

Equivalent MPG of LDV Fleet in 2030: 155.99

ZEV Miles Driven = 990.0 Fraction of Miles Driven by ZEVs = 78.9%

Computed NUMINATOR MILEAGE

Computing the Ratio of Per-Capita 2030 Driving to Per-Capita 2005 Driving

Equivalent Mileage in 2030 is what we made it by selecting the "z" values in the previous table. = "**NUMERATOR MILEAGE**"

$$\frac{d_{2030}}{d_{2005}} = .1770 * \frac{155.99}{27.63} = 1.00$$

2015 Fleet Mileage was computed **= "DENOMINATOR MILEAGE"**

For the next case, the ***z*** values were taken from a published article describing values selected by the Chair of the California Air Resources Board, Mary Nichols.

"Mary Nichols Case", 90% Renewable Electricity

Zev Mileage = 621.67 So $G_z = D_z / 621.67$

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.9267	37.01	0.3	29.2	0.7886	0.027	2.7	0.004	31.89	0.7930	40.22
2017	35.1	0.9200	38.15	0.4	38.9	1.0201	0.027	2.7	0.004	41.62	1.0245	40.63
2018	36.1	0.9133	39.53	0.5	47.4	1.2003	0.051	5.1	0.008	52.56	1.2086	43.49
2019	37.1	0.9067	40.92	0.6	55.5	1.3560	0.075	7.5	0.012	63.01	1.3681	46.06
2020	38.3	0.9000	42.56	0.7	63.0	1.4814	0.099	9.9	0.016	72.98	1.4974	48.74
2021	40.3	0.8500	47.41	0.8	70.1	1.4790	0.124	12.4	0.020	82.47	1.4988	55.02
2022	42.3	0.8000	52.88	0.9	76.7	1.4509	0.148	14.8	0.024	91.48	1.4746	62.03
2023	44.3	0.8000	55.38	1.0	82.8	1.4957	0.172	17.2	0.028	100.00	1.5233	65.65
2024	46.5	0.8000	58.13	1.0	80.4	1.3834	0.196	19.6	0.032	100.00	1.4149	70.67
2025	48.7	0.8000	60.88	1.0	78.0	1.2813	0.220	22.0	0.035	100.00	1.3167	75.95
2026	51.2	0.8000	64.00	1.0	62.4	0.9750	0.376	37.6	0.060	100.00	1.0355	96.57
2027	53.7	0.8000	67.13	1.0	46.8	0.6972	0.532	53.2	0.086	100.00	0.7828	127.75
2028	56.2	0.8000	70.25	1.0	31.2	0.4441	0.688	68.8	0.111	100.00	0.5548	180.25
2029	58.7	0.8000	73.38	1.0	15.6	0.2126	0.844	84.4	0.136	100.00	0.3484	287.05
2030	61.2	0.8000	76.50	1.0	0.0	0.0000	1.000	100.0	0.161	100.00	0.1609	621.67
Sum of Miles and then Gallons of equivalent fuel:										1236.00	16.00	

Equivalent MPG of LDV Fleet in 2030: 77.24

ZEV Miles Driven = 457.9 **Fraction of Miles Driven by ZEVs = 37.0%**

Computed NUMINATOR MILEAGE

Computing the Ratio of Per-Capita 2030 Driving to Per-Capita 2005 Driving

Equivalent Mileage in 2030 is what resulted from the Mary Nichols statement. It is the "**NUMERATOR MILEAGE**"

$$\frac{d_{2030}}{d_{2005}} = .1770 * \frac{77.24}{27.63} = .495$$

2015 Fleet Mileage was computed = "**DENOMINATOR MILEAGE**"

CARB may not understand that the fleet electrification schedule suggested by their Board Chair would require that per-capita driving be about half what it was in 2005, if LDVs are to achieve climate-stabilizing targets.

Net Driving Decrease with Respect to 2005 Driving for the "Balanced" Cases

(Per-Capita Driving Factor) x (Population Factor) = Net Driving Factor

This factor corresponds to the 32% reduction in per-capita driving

(.68) x (1.1744) = .80

Therefore, even though the population will grow 17%, net driving must decrease by 20%.

Therefore, why add highway lanes?

We need enforceable measures to reduce driving so much there will be no more congestion!

4 Cases that Support Climate Stabilization

Note: Purple denotes difficult; red, impossible.

	Case Designations			
	Balanced_1	Balanced_2	2005 Driving	Mary Nichols
% Renewable Electricity	85.0%	90.0%	90.0%	90.00%
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	20.0%	15.0%	82.0%	12.35%
% ZEVs, Year 2022	35.0%	25.0%	97.0%	14.76%
% ZEVs, Year 2023	55.0%	45.0%	99.0%	17.18%
% ZEVs, Year 2024	80.0%	70.0%	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	**32.0%**	**32.0%**	0%	**50.5%**

Enforceable Measures to Reduce 2030 Driving by 32% With Respect to 2005

California designs and implements this

Local governments do this with a 3rd party vendor

Driving-Reduction Requirments	Per-Cent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Value-Priced Parking (Unbundling the Cost)	8%	0.92
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
Pay-to-Graduat e Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		**0.68**
% Reduction		**32%**

These enforceable measures are described in the AWMA paper.

An Important Pricing Strategy

A Road-Usage-Charge (RUC) Pricing & Payout System

THEREFORE, BE IT RESOLVED, that the Democratic Club of Carlsbad and Oceanside (DEMCCO) supports a road-usage charge (RUC) pricing & payout system that would (1) cover all road-use costs, including the environmental & health costs caused by driving; (2) mitigate impacts on low-income users; (3) protect privacy; (4) include congestion pricing; (5) keep the per-mile price incentive to drive energy-efficient cars at least as large as it is with today's fuel excise tax; and (6) send its earnings to all citizens and institutions that are currently losing money by subsidizing road use.

Another Important **Pricing** Strategy

A good car-parking system: value-priced (with congestion pricing), shared, automated, and providing earnings to those losing money because the parking is being provided.

The first such systems should be installed by a third-party vendor (such as **Google, Qualcomm, Uber, or Lime Bicycle)**, selected by a RFP (Request for Proposal) process, for municipal government employees, as part of the government's **Climate Action Plan**. It would be operated for the financial gain of the employees. The RFP would specify that even employees that continue to drive every day would at least break even. The winning third-party vendor would be skilled at monetizing parking, whenever it is not being used by the employees; at monetizing data; and at expanding the system. The system would be automated with a useful phone app to find the best parking at the user-specified price and walk-distance.

From: https://www.cadem.org/body/Final-CDP-Platform-2020-11.16.2019.pdf

From the 2020 California Democratic Party (CDP) Platform

- Work to ensure that all graduating high school students are climate literate, including knowing
  - reasons for anthropogenic climate change and its potential for harm;
  - the difference between climate stabilization and destabilization;
  - climate-stabilizing greenhouse gas (GHG) reduction targets;
    - the basis for those targets, and
    - the measures needed to achieve them; and
  - the primary categories of emissions, including the most problematic category: cars and light-duty trucks;

- Demand a state plan specifying how cars and light-duty trucks can meet climate-stabilizing targets by defining enforceable measures to achieve necessary fleet efficiency and per-capita driving limits;

- Demand Regional Transportation Plan (RTP) driving-reduction targets, shown by science to support climate stabilization;
- Work for equitable and environmentally-sound road and parking operations; smart growth; “complete streets”; teaching bicycling traffic skills; and improving transit, from local systems to high-speed rail;
- Support the design and implementation of a single, environmentally-sound technology system that will collect and distribute fees for the use of roads, parking, and transit that is both economically fair and convenient and protects user privacy and the interests of low-income users;
- Work for the electrification of all trucking and transit systems;
- Work to ensure that freeway expansion projects are subordinate to more sustainable alternatives that will result in more jobs and growth.

From the 2016 & 2018 Platform (*Dividend Account Parking*)

- Work for shared, convenient, and value-priced parking, operated with a system that provides earnings to those paying higher costs or receiving a reduced wage, due to the cost of providing the parking.

Please email comments or questions to **mike_bullock@earthlink.net**

Dividend-Account Parking: Feasible & Enforceable Mitigation

Updated from Air and Waste Management Association Paper 2010-A-554-AWMA

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ABSTRACT

Bundled-cost and *bundled-benefit* car-parking systems (generally called "free parking") are defined, showing that they are not free and that they increase the drive-alone mode, since non-drivers lose just as much money as those that use the parking.

Dividend-Account Parking (DAP) is defined as a parking system in which all of the parking spaces are *shared* by all drivers that are driving a car that is registered in the system. "Registered" means that the car can be associated with a person having an *account* in the system. The parking is *value-priced*, with an option for a *congestion pricing overlay*. The critical final feature is that the earnings (*dividends*) are given to the people, for whom the parking is built, such as employees, shoppers, residents of apartments or condominiums, students, or train riders. It is stated that this system is defined in the California Democratic Party (CDP) Platform, making it the official policy of the largest political, environmental, and public-policy-advocacy organization in California. It is also at the center of the Sierra Club's lawsuit against the San Diego County's Climate Action Plan (CAP). The court has found in multiple rulings that DAP is feasible mitigation.

Motivations for change are provided, mostly based on an Air and Waste Management Association paper, *Climate-Stabilizing California Light-Duty-Vehicle (LDV) Requirements*. The following is shown:

1. Parking reform is needed, since fleet electrification, while critically needed (ASAP), cannot, under even the most wildly-optimistic assumptions, achieve the needed GHG emission reduction, for light-duty vehicles (LDVs), soon enough to achieve climate-stabilizing targets.
2. Per-capita driving must be reduced.

It is asserted that parking reform has a large role to play.

DAP is presented as a feasible, enforceable, mitigation measure for any Climate Action Plan or for any application where sustainability is a goal.

100 word summary:

Bundled-cost and *bundled-benefit* car-parking systems (erroneously called "free") are defined, showing that they are not free and that they increase the drive-alone mode, since non-drivers lose just as much money as drivers, due to the parking.

Dividend Account Parking (DAP) is presented as a mitigation measure for any Climate Action Plan (CAP) or for any application where sustainability is a goal. The parking is shared, convenient, fully automated, and value priced with a congestion-pricing algorithm. Earnings go to those losing money because the parking is provided.

Motivations are provided, based on an Air and Waste Management Association (AWMA) paper.

Dividend-Account Parking (DAP) is defined as a parking system in which all of the parking spaces are *shared* by all drivers that are driving a car that is registered in the system. "Registered" means that the car can be associated with a person having an *account* in the system. The parking is *value-priced*, with an option for a *congestion pricing overlay*. The critical final feature is that the earnings (*dividends*) are given to the people, for whom the parking is built, such as employees, shoppers, residents of apartments or condominiums, students, or train riders. It is stated that this system is defined in the California Democratic Party (CDP) Platform, making it the official policy of the largest political, environmental, and public-policy-advocacy organization in California. It is also at the center of the Sierra Club's lawsuit against the San Diego County's Climate Action Plan (CAP). The court has found in multiple rulings that DAP is feasible mitigation.

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1. Parking reform is needed, since fleet electrification, while critically needed (ASAP), cannot, under even the most wildly-optimistic assumptions, achieve the needed GHG emission reduction, for light-duty vehicles (LDVs), soon enough to achieve climate-stabilizing targets.
2. Per-capita driving must be reduced.

It is asserted that parking reform has a large role to play.

DAP is presented as a feasible, enforceable, mitigation measure for any Climate Action Plan or for any application where sustainability is a goal.

It shows documented driving reductions due to the pricing of parking. It notes that although the benefits of priced and shared parking are known, such parking has not been widely implemented, due to understandable concerns. It states that a system solution, called *Dividend-Account Parking*, can overcome these concerns, because it would be is easy to use, share, understand, and support. The system operates the parking to maximize the financial gain of those losing money because of the parking. Eight background informational items are provided, including how value-priced parking would help California achieve greenhouse gas (GHG) reduction targets. Arguments for less parking, shared parking, and priced parking are made. Barriers to progress are identified. The fair pricing of parking is described. Seven goals of *Dividend-Account Parking* are listed. Eleven definitions and concepts that define *Dividend-Account Parking* are given. This includes a method to compute a baseline price of parking and how to adjust that price instantaneously to keep the vacancy above 15%. That price adjustment implements "Congestion Pricing." This information is sufficient to support a "Request for Proposal" (RFP) process to get a *Dividend-Account Parking* design. An implementation strategy is provided.

INTRODUCTION:

It has been well established that appropriately priced parking will significantly reduce driving[1]. Most case studies presented in Table 1 are evaluations of the most general type of "car-parking cash-out": *a program that pays employees extra money each time they get to work without*

driving. They show that a price differential between using parking and not using parking will significantly reduce driving, even when transit is described as poor. Since driving *must* be reduced[2], the pricing of parking is desirable.

Shared parking is also recognized as desirable because it can sometimes result in less parking being needed.

Although the advantages of pricing and sharing parking have been recognized for many years, these practices are still rare. This paper identifies some of the reasons for this lack of progress. The pricing and sharing method of this paper has a natural transparency and ease of use that would reduce many of the concerns. This paper also suggests that those governments that have the necessary resources can take the lead role in developing and implementing the described systems. These governments will recover their investments, over time.

This paper describes how parking facilities could be tied together and operated in an optimum system, named *Dividend Account Parking (DAP)*. The description of *Dividend Account Parking (DAP)* is sufficient to support a "Request for Proposal" process, leading to full implementation.

There are two distinct parts to *Dividend Account Parking (DAP)*. The first is how to set the price. The second is how to distribute the earnings. Briefly, the earnings go to the individuals in the group for whom the parking is built.

Table 1 Eleven Cases of Pricing Impact on Parking Demand

Location	Number of Workers @ Number of Firms	1995 $'s Per Mo.	Parking Use Decrease
Group A: Areas with poor public transportation			
West Los Angeles	3500 @ 100+	$81	15%
Cornell University, Ithaca, NY	9000 Faculty & Staff	$34	26%
San Fernando Valley, Los Angeles	850 @ 1	$37	30%
Costa Mesa, CA	Not Shown	$37	22%
Average for Group		**$47**	**23%**
Group B: Areas with fair public transportation			
Los Angeles Civic Center	10,000+ @ "Several"	$125	36%
Mid-Wilshire Blvd, Los Angeles	1 "Mid-Size" Firm	$89	38%
Washington DC Suburbs	5,500 @ 3	$68	26%
Downtown Los Angeles	5,000 @ 118	$126	25%
Average for Group		**$102**	**31%**
Group C: Areas with good public transportation			
U. of Washington, Seattle, WA	50,000 employees, students	$18	24%
Downtown Ottawa, Canada	3,500 government staff	$72	18%
Bellevue, WA	430 @ 1	$54	39%*
Average for Group, except Bellevue, WA Case*		**$45**	**21%**
Overall Average, Excluding Bellevue, WA Case*			**25%**

[*] Bellevue, WA case was not used in the averages because its walk/bike facilities also improved and those improvements could have caused part of the decrease in driving.

PERTINENT BACKGROUND INFORMATION

- Vehicle miles traveled (VMT) are a major cause of global warming and pollution[2, 3].
- California's Metropolitan Planning Organizations (MPOs) will need to adopt strategies that reduce vehicle miles traveled (VMT), in order to meet SB375 GHG reduction targets, to be issued by the California Air Resources Board in late 2010, for years 2020 and 2035[2].
- The appropriate pricing of parking is one of the least costly documented tools to reduce VMT.
- New technologies, such as sensors feeding computer-generated billing, offer the potential to efficiently bill drivers for parking and alert law enforcement of trespassers.
- Reformed parking policies can increase fairness, so that, for example, people who use transit or walk do not have to pay higher prices or suffer reduced wages, due to parking.
- Methods to unbundle parking cost are inefficient unless they support the spontaneous sharing of parking spaces. Shared parking with unbundled cost would ultimately allow cities to require significantly less parking.
- Typical systems of timed parking and metered parking are far from ideal. Parking has no automated record keeping, so it is difficult to know where there is too much or too little.
- Good policies will eventually let cities turn parking minimums into parking maximums.

A GLIMPSE INTO A POSSIBLE FUTURE

Jason is driving to work for the first time in several years. He has decided to save money by carrying home a new 3-D, big-screen computer, which he plans to purchase at a store near his office after work. He wanted to avoid paying delivery charges.

Things have been changing around his office development since they unbundled the cost of parking at the near-by train station. Many people who caught the early trains and lived close to the station stopped driving and parking in the best parking spaces; demand for housing close to the station went up; and wealthy riders, who insisted on driving, did so, confidant that they could always find parking as close to the platform as their schedules required, due to congestion pricing. Who would have guessed how much those people were willing to pay? It was shocking. Parking-lot earnings, paid to round-trip train riders, meant that the net cost to ride the train went significantly down. Ridership and neighborhood vitality both went significantly up. All Jason knew was that the price to park at his office had been going up yearly because of increased land values. His parking-lot earnings from his office had been increasing almost every month, due to the ripple effect of train riders parking off-site at cheaper parking. Some of them were using his office parking.

As he pulls out of his driveway, he tells his GPS navigation unit his work hours (it already knew his office location), the location of the store where he plans to buy the computer, and his estimated arrival and departure times at the store. He tells the GPS unit he wants to park once, park no more than 1 block from the store, walk no more than 1 mile total, and pay no more than an average of $2 per hour to park. He is not surprised to hear the GPS tell him that his request is

impossible. He tells the GPS he will pay an average of $3 per hour and learns that the GPS has located parking.

It guides him into a church parking lot. He hopes the church will use his money wisely. The GPS tells him the location of a bus stop he could use to get to work and the bus's next arrival time at the stop. With automatic passenger identification and billing, the bus has become easy to use, except that it is often crowded. Jason gets out of the car and walks to work, with no action required regarding the parking.

Three weeks later, when Jason gets his monthly statement for his charges and income for automotive road use, transit use, parking charges, and parking earnings, he finds that the day's parking did indeed cost about $30 for the 10 total hours that he parked. He notes that the parking-lot earnings for his office parking averaged about $10 per day that month. He then notices the parking lot earnings from the store, where he spent about $1000 dollars. He sees that the parking-lot earnings percent for the store that month was 1.7%, giving him about $17. So for the day, Jason only spent a net of about $3 on parking. Then he realized that he should have had the computer delivered after all. If he would have bicycled that day, as he usually did, he would have still gotten the $27 earnings from the two parking facilities and he would have paid nothing for parking. So the choice to drive cost him $30. He remembers that the delivery would have only been $25 dollars. Oh well. He enjoyed his before-work and after-work walks.

THE CASE FOR LESS PARKING

Less parking will support more compact development.[1] This makes walking and biking more enjoyable and less time consuming. There would certainly be less "dead space", which is how parking lots feel to people, whether they arrive by car or not, after they become pedestrians.

Since parking can be expensive, less parking can reduce overhead costs significantly, such as leasing expense and parking-lot maintenance cost. Less overhead means more profit and less expense for everyone. A need for less parking can create redevelopment opportunities at existing developments and reduce project cost at new developments.

At new developments, car-parking costs could prevent a project from getting built.[2]

THE CASE FOR SHARED PARKING

Shared parking for mixed uses means that less parking is needed. For example, shared parking could be used mostly by employees during the day and mostly by residents at night.

Fully shared parking means that very little parking would be off limits to anyone. In a central business district with shared parking, drivers would be more likely to park one time per visit, even when going to several locations. Pedestrian activity adds vitality to any area.

THE CASE FOR APPROPRIATELY-PRICED PARKING

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[1] This is especially true of surface parking, which only accommodates 120 cars per acre.

[2] On September 23, 2008, a panel of developers reviewed the Oceanside, Ca. "Coast Highway Vision" http://www.ci.oceanside.ca.us/pdf/chv_finalvisionstrategicplan.pdf. Parts of this plan were described as smart growth.

At the review, developer Tom Wiegel said, "Parking is the number 1 reason to do nothing," where "do nothing" meant "build no project." The other developers at the meeting agreed.

To Reduce Driving Relative to Zero Pricing

Traditional Charging or Paying Cash-out Payments

As shown in the Introduction, this relationship (pricing parking reduces driving) is not new.[3]

Using results like Table 1, at least one study[4] has used an assumption of widespread pricing to show how driving reductions could help meet greenhouse gas (GHG) target reductions. Dr. Silva Send of EPIC http://www.sandiego.edu/epic/ghgpolicy/ assumes that all work locations with 100 employees or more in San Diego County will implement cash-out, to result in 12% less driving to work. Currently, almost all employees in San Diego County "park for free", unless they happen to work in a downtown core area.

Current, Best-Practice "Unbundling"

The "best-practice" use of the phrase, "unbundled parking cost", is to describe the case where either the cost of parking, for the case of a condominium, or the rent for parking, for the case of an apartment, is separated from either the purchase price and common fees or the rent of the dwelling unit.

This gives the resident families the choice of selecting the number of parking spaces they would like to rent or buy, including the choice of zero. This would tend to reduce the average number of cars owned per dwelling unit and, in this way, would also tend to reduce driving. Its major drawback is that this method does not encourage sharing.

To Increase Fairness and Protect the US Economy

It is stated above that almost all employees in San Diego County "park for free". Of course there is really no such thing as "parking for free". So-called "free parking" always reduces wages or increases costs. At a work site, it reduces everyone's wage, even those employees that never drive. At an apartment complex, so-called "free parking" increases the rent. Therefore, "free parking" at work or at apartments violates the fundamental rule of the free market, which is that people should pay for what they use and not be forced to pay for what they do not use. Parking should at least be priced to achieve fairness to non-drivers.

The US economy would also benefit. Reductions in driving would lead to reductions in oil imports, which would reduce the US trade deficit.[4]

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[3] For many years the Victoria Transport Policy Institute (VTPI) has been recognized as a source of reliable information on "Transportation Demand Management", or TDM.

From http://www.vtpi.org/tdm/tdm72.htm#_Price_Parking:

> Even a relatively small parking fee can cause significant travel impacts and provide significant TDM benefits.

"TDM Benefits" refers to the many public and private benefits of having fewer people choosing to drive.

[4] From http://en.wikipedia.org/wiki/Balance_of_trade#Warren_Buffett_on_trade_deficits, Warren Buffet wrote in 2006,

> "The U.S. trade deficit is a bigger threat to the domestic economy than either the federal budget deficit or consumer debt and could lead to political turmoil. Right now, the rest of the world owns $3 trillion more of us than we own of them."

BARRIERS TO PROGRESS

Given all this, it might seem that the widespread pricing of parking should have happened by now. However there are barriers. In 2007, a majority of the City Council of Cupertino, Ca. indicated that they wanted their City Manger to negotiate reduced parking requirements with any company that would agree to pay sufficient cash-out payments. To this date, no company, including Apple Inc., has expressed an interest. Most companies probably perceive cash-out as expensive. Even if they realize they could get a reduced parking requirement in exchange for paying sufficient cash-out amounts and even if the economics worked in support of this action (quite possible where land is expensive), they want to stay focused on their core business, instead of getting involved in new approaches to parking, real estate, and redevelopment.

On the other hand, simply charging for parking and then giving all the employees a pay raise is probably going to run into opposition from the employees, who will feel that they would be losing a useful benefit.

In addition, neighbors fear the intrusion of parked cars on their streets. Permit parking, which could offer protection, is not always embraced. City Council members know that a sizable fraction of voting citizens believe that there can actually never be too much "free parking", Professor Shoup's famous book[5] notwithstanding. Some Council members probably feel that way themselves.

It doesn't help that current methods of charging for downtown parking are often very inefficient.[5] For example, downtown Oceanside, California has parking meters that will only accept coins. Besides this, all their on-street, downtown parking is timed, with maximums from 10 minutes to 4 hours. These time limits are enforced by a city employee, who applies chalk from a tire to the street and then records the time. However, by watching the time and moving their car soon enough, drivers can avoid getting a ticket. Of course, they could instead drive to the mall and not have to worry about having coins or elapsed time since parking. It is not surprising that downtown merchants often object to charging for parking.

In summary, those that resist charging for parking, *based on their perceptions*, include

- Companies, *who fear the complexity and expense of paying cash-out payments*;
- Employees, *who fear losing a current benefit*;
- City leaders, *who fear the political repercussions*;
- Downtown patrons, *who dislike the inconvenience and worry*;
- Downtown business owners, *who fear that it will drive away customers*.

THE COST, VALUE, AND FAIR PRICE OF PARKING

Estimated and Actual Capital Cost

Surface Parking

One acre of surface parking will accommodate 120 cars. Land zoned for mixed use is sometimes expensive. At $1.2 million per acre, the land for a single parking space costs $10,000. Construction cost should be added to this to get the actual, as-built cost of each parking space.

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[5] According to Bern Grush, Chief Scientist of Skymeter Corporation http://www.skymetercorp.com/cms/index.php, often two-thirds of the money collected from parking meters is used for collection and enforcement costs.

Estimated cost can be determined by using appraised land value and construction estimates. For new developments, after the parking is constructed, it is important to note the actual, as-built cost.

Parking-Garage Parking

One acre of parking-garage will accommodate considerably more than 120 cars. The construction cost of the garage and the value of its land can be added together to get the total cost. Dividing that total cost by the number of parking spaces yields the total, as-built cost of each parking space. Adding levels to a parking garage may seem like a way to cut the cost of each parking space, for the case of expensive land. However, there is a limit to the usefulness of this strategy because the taller the parking garage, the more massive the supporting structural members must be on the lower levels, which increases total cost. Parking-garage parking spaces are often said to cost between $20,000 and $40,000. The actual costs should be noted.

Underground Parking

In order to compute an estimate for the cost of a parking space that is under a building, it is necessary to get an estimate of the building cost with and without the underground parking. The difference, divided by the number of parking spaces, yields the cost of each parking space. The cost or value of land plays no role in the cost of this parking. However, it does not follow that this parking is cheap. Underground parking spaces are often said to cost between $60,000 and $90,000 dollars each. Although there will be an "as built" cost of the building with the parking, there will never be an "as built" cost of the building without the parking. However, after the construction is done, the estimate for the cost of the underground parking should be reconsidered and re-estimated if that is needed. The final, best-estimate cost should be noted.

Value

Initially, value and cost are the same. For surface parking and parking-garage parking, the value would initially be the same as the as-built cost. For underground parking, the value would initially be the same as the best-estimate cost. However, over time, the value must be updated. Both construction costs and land-value costs will change. The value assigned to a parking place should always be based on the current conditions.

Fair Pricing

Parking space "values", as described above, must first be converted to a yearly price by using a reasonable conversion factor. This conversion factor could be based on either the "cost of money" or the "earnings potential of money". It is expected that this conversion factor would be 2% to 5% during times of low interest rates and slow growth; but could be over 10% during times of high-interest and high growth. For example, if the surface parking value is $12,000 and it is agreed upon to use 5% as the conversion factor, then each parking spot should generate $600 per year, just to cover capital costs. The amount needed for operations, collection, maintenance, depreciation, and any special applicable tax is then added to the amount that covers capital cost. This sum is the amount that needs to be generated in a year, by the parking space.

The yearly amount of money to cover capital cost needs to be re-calculated every year or so, since both the value and the conversion factor will, in general, change each year. The cost of operations, collection, maintenance, depreciation, and any special applicable tax will also need to be reconsidered.

Once the amount generated per year is known, the base price, per unit year, can be computed by dividing it (the amount generated per year) by the estimated fraction of time that the space will

be occupied, over a year. For example, if a parking space needs to generate $900 per year but it will only be occupied 50% of the time, the time rate charge is $1800 per year. This charge rate per year can then be converted to an hourly or even a per-minute rate. The estimated fraction of time that the parking is occupied over a year will need to be reconsidered at least yearly.

NEW DEFINITIONS TO PROMOTE AN OBJECTIVE VIEW OF PRICING

- The "fair price" means the price that accounts for all costs.
- The "baseline amount of driving" means the driving that results from the application of the fair price.
- "Zero transportation demand management" ("zero TDM") is the amount of demand management that results when the fair price is used. It will result in the baseline amount of driving.
- "Negative TDM" refers to the case where the price is set below the fair price. This will cause driving to exceed the baseline amount. Since TDM is commonly thought to be an action that reduces driving, it follows that negative TDM would have the opposite effect.
- "Positive TDM" refers to the case where the price is set above the fair price. This would cause the amount of driving to fall below the baseline amount.

Clearly, so-called "free parking" is an extreme case of negative TDM. The only way to further encourage driving would be to have a system that pays a driver for the time their car is parked.

GOALS OF THE "DIVIDEND ACCOUNT PARKING" CAR-PARKING SYSTEM (FORMERLY "*INTELLIGENT PARKING")*

- There is only one third-party vendor (or several, collaborating so closely that users are unaffected compared to a single operator) operating all parking. ("All parking" does not include driveways and garages in single-family homes.) *Dividend Account Parking* is designed and installed by regional or state government, using low-bid contractors, with design and start-up costs covered by the overhead portion of collection fees.
- Nearly all parking is shared. Almost always, anyone can park anywhere. Those who want exclusive rights to parking will pay "24/7" (all day, every day).
- Parking is operated so that the potential users of parking will escape the expense of parking by choosing to not use the parking. This characteristic is named "unbundled" because the cost of parking is effectively unbundled from other costs.
- Parking is priced and marketed to eliminate the need to drive around looking for parking.
- Parking at any desired price is made as easy as possible to find and use.
- Records of the use of each parking space are kept, to facilitate decisions to either add or subtract parking spaces.
- The special needs of disabled drivers, the privacy of all drivers, and, if desired, the economic interests of low-income drivers are protected.

DEFINITIONS & CONCEPTS OF *DIVIDEND ACCOUNT PARKING (DAP)*

Parking Beneficiary Groups

There are at least 7 types of beneficiary groups. Note that in all cases, members of beneficiary groups must be old enough to drive.

1.) People who have already paid for the capital cost of parking. An example of this type of beneficiary group would be the owners of condominiums, where parking has been built and the cost is included in the price of the condominium. Note that although they have technically already paid for the parking, if they borrowed money to pay for some portion of the price, the cost is built into their monthly payment. This illustrates why the value of parking and the cost of borrowing money (rate of return on money) are key input variables to use to compute the appropriate base, hourly charge for parking.

2.) People who are incurring on-going costs of parking. An example of this type of beneficiary group is a set of office workers, where the cost of 'their" parking is contained in either the building lease or the cost of the building. Either way, the parking costs are reducing the wages that can be paid to these employees.[6]

3.) People who are purchasing or renting something where the cost of the parking is included in the price. Examples of this beneficiary group are people that rent hotel rooms, rent an apartment, buy items, or dine in establishments that have parking.

4.) People who own off-street parking as a business. They could be the individual investors or could be a government or government-formed entity.

5.) People who are said to benefit from parking, even though the money for the parking has been supplied by a source that may have very little relationship to those that are said to benefit. An example of this group would be train riders that make round trips from a station which has parking that is said to be "for riders". Students at a school with parking would be another example.

6.) People who are considered by many to be the logical beneficiaries of on-street parking. Owners of single-family homes are the beneficiaries of the parking that is along the boundaries of their property. The same status is given to residents of multi-family housing.

7.) Governments. Since they build and maintain the streets, they should get a significant benefit from on-street parking.

Unbundled Cost and Spontaneous Sharing

"Unbundled cost" means those who use the parking can see exactly what it costs and those who don't use the parking will either avoid its cost entirely or will get earnings to make up for the hidden parking cost they had to pay. This conforms to the usual rule of the free market where a person only pays for what they choose to use. Unbundled cost is fair.

"Spontaneous sharing" means that anyone can park anywhere at any time and for any length of time. Proper pricing makes this feasible.

How to Unbundle

The method of unbundling can be simply stated, using the concept of "beneficiary group" as discussed above. First, the fair price for the parking is charged. The resulting earnings[7] amount is

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[6] Such parking is often said to be "for the benefit of the employees". Defining this beneficiary group will tend to make this statement true, as opposed to the common situation where the employees benefit only in proportion to their use of the parking.

[7] The earnings amount is the revenue collected minus the collection cost and any other costs that will have to be paid due to the implementation of *Dividend Account Parking (DAP)*. The costs associated with the parking, paid *before*

given to the members of the beneficiary group in a manner that is fair to each member. Methods are described below.

Why this Supports Sharing

Members of a beneficiary group benefit financially when "their" parking is used. They will appreciate users increasing their earnings. They are also not obligated to park in "their" parking. If there is less-expensive parking within a reasonable distance, they might park there, to save money. This is fine, because all parking is included in the *Dividend Account Parking (DAP)* system.

Computing the Earnings for Individuals

Dividend Account Parking (DAP) must be rigorous in paying out earnings[7]. For a mixed use, the total number of parking spaces must first be allocated to the various beneficiary groups. For example in an office/housing complex, 63.5% of the parking might have been sold with the office. If so, the housing portion must be paying for the other 36.5%. For this case, it would follow that the first step is to allocate 63.5% of the earnings to the workers and 36.5% to the residents.

How the monthly earnings are divided up among the members of the beneficiary group depends on the beneficiary group type. For each member, the group's total monthly earnings amount is always multiplied by a quantity and divided by the sum (the sum is the denominator) of that quantity, for all members.

For example, for each employee, the multiplier is the number of hours that the employee worked over the month while the denominator is the total number of hours worked by all employees over the month. At a school, for each student, the numerator is the total time spent at the school, over the month, while the denominator is the sum of the same quantity, for all the students.

For a train station with parking being supplied for passengers that ride on round trips of one day or less, the numerator is the passenger's monthly hours spent on such round trips, over the month; while the denominator is the total number of hours spent by all passengers on such round trips, over the month. Radio Frequency Identification (RFID) units on passengers could support an automated calculation of monthly charges for fares, as well as monthly hours on round trips.

At a shopping center, the numerator is the sum of the money spent by the shopper, over the month, while the denominator is the total amount of money spent by all shoppers over the month.

At a condominium, the numerator is the number of parking places that were paid for (directly or indirectly) by the resident family and the denominator is the total number of parking places at the condominium project; similarly, for apartment complexes.

Where Earnings Are Low

The goal is that if someone doesn't park, they don't pay, either directly or indirectly, because the earnings that they get will balance out their losses (like reduced wages, for example). However, charging for parking that few want to use will not sufficiently compensate the people that have been forced, or are being forced, to pay for such parking. The only remedy in this case is to redevelop the parking or lease the parking in some other way, for storage, for example. The

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the implementation of *Dividend Account Parking (DAP)*, should *not* be subtracted from the revenue because they will continue to be paid as they were before the implementation of *Dividend Account Parking (DAP)*. Therefore, these costs will continue to reduce wages and increase the prices of goods and services.

earnings from the new use should go to those that are in the beneficiary group that was associated with the low-performing parking.

Why This Method of Unbundling Will Feel Familiar to Leaders

Developers will still be required to provide parking and will still pass this cost on, as has been discussed. There will be no need to force an owner of an exiting office with parking to break his single business into two separate businesses (office and parking).

Parking beneficiaries are identified that conform to traditional ideas about who should benefit from parking.[8]

Unbundling the Cost of On-Street Parking

The revenue from on-street parking in front of businesses will be split evenly between the city and the business's parking beneficiaries. All of the earnings from on-street parking in front of apartments or single-family homes will be given to the resident families.[9]

Special Considerations for Condominiums

Unbundling for a condominium owner means that, although their allocated amount of parking has added to their initial cost, their allocated amount of parking also earns money for them. Unbundling for a condominium could also mean that an owner can choose to have control over a single or several parking places. Such parking spaces could be equipped with a red light and a green light. If the red light is lit, this will mean that the space is not available for parking, except for the person who is controlling the spot. If the green light is lit, it will mean that the space is available to anyone. A space that is being reserved with a red light is charged at the full price to the condominium owner that has control over the space. The owner that controls these spaces can change the state of the parking space (available or not available) by either a phone call, on line, or at any pay station system that might be in use for the system. After condominium owners experience the cost of reserving a space for themselves, they might give up on the idea of having their own, personal, unshared parking space; especially since *Dividend Account Parking (DAP)* will give most owners and their guests all the flexibility they need in terms of parking their cars.

Some people think that condominium parking should be gated, for security reasons. However, parking within parking garages needs to be patrolled at the same frequency level as on-street parking, which is enough to ensure that crime around either type of parking is very rare. Cameras can help make parking garages that are open to the public safe from criminal activity.

Special Considerations for Renters

Unbundling for renters means that, although their allocated amount of parking increases their rent, their allocated amount of parking also earns money for them. Therefore, their traditional rent (includes parking) is effectively reduced by the money earned by those parking spaces allocated to them. Renters will be motivated to either not own a car or to park in a cheaper

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[8] Showing exactly where parking earnings go will reduce the political difficulties of adopting pay parking in a democracy where the high cost of parking is often hidden and rarely discussed.

[9] Although governments own the streets, often, back in history, developers paid for them and this cost became embedded in property values. Admittedly, how to allocate on-street parking earnings is somewhat arbitrary. With congestion pricing and efficient methods, governments may earn significantly more than they are under current practices.

location. Parking in a cheaper location is not a problem because all parking is part of the *Dividend Account Parking (DAP)* system. Renters will welcome anyone to park in "their" parking, because it will increase their earnings.

Special Considerations for Employers

At first, companies may want the option of offering "free parking" to their employees so as to be able to compete with traditional job sites. This means giving employees that drive every single day an "add-in" amount of pay so that the sum of the add-in and their parking-lot earnings equals their charge, for any given monthly statement. The operator of the parking, which sends out statements, can pay out the "add in" amount, in accordance with the company's instruction. The company will then be billed for these amounts. There could be no requirement for the company to provide any such "add-in" amount to the employees that don't drive every day. This would allow the company to treat its every-day drivers better than other employees and so this would be a negative TDM. However, this economic discrimination would be substantially less than the current, status-quo, economic discrimination, where drivers get "free" parking and non-drivers get nothing.

Clusters of Parking

Clusters are a contiguous set of parking spaces that are nearly equal in desirability and thus can be assigned the same price. They should probably consist of from 20 to 40 spaces. For off-street parking, they could be on either side of the access lane to the parking spaces, so that an observer could see the 20 to 40 cars, and get a feel for the vacancy rate. At a train station, clusters will normally be organized so that their parking spaces are approximately an equal distance from the boarding area. On-street clusters would normally conform to our current understanding of what a block is, which is to say from one cross street to the next cross street. The width of the street and the length of the block should be taken into account in defining on-street clusters of parking and in deciding if the parking on either side of the street should or should not be in the same cluster of parking spaces.

Examples of Good and Bad Technology

Parking Meters or Pay Stations

Parking meters are a relic of an earlier period, before computers. Pay stations do not add enough usefulness to merit their inclusion in *Dividend Account Parking (DAP)*, except as a bridge technology. Once good systems are set up, pay stations should cost additional money to use because of their expense. It would be best to devise an implementation strategy that will minimize their use when the system is first put into effect and will take them out of service as soon as possible.

Radio Frequency Identification Backed Up by Video-Based "Car Present" and License Recognition

Government will eventually enter into an RFID (Radio Frequency Identification) age. Organizers of large athletic events already have. Organizers that put on large open-water swims, foot races, and bike rides have routinely used RFID for many years.[10] An RFID vendor in San Diego[11]

[10] For example, over 20,000 people ran the 2008 Bay-to-Breakers foot race in San Francisco. Each runner had a "chip" in their shoe lace. Each runner's start time and finish time were recorded and all results were available as soon as the last runner crossed the finish line.

states that passive RFID units cost less than $5, are reliable, are durable, and they could be used to identify cars as well as people. He also sees no problem in implementing most of the features of *Dividend Account Parking (DAP)*.[12]

Automatic Data Collection and Sending Out Statements

Note that the "back end database" of Dr. Carta's written statement[12] refers to the ability to send statements of earnings and billing to students.[13]

Putting it Together

Certainly, government, and in particular transit agencies and parking agencies, could use RFID-based technology. For example, when a person with an RFID unit which is tied to a billable address or a credit card with an open account gets on a bus or a train, they should not have to pay at that time, visit a pay station, or "swipe a card" that has a positive balance. Utility customers that pay their bills are not required to pre-pay. The same courtesy should be extended to transit riders, people that drive on roads, people that get parking-lot earnings, and people that park cars. There should be one monthly bill or statement, for all four activities.

Global Positioning Systems GPS

An alternative model is to have GPS systems in cars that would detect the car's parking location, that location's current charge rate, and would perform all of the charging functions in the car. The only information the parking-lot-enforcement system would need is whether or not a car being parked is owned by a bill-paying owner. The car owner's responsibility would be to pay the bills indicated by the box in the car. The box would need to process a signal that a bill had been paid. It would also need to process pricing signals.

Not Picking Winners

The purpose of this report is to describe what an ideal system would do, *not* how it is done. How a proposed system works is left to the systems, software, and hardware engineers that work together to submit a proposal based on this description of what an ideal system does.

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[11]David R. Carta, PhD, CEO Telaeris Inc., 858-449-3454

[12] Concerning a Final Environmental Impact Report-approved and funded new high school in Carlsbad, California, where the School Board has signed a *Settlement Agreement* to consider "*unbundled parking*", "*cash-out*", and "*pricing*", Dr. Carta wrote, in a January 13th, 2010 written statement to the Board,

> I wanted to send a quick note discussing the technical feasibility of tracking cars into a lot without impacting students or requiring the need for gates. Mike Bullock and I have discussed this project; it can be accomplished straightforwardly by utilizing Radio Frequency Identification and/or Video Cameras integrated with automated license recognition systems. The cars would need to register with the system at the start, but it would be fairly painless for the users after the initial installation. The back end database system can also be implemented both straightforwardly and at a reasonable price.
>
> This is not necessarily a recommendation of the proposal for unbundled parking. Rather it is strictly an unbiased view of the technical feasibility of the proposal to easily and unobtrusively track cars, both registered and unregistered, into a fixed lot.

[13] In an earlier email on this subject, Dr. Carta wrote,

> This is not too tough - we probably would integrate with a service that already sends physical mail from an electronic submission instead of re-inventing this wheel.

Privacy

Privacy means that no one can see where someone has parked, without a search warrant. Also, the level of the detail of information that appears on a bill is selected by the customer.[14]

Ease of Use for Drivers

For credit-worthy drivers that have followed the rules of the system, pay parking will not require any actions other than parking. Paying for all parking fees over a month is then done in response to a monthly billing statement. Parking will feel to the consumer like a service provided by a municipality, such as water, energy, or garbage. One important difference is that users belonging to a "beneficiary group" will get an earnings amount in their monthly statement. Those that earn more than what they are charged will receive a check for the difference. This ease of use will make all parking less stressful.

Base Price

Off-Street

Off-street parking is priced so that even if demand does not threaten to fill the parking beyond 85%, the money generated will at least equate to an agreed-upon return on the parking value and pay all yearly costs. Equation 1 shows the calculation of the hourly rate.

$$r_{BaselineHourly} = \frac{(r_{Investment} \times v_{Parking}) + c_{YOPD}}{(n_{HoursPerYear} \times f_{TO})} \quad \textbf{(Eq. 1)}$$

where:

$r_{BaselineHourly}$	=	the computed baseline hourly rate to park
$r_{Investment}$	=	yearly return on investment, such as .06
$v_{Parking}$	=	value of a parking space, such as (parking garage) $40,000
c_{YOPD}	=	yearly operations[15] plus depreciation, per space, such as $100
$n_{HoursPerYear}$	=	number of hours per year, 24 x 365 = 8760 Hours per Year
f_{TO}	=	fraction of time occupied, such as 0.55.

For the example values given, the base hourly rate of parking, to cover the cost of the investment, operations[15], and depreciation is $0.519 per hour. This could be rounded up to $0.52 per hour. This price could also be increased to result in positive TDM, to reduce driving more than the fair-price, zero-TDM amount.

On-Street

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[14] License plates that have no RFID tags fail to use the best technology to accomplish the primary purpose of license plates, which is to identify and help intercept cars used in a crime. Identifying cars is a legitimate government goal. Protecting privacy is also a legitimate goal. Both goals can be realized with good laws, good enforcement, and good systems engineering.

[15] This includes money for policing, cleaning, maintenance, any applicable parking tax, and all collection costs. Collection costs will need to include an amount to recover the development and installation costs of *Dividend Account Parking (DAP)*.

If on-street parking is located within walking distance (one-quarter mile) of off-street parking, its base price is set equal to the closest off-street parking's base price. Otherwise, it is set to some agreed-upon value, like fifty cents per hour. However, on-street parking has a special meaning for downtown merchants and for neighborhoods, two powerful political forces in any city. Merchants that have few cars parking on their street, even though it is permitted, are probably failing in their businesses. They would like free parking to help draw visitors to their store front. Neighborhoods that are not impacted by parking would probably prefer no pricing. For these reasons, for any on-street parking cluster, no price is charged until the cluster occupancy reaches 50%. (Time of day is irrelevant.)

Congestion Pricing

The time-rate price of parking is dynamically set on each cluster of parking, to prevent the occupancy rate from exceeding 85% (to reduce the need to drive around looking for parking). An 85% occupancy rate (15% vacancy) results in just over one vacant parking space per city block[5]. If the vacancy rate is above 30%, the price is left at the baseline hourly rate. If vacancies fall below 30%, the price can be calculated in a stair-step method, such as shown in Table 2.

Equation 2 is an alternative method.

In either case, the total charge is time parked, multiplied by the time-averaged, time-rate price. The base multiplier would be adjusted to be just large enough to keep the vacancy rate from falling below a desired level, such as 15%, so it is always easy to find parking.

Table 2 Hourly Rates for 2 Base Multipliers and a Baseline Hourly Rate of $0.52

Vacancy Rate	Base Multiplier = 2			Base Multiplier = 2.5		
	Multiplication		Hourly Rate	Multiplication		Hourly Rate
	Formula	Value		Formula	Value	
Above 30%	2^0	1	$0.52	2.5^0	1	$0.52
25% to 30%	2^1	2	$1.04	2.5^1	2.5	$1.30
20% to 25%	2^2	4	$2.08	2.5^2	6.25	$3.25
15% to 20%	2^3	8	$4.16	2.5^3	15.625	$8.13
10% to 15%	2^4	16	$8.32	2.5^4	39.0625	$20.31
5% to 10%	2^5	32	$16.64	2.5^5	97.6563	$50.78
Below 5%	2^6	64	$33.28	2.5^6	244.1406	$126.95

$$r_{HourlyRate} = r_{BaselineHourly} \times \left(B^{(30-V)/5}\right), for\ V < 30;\ r_{BaslineHourly}, otherwise \quad \textbf{(Eq. 2)}$$

where:

$r_{HourlyRate}$ = the congestion-priced hourly rate to park

$r_{BaselineHourly}$ = the baseline hourly rate to park, such as $0.52 per hour (taken from from Eq. 1.

B = the base of the multiplier being computed, such as 2.50

V = the vacancy rate percent, such as 17.5, for 7 vacancies in a cluster of 40 spaces, 100*(7/40) = 17.5

For the example values given, the hourly rate of parking would be $9.88 per hour.

Pricing Predictions and Notifications

Drivers will develop strategies for their routine trips. The computer system that keeps records of parking use will also provide help for users. The *Dividend Account Parking (DAP)* website will direct a user to an appropriate cluster of parking if the user provides the destination location or locations, the time and date, and the hourly rate they wish to pay. If the walk is going to be long, the website could suggest using transit to get from the cheaply-priced parking to the destination. In such cases, the website may also suggest using transit for the entire trip.

Another user option is to specify the time, location, and the distance the user is willing to walk. In this case, the computer would give the cheapest cluster of parking available at the specified walk distance. The price prediction would be provided.

All price predictions would also have a probability of correctness associated with them. If a user can show that a computer has predicted a much lower price than what actually occurred, with a sufficiently high probability, it would be reasonable to charge the user the predicted price rather than the actual price.

Websites could routinely inform viewers when occupancy rates are expected to be unusually high, due to a special event (for example, a sporting event). The parking system website will always give current and predicted hourly rates for all locations. The hourly rates of parking will also be available at a phone number and possibly at pay stations. The base-price hourly rate, for any parking cluster, would be stable and could therefore be shown on signs. Parking garage entrances could have large video screens showing both predicted and existing price. Users will also learn to look at parking and judge whether congestion pricing applies, or could apply, while their car is parked. It would not be long before these capabilities are added into GPS navigation systems.

Prepaid RFID

To be inclusive, pay stations or convenience stores will offer a pre-paid RFID that can be set on the dashboard of a car. This will support drivers with poor credit or drivers who have not obtained the necessary equipment to support the normal, trouble-free methods. This will also work for drivers that do not trust the system to protect their privacy for a certain trip (by removing or disabling the permanent RFID) or for all trips. No billing would occur.

Enforcement

The system would notify the appropriate law enforcement agency if an unauthorized car was parked. Authorized cars would need either a pre-paid RFID or equipment indicating that their owners had *Dividend Account Parking (DAP)* accounts and were sufficiently paid up on their bills.

IMPLEMENTATION

This description of *Dividend Account Parking (DAP)* will help to implement efficient parking systems. Parking at train stations, schools, and government buildings could introduce many of these concepts. This description of *Dividend Account Parking (DAP)* is sufficient to support a "Request for Proposal" process, which could lead to full implementation. Widespread

installation should be done by a government agency, to minimize actions required on the part of the private sector. Laws would simply require the cooperation of all private-sector and government entities.

SUMMARY

A parking plan, *Dividend Account Parking (DAP)* has been described.

1. Technology will make it easy to use for most drivers.
2. Its parking is almost always shared, to support mixed uses.
3. It unbundles cost by charging and having earnings go to the parking beneficiaries.
4. Traditional groups, such as single-family home owners, employees, tenants, train riders, and students benefit from parking. The benefit is equal for drivers and non-drivers.
5. Baseline prices are computed primarily from the value of the parking and an agreed-upon rate of return. On-street parking is free until it is half full, at which time its base price often matches that of the closest off-street parking.
6. For all parking, price is dynamically increased to guarantee availability. Earnings are therefore only limited by what people are willing to pay.
7. Technology helps drivers find parking and decide if they want to drive or use transit.
8. Prepaid RFIDs provide service to those who have poor credit or don't want to be billed.
9. Disabled and perhaps low-income drivers will have accounts that allow them to park at reduced prices and perhaps avoid congestion pricing. Specially designated spots might also be required for disabled drivers.
10. The system will provide reports showing where additional parking would be a good investment and where it would be wise to convert existing parking to some other use.
11. Privacy will be protected. Law enforcement officials would need a search warrant to see where someone's car has been parked. The level of detail on billing would be selected by the car's owner.
12. Implementations could begin in carefully selected locations and expand.

Global warming, air pollution, trade deficits, and fairness are some of the significant reasons that governments have a responsibility to implement *Dividend Account Parking (DAP).*

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KEYWORDS

A&WMA, Parking, Unbundled, Shared, TDM, cash-out, pricing, beneficiary, greenhouse gas, GHG, GPS, RFID

Eliminating the Harm of Bundled-Cost or Bundled-Benefit Parking

- Definitions of Parking Systems
- New System: *Dividend-Account Parking*
  - Motivations for change
  - Definition and features
  - A demonstration project

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A *Bundled-Cost* Parking System

The most common of all parking systems. Erroneously called "free"

The cost of the parking is hidden within some other payment, such as:

- **Rent**
- **Train fare (at least 1 train station with so-called "free" parking)**
- **Price of consumer items, including food**

A Bundled-Benefit Parking System

The 2nd most common of all parking systems. Erroneously called "free"

The parking is part of a benefit package being provided, such as:

- **Compensation for work**
- **Public or private education**

Bundled-Cost **and** ***Bundled-Benefit*** **systems take** ***money*** **from people without their knowledge or consent.**

They increase the choice to drive alone.

Sierra Club California: **Appropriate pricing of parking is the least costly way to reduce vehicle miles travelled.**

Bundled-Cost or *Bundled-Benefit* systems should be replaced with the *DAP* Car-Parking system!

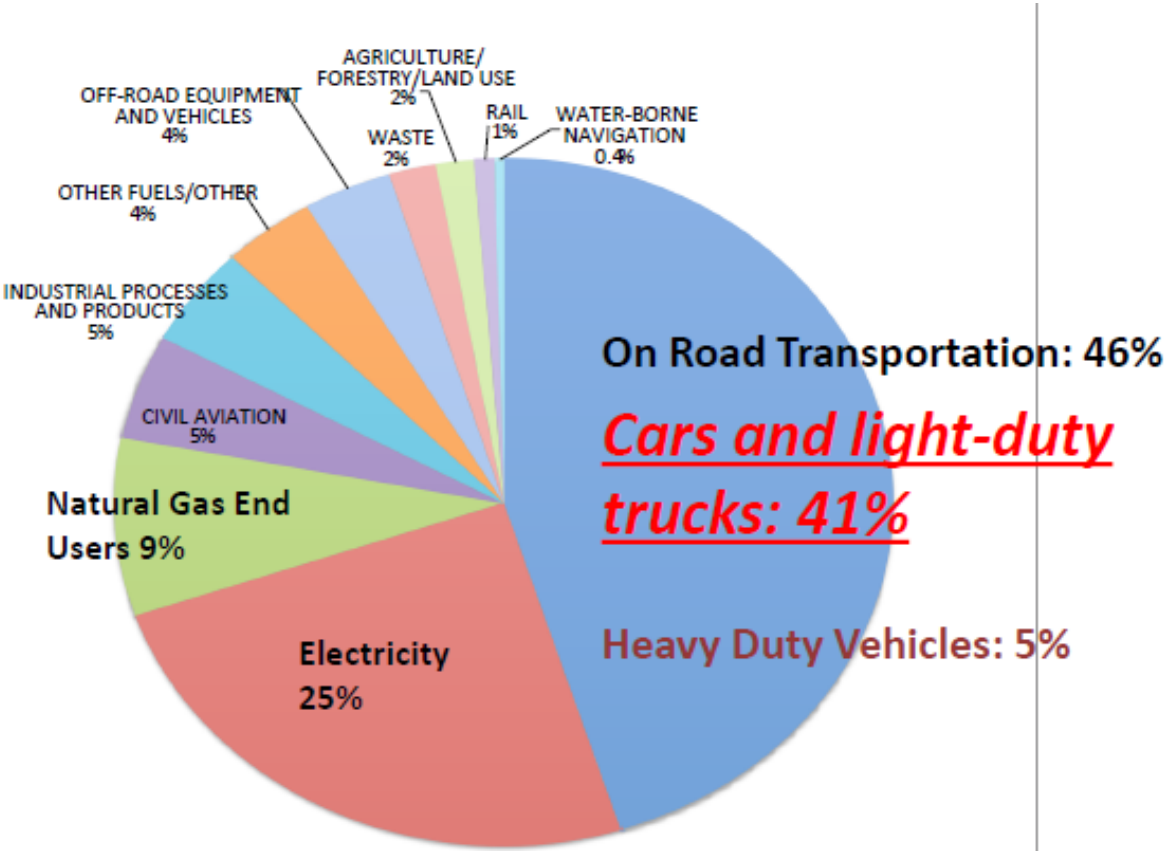
Dividend Account Parking (DAP)

Brief System Definition

1. **Automated (nothing to do; just park)**
2. **Value-priced, with a congestion-pricing option**
3. **It generates earnings for those who are losing money because of the parking**
4. **Cars parked are associated with an Account**
5. **Parking is available to those having an Account (shared parking)**

Motivation for Change, 1 of 4

Cars and Light-duty vehicles (LDVs) emit the most GHG of any category



Motivation for Change, 2 of 4

- ***Fleet Efficiency Will Not Come Soon Enough, as shown in this peer-reviewed report:***

2020 Air & Waste Management Association (AWMA) Report

Deriving Climate-Stabilizing Solution Sets of Fleet-Efficiency and Driving-Level Requirements, for California Light-Duty Vehicles*

***Available upon request from mike_bullock@earthlink.net**

Motivation for Change, 3 of 4

Climate-Stabilizing Requirements, for Four Cases

Difficult but possible

	Case Designations			
	Balanced_1	Balanced_2	2005 Driving	Mary Nichols
% Renewable Elecricity	85.0%	90.0%	90.0%	90.00%
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	20.0%	15.0%	82.0%	12.35%
% ZEVs, Year 2022	35.0%	25.0%	97.0%	14.76%
% ZEVs, Year 2023	55.0%	45.0%	99.0%	17.18%
% ZEVs, Year 2024	80.0%	70.0%	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	32.0%	32.0%	0.0%	50.5%

Driving as much as we did in 2005 might seem nice, but these % ZEV jumps are not possible

Air Resources Board Mary Nichols has a nice electrification schedule but it would require a very difficult reduction in driving.

Motivation for Change, 4 of 4

Requirements to Achieve the Needed 32% Reduction in Per-Capita Driving, With Respect to 2005

Driving-Reduction Requirments	Per-Cent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Dividend Account Parking	**8%**	**0.92**
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
*Pay-to-Graduat*e Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		**0.68**
% Reduction		**32%**

A *Dividend-Account Parking System* for Oceanside's Civic Center Garage

A System to Eliminate the Harm of Bundled-Benefit Car Parking for City Employees

300 North Coast Highway

- Top-Level Outcome & Overview
- Some Top-Level Calculations
- Who gets to use the system
- Overcoming problems & perceptions
- Outcomes of a new incentive
- Cash flow ("Hey, where does the $$ come from?")

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Top-Level Outcomes

- Employees that drive every day, break even **(Lose no money!)**
- Employees get *paid to not drive* **(Make more money!)**
- Fewer employees drive, reducing Greenhouse Gas (GHG) emissions **(Less GHG!)**

Overview

- Fully-automated parking system, implemented by a 3rd-party vendor (RFP selection process)
- operated for the financial gain of employees
  - Earnings = Money Generated Minus Vendor Earnings
  - Earnings go to employees
- Price is cost per minute
  - Such as 1.85 cents per minute (= $1.11 per hour= $10 per 9 hours at the workplace)
- An employee's **Earnings** ("**Dividend**") is proportional to their time at the work site

Calculations of an Employee's Earnings

- An employee's earning is proportional to time spent at work (automatic collection of enter/exit times, using employee RFID)

Definitions to Compute an Employee's Monthly Earnings	
$T_{Employee}$	The Employee's Monthly Time at the Work Site
$T_{AllEmployees}$	Total Monthly Time at the Work Site, All Employees
$E_{AllEmployees}$	Total Monthly Earnings from the Employee Parking

$$\text{Employee Earnings} = E_{AllEmployees} \times (T_{Employee} / T_{AllEmployees})$$

"Add In" Payment so Those that Drive Every Day Will Lose No Money

Note: This is for an individual employee

The employee's Parking Payment =

The employee's Earnings – The employee's parking charge + The employee's "Add In"

"Add In" is zero, unless it must take on a positive value so that the employee loses nothing

"Add In" payments will be easily covered by Dividend Account Parking parkers that are not employees.

Charge, Earnings, & Add-In, Payment *For Each Employee*

- **Charge**
  - Total Minutes Parked x Cost per Minute
- **Earnings**
  - As shown on earlier slide (proportional to employee's time spent at work)
- **Add-In**
  - If **Charge** > **Earnings**, **Add-In** = **Charge** – **Earnings**
  - **Otherwise, Add-In = zero**
- **Payment** = **Earnings** – **Charge** + **Add-In**

Who Gets To Use Dividend-Account Parking

- ***Anyone*** (not necessarily an employee) driving a car registered in the system
  - There is a person with an account associated with the car
  - The car will be identified
    - License plate reader and/or
    - RFID tag not needed
  - Account can be established on the spot, in less than 5 minutes: credit card info and license number

Employee Behavior 1 of 2

Employees Must Park in Their Parking Lot if they Drive to Work

Measures to Reduce "Cheating" = Parking in the Neighborhood

Not Stated in Presentation to Stay within 15 minutes

Russ was worried!

- Soft, pre-emptive measure: messaging
  - **Perceived integrity** is every employee's responsibility
  - **Insufficient perceived integrity** can cost employees
    - Reduced chance of promotion
    - Smaller pay raises
    - More chance of terminated employment
  - Parking free in the neighborhood will not be tolerated
  - The City wants to be a good neighbor: this is the reason for off-street parking ordinances

Employee Behavior 2 of 2

Employees Must Park in Their Parking Lot if they Drive to Work

Measures to Reduce "Cheating" = Parking in the Neighborhood

Not stated in presentation to stay within 15 minutes

- Soft, pre-operational measure: data collection
  - Operate the system for a time, perhaps even a year, before actually collecting or distributing money
  - Self-identified non-drivers are recognized, thanked, and asked to provide details as to how they are getting to work without driving
- Soft, In-Operation Mode: New non-drivers are thanked and interrogated as to how they do it
- **Hard: cameras or RFID sensors can identify employees walking into the work perimeter from the neighborhoods**

Russ was worried!

Difficult-to-Not-Drive Example

Fictional, Simplified Case with Pricing and Payout Considered per Day, *Page 1*

- Employment Center (factory and office)
- Outside Hemet, California
- 100 employees; parking lot has 100 spaces
- No Transit, 110-degree temperature with poor roads for biking, culture of not car-pooling
- Before installing
  - 99 drive
  - 1 bikes

Difficult-to-Not-Drive Example

Fictional, Simplified Case with Pricing and Payout Considered per Day, *Page 2*

- Dividend-Account Parking charges $10/day
- After installing
  - 99 drive
  - 1 bikes
- Total collected each day: $990
- Each employee gets $9.90 earnings per day ($990/100)
- Each driver loses 10 cents per day
- The “crazy” bike rider gets $9.90 per day extra

Hey, isn’t this an improvement? I would say the “crazy” bike rider is earning his money!

If another employee bikes, the drivers would lose 20 cents per day and the bike riders would get $9.80 per day. If the company president rented out the 2 extra spaces for $10 per day, the drivers would lose nothing and the bike riders would get $10 per day. Biking would increase by 100%! **What’s wrong with that?**

Results of 3 Actions, Including Cash-out

Case (#1), Reference Patrick Siegman's article in Bicycle Pedestrian Federation

- Company: CH2M Hill
  - Location: Bellevue, WA (Seattle suburb)
  - Engineering Firm with 430 employees
- Actions
  - $54/month (1995 $'s), *to not drive*
  - Improved Transit
  - Improved Bike/Ped facilities

CH2M Hill Work Trips		
Mode	***Before***	***After***
Drive Alone	**89%**	**54%**
Carpool	**9%**	**12%**
Bus	**1%**	**17%**
Bike, Walk	**1%**	**17%**
	100%	***100%***

Since these changes are brought about by more than just cashout, this case is not used in the tabulation of cashout results (next chart)

Cash-Out Results

(11 Locations, 3 Groups, 1995 Dollars)

Money Matters !!!!!

- Reference: *How to Get Paid to Bike to Work: A Guide to Low-traffic, High- Profit Development* by Patrick Siegman*. Published in *Bicycle Pedestrian Federation of America*, 1995.
- 3 Largest Responses
  - 38%, 36%, 31%
- 3 Smallest Responses
  - **15%** , 18%, 24%
- Responses are the *change;* car vacancy rates would be larger

*Patrick Siegman, of Nelson Nygaard

Impact of Financial Incentives on Parking Demand

Location	Scope	1995 dollars per mo.	Parking Use Decrease[1]
Group A: Areas with little or no public transportation			
CenturyCityDistrict, West Los Angeles	3500 employees at 100+ firms	$81	15%
Cornell University, Ithaca, NY	9000 faculty & staff	$34	26%
San Fernando Valley, Los Angeles	1 employer, 850 employees	$37	30%
Costa Mesa, CA		$37	22%
Average for Group		**$47**	**23%**
Group B: Areas with fair public transportation			
Los Angeles Civic Center	10000+ employees, several firms	$125	36%
Mid-Wilshire Blvd., Los Angleles	1 mid-size firm	$89	38%
Washington DC Suburbs	5500 employees at 3 worksites	$68	26%
Downtown Los Angeles	5000 employees, 118 firms	$126	25%
Average for Group		**$102**	**31%**
Group C: Areas with good public transportation			
University of Washington, Seattle Wa.	50,000 faculty, staff & students	$18	24%
Downtown Ottowa, Canada	3500+ government staff	$72	18%
Bellevue, WA	1 firm with 430 employees	$54	39%[2]
Average for Group, but not Bellevue Washington		**$45**	**21%**
Over All Average, Excluding Bellevue Washington			**25%**

[1] **Parking vacancy would be higher!** [2] **Not used, since transit & walk/bike facilities also improved.**

Dividend-Account Parking, Oceanside

Civic Center Parking Garage

Money Flow Calculations

Simplifying Assumptions:

1. **Workers work 8 hours, with a one-hour lunch, for 9 total hours at the work location, each day they work**
2. **They only work from 8 AM to 5 PM**
3. **Evening hours, when parking can earn money from the public, are (only) from 5 PM to 9 PM**
4. **Week-end workers also work on weekdays, for a total of 7*9 = 63 hours, at the work location, per week**

Dividend-Account Parking

Money Flow Calculations

Notation Conventions	
Letters	**Meaning**
N	Number
DAP	Dividend Account Parking
VP	Value Priced
WE	Week End
WD	Week Day
WH	Work Hours, Meaning 8 AM to 5 PM
AH	After Hours, Meaning 5 PM to 9 PM

Dividend-Account Parking

Money Flow Calculations

Assume This is the "Value-Price" of the Parking

Use $10 per 9 Hours at the Work Site

Value	Units
1.8519	Cents per Minute
1.11	Dollars per Hour

Dividend-Account Parking

Money Flow Calculations

Assumed Values Used in the Following Performance Assesment		
Description	**Name**	**Value**
Number of parking places	N_DAP	250
Number or employees	N_Emp	250
% employees that drive on week day & week end	%Drive	80
Value-price to park, per 9 hours day (8 hours work + lunch)	VP_9Hrs	$ 10.00
% employees that work on Sat. and on Sun.	%WE	20
Yearly bonus paid to all workers	Y_Bonus	$100.00
Non-Workers Use This Per-Cent of the Parking That Is Not Used by Workers		
Week Day, Work Hours	%NonWrkWDWH	50
Week Day, After Hours (5 to 9)	%NonWrkWDAH	30
Week End, Work Hours	%NonWrkWEWH	50
Week End, After Hours (5 to 9)	%NonWrkWEAH	30

Dividend-Account Parking

Money Flow Calculations

Calculations to get the Weekly Earnings From Employees & the Weekly "AddIns" Required, per Employee			
Description	**Formula**	**Name**	**Value**
Number of Employees That Drive on a Week Day	N_Emp * %Drive / 100	**N_DrWD**	200
Money From Employees on a Week Day	VP_9Hrs * N_DrWD	**$_AllE_WD**	$ 2,000
Number of Employees That Work on a Week End	N_Emp * %WE / 100	**N_WrkWE**	50
Number of Employees Driving on a Week-End Day	N_WrkWE * %Drive / 100	**N_DrWE**	40
Money From All Employees Each Week-End Day	VP_9Hrs * N_DrWE	**$_AllWE**	$ 400
Weekly Money From Employees From Both the Week End & the Week Days	5 * $AllE_WD + 2 * $_AllWE	**$_AllE**	$ 10,800
Total Hours at This Location Per Week	N_Emp * 9 * 5 + N_Emp * %WE / 100 * 9 * 2	**HrsPerWeek**	12150
Weekly Earnings for an Employee at the Location for 45 Hours	$_AllE * 45 / HrsPerWeek	**PerWeek45**	$ 40.00
AddIn for an Employee at the Location for 45 Hours per Week	5 * VP_9Hrs - PerWeek45	**AddIn45**	$ 10.00
Weekly earnings for an employee at the location for 63 hours	$_AllE * 63 / HrsPerWeek	**PerWeek63**	$ 56.00
Per Week AddIn for an Employee at the location for 63 Hours per week	7 * VP_9Hrs - PerWeek63	**AddIn63**	$ 14.00

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week Day Work Hours (8 to 5)			
Description	**Formula**	**Name**	**Value**
Spaces Available for Non-Workers, Work Day, Work Hours	N_DAP - N_DrWD	**S_4NW_WDWH**	50
Spaces Used by Non-Workers, Work Day Work Hours	S_4NW_WDWH * %NonWrkWDWH / 100	**SNW_WDWH**	25
Money from Spaces Used by Non-Workers Per Day	SNW_WDWH * VP_9Hrs	**$NW_WDWH**	$ 250
Money from Spaces Used by Non-Workers Per Week	5 * $NW_WDWH	**W$NW_WDWH**	$ 1,250

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week Day After Hours (5 to 9)			
Spaces Available for Non-Workers, Work Day, 5 to 9, AKA After Hours	N_DAP	**S_4NW_WDAH**	250
Spaces Used by Non-Workers, Week Day After Hours	S_4NW_WDAH * %NonWrkWDAH / 100	**SNW_WDAH**	75
Money From Spaces Not Used by Workers, Week Day After Hours	(4/9) * VP_9Hrs * SNW_WDAH	**$NW_WDAH**	$ 333
Money per Week from Spaces Not Used by Workers, Week Day After Hours	5 * $NW_WDAH	**W$NW_WDAH**	$ 1,667

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week End Work Hours (8 to 5)			
Spaces Available for Non-Workers, Week End Work Hours	N_DAP - N_DrWE	**S_4NW_WEWH**	210
Spaces Used by Non-Workers, Week End Work Hours	S_4NW_WEWH * %NonWrkWEWH / 100	**SNW_WEWH**	105
Money From Spaces Used by Non-workers Per Week-End Day, Work Hours	SNW_WEWH * VP_9Hrs	**$NW_WEWH**	$ 1,050
Money From Spaces Used by Non-workers On the Week End After Hours, Per Week	2* $NW_WEWH	**W$NW_WEWH**	$ 2,100

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week End After Hours (5 to 9)			
Spaces Available for Non-Workers, Week End After Hours	N_DAP	**S_4NW_WDAH**	250
Spaces Used by Non-Workers, Week End After Hours	S_4NW_WDAH*%NonWrk WDAH/100	**SNW_WDAH**	75
Money From Spaces Used by Non-workers Per Week-End Day After Hours	4/9 * SNW_WDAH * VP_9Hrs	**$NW_WDAH**	$ 333
Money From Spaces Used by Non-workers on Week-End Days After Hours, Per Week	2 * $NW_WDAH	**W$NW_WDAH**	$ 667

Dividend-Account Parking

Money Flow Calculations

The Weekly Earnings From Non-Employees, the Weekly "AddIns" Required, the Weekly Surplus Generated, the Yearly Surplus, and the Yearly Surplus After Giving Employees a $100 Per Year Bonus			
Description	**Formula**	**Name**	**Value**
Weekly Money Earned by the spaces not taken by workers	W$NW_WDWH + W$NW_WDAH + W$NW_WEWH + W$NW_WEAH	**W$NW**	$ 5,683
Weekly Money Required to Pay All of the AddIn Amounts	N_DrWD * AddIn45 + N_DrWE * AddIn63	**AddInPerWeek**	$ 2,560
Weekly Money Left Over After Paying Add Ins	W$NW - AddInPerWeek	**$PerWeek**	$ 3,123
Yearly Money After Paying Add Ins From the Money From Non-Workers	52 * $PerWeek	**$PerYear**	**$ 162,413**
Yearly Money After Paying Add Ins and Also a $100 Bonus Per Year for Each Employee	$PerYear - $100 * N_Emp	**$PerYear**	**$ 137,413**

Dividend-Account Parking

Money Flow Calculations

3 Cases of Dividend-Account Parking Performance Oceanside Civic Center Garage			
	Baseline	**Worse**	**Better**
% employees that drive on week day & week end	80%	85%	75%
% employees that work on Sat. and on Sun.	20%	25%	15%
% Parking Not Used by Workers, That is Used by Non-Workers			
Week Day, Work Hours	50%	45%	55%
Week Day, After Hours (5 to 9)	30%	25%	35%
Week End, Work Hours	50%	45%	55%
Week End, After Hours (5 to 9)	30%	25%	35%
Yearly Amount Left Over After Paying Add-Ins	**$162,413**	**$125,242**	**$210,374**
Amount Left After Paying Add-Ins & $100 Bonus	**$137,413**	**$100,242**	**$185,374**

Conclusion 1

Given our climate emergency, we need this parking system to spread to all parking, to include offices, on-street, apartments, "big box", shopping centers, and mixed use.

Conclusion 2

Society needs a corporation to specialize in managing and optimizing parking

Skills Needed Include:

1. Data collection, computing, marketing, archiving, transferring money, protecting privacy, and generating financial statements
2. Monetizing unused parking and data
3. **Financing and building solar canopies, roof top solar, and charging stations**
4. **Selling electricity**

Conclusion 3

This could be an enforceable mitigation measure in a city's Climate Action Plan, to reduce driving, perhaps in its Transportation Demand Management (TDM) Section.

Back up Slides

Conclusion & Path Forward

- A big part of the needed 32% reduction needs to come from car-parking reform.
- The first step could be a demonstration project of a car-parking system, at a work location.

From the California Democratic Party (CDP) 2018 Platform

From: https://www.cadem.org/our-party/standing-committees/body/CDP-Platform-2018.pdf

Transportation Sub-Plank Statement

- Work for **shared**, convenient, and **value-priced** parking, operated with a system that **provides financial support** to those paying higher costs or getting a reduced wage, due to the cost of providing the parking ***Note: this is DAP!***

1500-Character Extended Abstract

The presentation starts with the definition of two commonly-used, car-parking systems: the bundled-price system and the bundled-cost system. The flaws of these systems are exposed. The Dividend Account Parking (DAP) parking system is introduced; with the motivation for its implementation: the importance of cars in reducing GHG and how DAP fits into a plan to ensure that cars support climate-stabilization.

The rest of the slides present a specific DAP proposal, in downtown Oceanside, CA, for city employees. Outcomes, an overview, and a definition of DAP are given. Charge & payout formulations are specified. Methods to prevent cheating are described. A brief, simplified example of a DAP implementation is shown, where it would be difficult to not drive to work, showing DAP to still be a good choice. Results from cases of car parking cash-out (where employees are paid to get to work without driving) are given, showing that if a price differential (between driving and not driving to work) is introduced (DAP does this), driving alone to work is significantly reduced.

Money cash flow calculations are presented, using reasonable simplifying assumptions and then reasonably-conservative assumptions of how much money could be earned from employee parking, whenever it is not being used by an employee. The results from three cases (“Baseline”, “Worse”, and “Better”) are shown.

Twenty six back up slides appear, but they are NOT part of the presentation.

Measures to Get 32%

Estimated Reduction

- Predictions, Regional Transportation Plans — 10%
- Stop expanding most roads and all freeways — 2%
  - No need, Eliminate congestion with less driving
- Reallocate freeway-expansion $$$ to **transit** — 2%
- **Payment methods**, **to increase fairness & choice**
  - Demonstration projects: Dividend-Account Parking
  - **Legislation**
    - Replace Bundled-Cost or Bundled-Benefit Parking — 8%
    - Equitable and environmentally-sound road-use fees — 8%
- **Smarter growth**, complete streets, bike classes — 2%

32%

Climate Literacy

THEREFORE BE IT RESOLVED, that the California Democratic Party reinforces the need for all high school students to know, before they graduate, and elected officials to know, acknowledge, and address, as soon as possible, (1) both the existence of and the reason for anthropogenic climate change; (2) its potential for harm; (3) the difference between stabilizing the climate at a livable level and destabilization; (4) science-based, climate-stabilizing, GHG reduction targets; (5) the primary variables and considerations in identifying those targets and (6) the approximate amount of life style and technology change required to achieve those climate-stabilizing targets.

XXX Implementation Example

The City could have the vendor operate the system, for the first 10 years. Over those years, the vendor would be motived to debug the system and continue to look for operational efficiencies. The vendor could receive 10% of the revenue, for the first 5 years; 5% of the revenue, for the next 3 years; and 2%, for the final 2 years. If 600 cars are parked for 8 hours, 200 days per year, at 50 cents per hour, then the yearly revenue would be $480,000. The vendor would collect $240,000 over the first 5 years, $72,000 over the next 3 years, and $28,800 over the last two years.

How Bad Could It Get?

Governor Brown to the Pope:

Humanity must

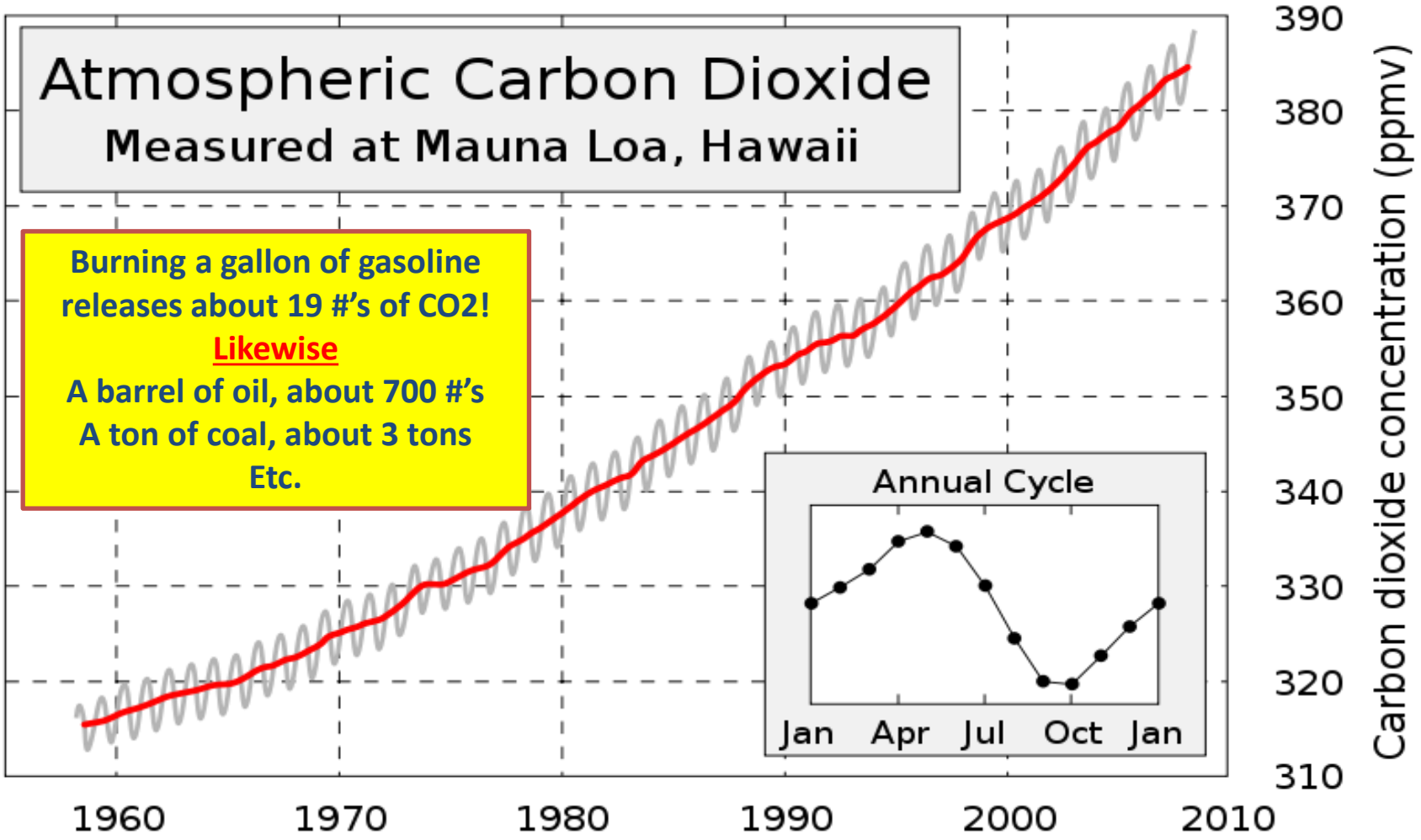
Reverse Course* **or** ***Face Extinction***

*** Must be quantified***

Climate Data

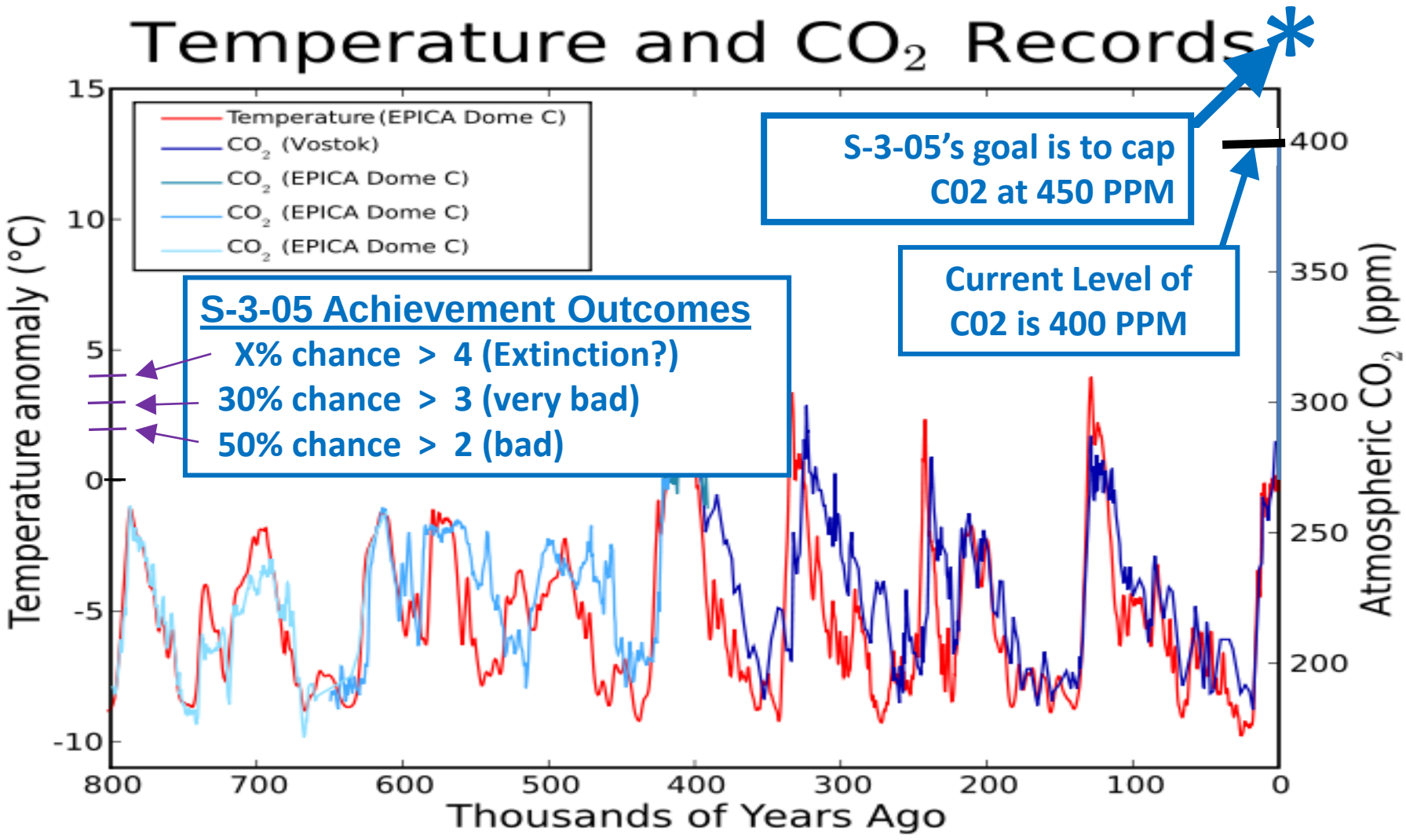
Currently 400 PPM! *

- Keeling Curve:
  http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis



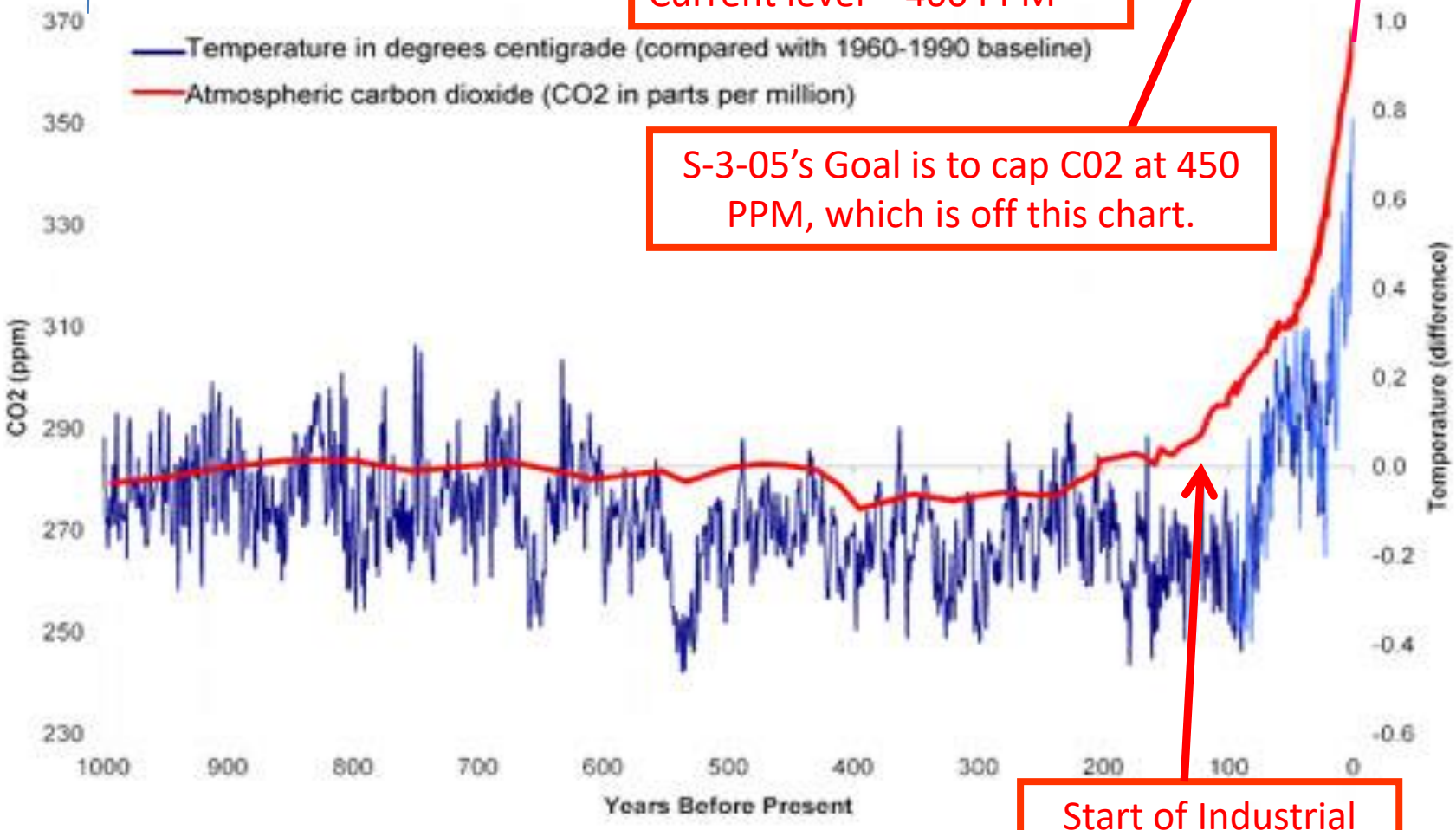
Our Climate Crisis

- From: http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis



Our Climate Crisis

- Earth & Space Research (ESR) website: http://www.esr.org/outreach/climate_change/mans_impact/man1.html



Fixing the Problem

We must stabilize the value of the earth's atmospheric CO2_e

CO2_e Emissions | **Sequestration (Photosynthesis)**

$E_N + E_A + E_{WFB}$ > → Positive Slope

$E_N + E_A + E_{WFB}$ = → Zero Slope

$E_N + E_A + E_{WFB}$ < → Negative Slope

S

Natural: rotting, fire, digestion. respiration

Anthropogenic: combustion of fossil fuel, methane, other

Warming **F**eed **B**ack: such as methane from melting permafrost

Growth of plants on Earth

The Warming Feed Back term is the wild card. It must not become dominant.

If Anthropogenic emissions were to be sufficiently low (80% below 1990 levels has been allocated to developed countries), the slope would be zero, thus capping the value of the Earth's atmospheric CO2_e

Motivation for Change

- Fairness to individuals
  - Costs no longer hidden
  - Costs avoided or recovered, by not using parking
- Less driving, to reduce environmental harm
  - Motivates choosing alternative modes
  - Less driving to find parking
- Cost Effective Development
  - Less parking needed reduces land and building costs

Goals, 1 of 2

- One agency operates all parking
- Nearly all parking is shared
- Parking costs are effectively unbundled
  - From wages and rents
  - From costs of goods and services
- No change to how parking gets built
  - Generally, municipalities require & developers build

Goals, 2 of 2

- Priced right
  - Value Priced: Base price derived from costs
  - Driver demand determines a congestion price
- No need to search for parking
  - Directions to parking that meets user's needs
  - Accurate price predictions
- Each parking space's use is archived
  - Supports informed decisions
- Privacy and the needs of the disabled are supported

Definitions and Methods, 1 of 6

- Definition & Examples of ***Parking Beneficiary Group***
  - Owners
    - Private investors or governments operating public parking
  - Those losing money due to provided parking
    - Employees
    - Apartment renters or condominium owners
    - Hotel or restaurant patrons
    - Shoppers
  - Those offered specific parking
    - Driving-age students at a school with parking
    - Driving-age train riders using a station with parking

Definitions and Methods 2 of 6

- How to Effectively Unbundle the Cost or the Benefit
  - Price charged per minute
    - Base price rate established to cover all costs
    - Congestion price rate
      - Dynamically set as a function of occupancy rate
      - Charge is time average, if rate changes, while car is parked
  - Parking generally available to all drivers
  - Earnings distributed to members of *Beneficiary Group*
    - Calculation of individual's earnings depends on situation

Definitions and Methods, 3 of 6

- Calculation of monthly earnings
  - If parking is provided for several groups, each group's portion of the earnings is proportional to its original contribution to cost (Mixed use case)
  - Each beneficiary group's total is divided up among its members
    - Condominium owners: proportional to spaces effectively purchased
    - Renters: proportional to spaces effectively renting
    - Shoppers: proportional to money spent
    - Employees or students of driving age: proportional to time spent at work or school
    - Train riders of driving age: proportional to time spent on round trips

Definitions and Methods, 4 of 6

- For congestion pricing, *define* ***Cluster of Parking***
  - 20 to 40 contiguous spaces nearly equal in desirability
  - Assigned the same price
- Pricing
  - Base price
    - Covers all costs $r_{BaselineHourly} = \frac{(r_{Invesment} \times v_{Parking}) + c_{YOPD}}{(n_{HoursPerYear} \times f_{TO})}$
    - Report's Page 13 & 14 provides details
  - Congestion price, for each cluster

$$r_{HourlyRate} = r_{BaselineHourly} \times \left(B^{(30-V)/5}\right), for\ V < 30;\ r_{BaslineHourly}, otherwise$$

- B is nominally 2; adjusted to keep vacancy above 15%
- V is the vacancy % rate (Report's Eq. 2, Table 2, Pages 14 & 15)

Definitions and Methods, 5 of 6

- Pricing predictions
  - For any set of dates, start times, durations, and destinations
  - Availability of predictions
    - Broadcast into navigational units
    - Website or phone
- Help to find desired parking
  - Driver gives times and locations and stipulates . . .
    - Max price, to get space at minimum walk distance
    - Max walk distance, to get space at minimum price
  - Voice-activated navigational system for ease and safety

Definitions and Methods, 6 of 6

- Monthly statements
  - All parking charges and earnings
    - First, within state
    - Then, within nation
    - Finally, within North and South America
  - Customer selects presentation detail
    - Less detail for ease and more privacy
    - More detail to know and adjust parking decisions
  - Packaged with other statements
    - All utilities, transit use, road use

Implementation Plan, 1 of 3

- Prototype design
  - Most likely a Climate Action Plan Mitigation Measure
- Requirements document to support request for proposal (RFP)
- Winning proposal leads to design
  - Hardware selection and design
  - Software generation
- Prototype installation
  - Most likely a Climate Action Plan Mitigation Measure
  - Debug
  - Adjustments to satisfy stakeholders

Implementation Plan, 2 of 3

- Government agency develops and executes full installation strategy
  - To minimize impact on institutions
  - To maximize early success and driving reductions
    - Large employment centers with “free” parking
    - Train stations with large, “free” parking lots
  - Supported by new law that requires cooperation but very little effort, from . . .
    - Private and public institutions
    - Individuals

Implementation Plan, 3 of 3

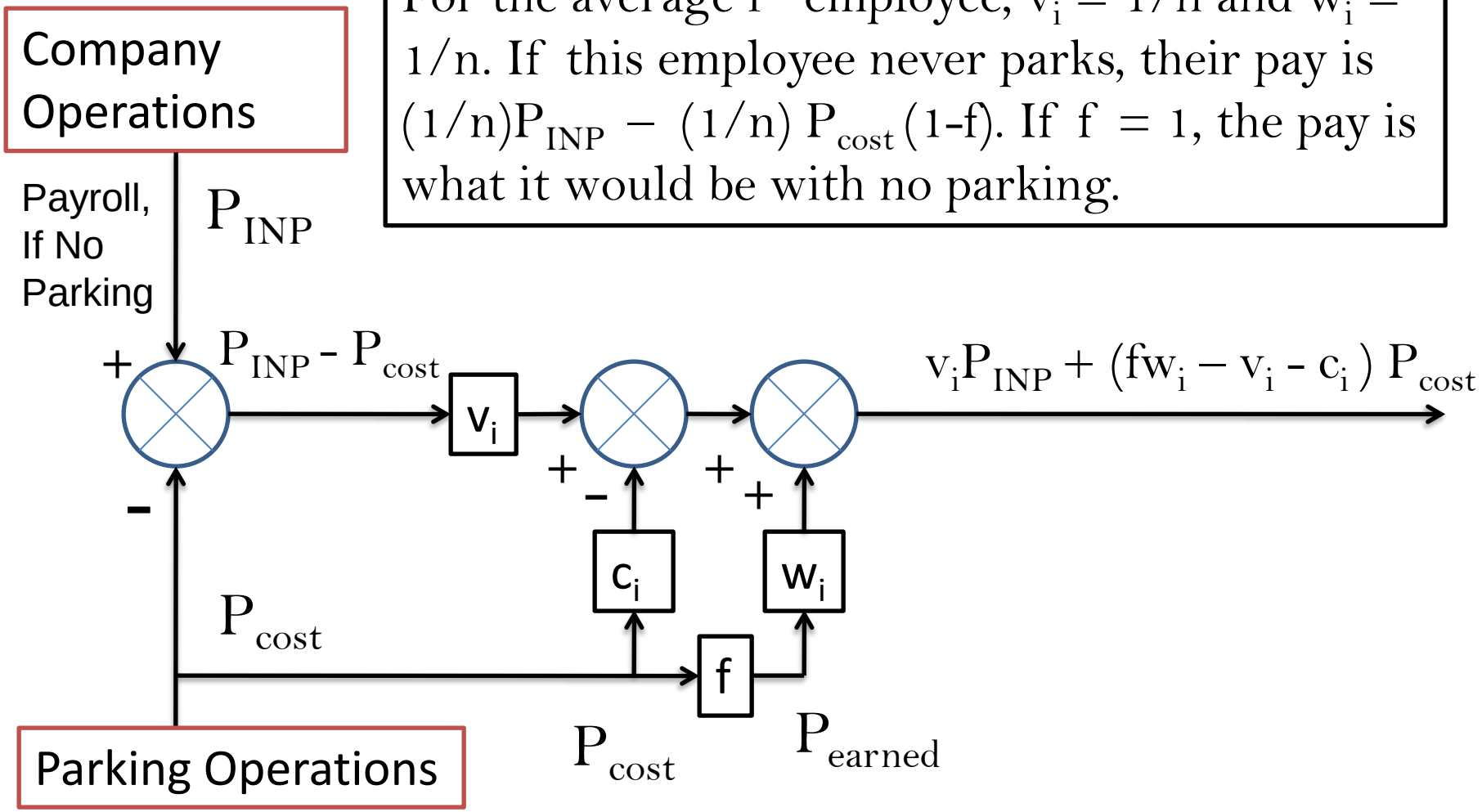
- Basis for a new law supporting installations
  - To provide equal protection of the law
    - Government has required parking for 50 years
    - Those driving less than average often lose money
  - Prototype will have demonstrated feasibility
  - Global warming considerations show subsidized parking to be a public nuisance
    - Global warming will likely cause a human catastrophe
    - Short term strategies are critical
    - Electric cars and getting most electricity from renewables will take decades
    - Properly pricing parking is relatively cheap and quick (5 years)

Unbundle Flow Diagram Definitions

Variable	Definition
P_{INP}	Company payroll if there were no parking costs
P_{cost}	Total parking cost. Price will be sized to recover this.
P_{earned}	Parking earnings equals parking cost minus collection cost
v_i	Employee value. Fraction of available pay. For the average employee, 1/n
c_i	Fraction of parking cost paid. Zero, if the employee never parks.
f	Parking earnings divided by parking cost. Close to 1 for efficient collection
w_i	time worked divided by total time worked of all employees. If average, this is 1/n.

Unbundle Flow Diagram

For the average i^{th} employee, $v_i = 1/n$ and $w_i = 1/n$. If this employee never parks, their pay is $(1/n)P_{INP} - (1/n)\,P_{cost}(1\text{-}f)$. If $f = 1$, the pay is what it would be with no parking.



Mike Bullock, 1 of 2

- Personal
  - Married, two daughters, 3 grand daughters, 1 grandson
    - Daughter Laura Bullock White (Berkeley)
    - Heidi Bullock (Oceanside)
  - Moved from Cupertino to Oceanside in April 2007
  - Oceanside home (1800 Bayberry Dr) and 4-plex (506 N. Ditmar)
  - Swims with and competes for Oceanside Swim Masters
- Education
  - BSEE, Lamar University
  - MSE, University of Texas at El Paso
- Professional
  - Lockheed Martin Systems Engineer, 1971 to 2007
    - Last 2 years, Space Based Infrared System (SBIRS, satellite to detect and track missiles)
    - 10 Years previous: Milstar (communication satellite)
      - Verification of antenna pointing accuracy
      - Antenna pointing calibration

Mike Bullock, 2 of 2

- Most Recent Activities
  - California Democratic Party
    - Delegate, 76TH AD
    - Elected member of the San Diego County Central Committee
    - CDP Resolutions and Platform

San Diego County's Climate Action Plan Misadventures

- The Sierra Club proposed Dividend-Account parking, as a demonstration project for County employees
- The County argued it was infeasible
- Superior Court Judge Taylor ruled that the County failed to show it was infeasible
- The County appealed on a 3-2 vote
- This is the 2nd failed CAP for the County. The first was ordered rescinded on the same issue and resulted in a published Appellant Court Ruling

DRAFT

These entities or others may become interested in issuing a Request for Information as described herein

City of Encinitas in cooperation with the cities of Oceanside, Carlsbad, Solana Beach, and Del Mar, the United States Marine Corps Base at Camp Pendleton, and North County Transit District

REQUEST FOR INFORMATION (RFI) OR A REQUEST FOR AN INDICATION OF INTEREST (RFIOI) IN RESPONDING TO AN RFI

Design, Install, and Operate a Dividend-Account Car Parking System at Selected Work Locations for Employees

CM RFI 18-XX

Date Issued: Month j, 2018 or 2019
Questions Due: Month k, 2018, 5:00 PM
Proposals Due: Month l, 2018, 2:00 PM

IF YOU DID NOT DOWNLOAD, OR DIRECTLY RECEIVE THIS DOCUMENT FROM THE XXX WEBSITE AT WWW.xxx.GOV/BIDS, YOU ARE NOT LISTED AS AN OFFICIAL DOCUMENT HOLDER FOR THIS SOLICITATION AND WILL NOT BE NOTIFIED BY THE CITY OF ADDENDA ISSUED. YOU MUST ACKNOWLEDGE ANY ADDENDA ISSUED IN YOUR SUBMITTAL OR RISK BEING CONSIDERED NON RESPONSIVE. PLEASE BE SURE TO VISIT THE WEBSITE ABOVE TO REGISTER AS A DOCUMENT HOLDER FOR THIS SOLICITATION.

City of XXX
City Manager's Department – Environmental Services
Attn: YYY

Table of Contents

I. INTRODUCTION

The City of Encinitas, or one of the other entities shown above, may want, at some future date, to request information that will aid in the selection of a vendor for a possible Dividend-Account Car-Parking System Demonstration pilot on behalf of the themselves and other entities, such as Oceanside, Carlsbad, Encinitas, Solana Beach, and Del Mar, the United States Marine Corps Base at Camp Pendleton, and the North County Transit District (collectively referred to as "Partners"). The Partners may seek to evaluate the benefits, effectiveness, and popularity of a Dividend-Account Car Parking System for employees in the north coastal region of San Diego County through the operation of a temporary pilot program lasting from twelve (12) to thirty-six (36) months. It could become the goal of the Partners to determine whether permanent Dividend-Account Car-Parking systems would be successful in our region based on the outcome of a pilot program. Partners may decide to be actively coordinating with the San Diego Association of Governments (SANDAG), the agency that may be leading regional Dividend-Account Car-Parking Systems coordination around topics including data collection and monitoring, public outreach, policy/regulations. The partners are more likely to want to proceed if there is an identified interest on the part of vendors to respond to an actual RFI. To save time, the rest of this document is written as if one of the Partners has already decided to issue an RFI. However, that is not currently the case. This document, perhaps best described as Request for Indication of Interest has been adapted from a dock-less bike share RFI. Thank you for considering this concept. Please indicate if you would be interested in designing and operating such a system.

Mike Bullock

Oceanside, CA 92054
760-754-8025; Cell: 760-421-9482

A. Location

The study area includes the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, and Del Mar, and the United States Marine Corps Base at Camp Pendleton, all of which are located in northern San Diego County along the coast. The region has a mild climate with average temperatures ranging from the mid-60s in the winter to mid-80s in the summer. The terrain is relatively flat along the coast, particularly when traveling in the north-south directions. Each of the cities have dense urban centers of varying sizes with grid street plans and relatively flat terrain. Generally, most of the cities in the study area have more hilly terrain and a suburban layout east of Interstate 5 (I-5). The combined population of the cities is approximately 365,000 and the combined geographical area of the cities is approximately 106 square miles. Highway 101 runs along the coast through each of the cities for a contiguous distance of approximately 20 miles. Highway 101 is one of the most popular bicycling routes in the San Diego region. North County Transit District (NCTD) operates two rail lines and 34 bus routes throughout North County. Thirteen rail and/or bus transit centers are located within the study area. Total annual NCTD ridership is approximately 10.7 million passengers. The Camp Pendleton Marine Corps base is located just north of Oceanside and serves as a major employer for both enlisted and non-enlisted personnel. The southwest corner of the base adjacent to Oceanside Harbor and west of I-5 features relatively flat terrain and could benefit from increased biking connections.

Table 1: General information about the region

	Population[1]	Employment[2]	Size (sq. mi.)	Coastline (mi.)
Oceanside	175,948	35,662	42	3.5
Carlsbad	112,930	66,596	39	6.3
Encinitas	61,928	22,443	20	6
Solana Beach	13,494	7,843	3.6	1.5
Del Mar	4,274	3,474	1.8	2.9

[1]SANDAG Current Estimates, 2016
[2]U.S. Census Bureau, 2015

B. Background

The cities in the North County coastal region of San Diego County are increasingly aware of the need to reduce local greenhouse gas (GHG) emissions to limit the effects of climate change

while offering viable transportation alternatives to driving alone. Many of the cities have adopted Climate Action Plans (CAPs) or are in the process of developing CAPs. CAPs establish environmental initiatives by which cities aim to achieve GHG emissions reduction goals and targets. Transportation, especially travel via single occupancy vehicle, is a major source of GHG emissions in North County. Facilitating safe, convenient, and affordable alternative transportation options is often a component of these plans and initiatives. Car parking systems that increase economic fairness and choice, compared to bundled-employee-benefit car parking systems (erroneously called "free parking") at places of employment will reduce single occupancy vehicle (SOV) commuting and increase the need for first/last mile solutions. For this reason, this RFI will be provided to those firms that would benefit from increasing the demand for first/last mile solutions.

The Marine Corps Mobility Transformation Strategy calls for demonstration projects at installations like Camp Pendleton to meet official business mobility with capabilities that are smarter, more efficient, more accessible, and cheaper.

Partners will seek to coordinate with SANDAG on Dividend-Account Car-Parking Systems data analysis while ensuring the selected Dividend-Account Car-Parking Systems vendor can meet data sharing requirements that assist in quantifying the impacts of Dividend-Account Car-Parking Systems on vehicle miles traveled (VMT), access to transit, economic development, and other benefits.

Offering and promoting programs, like Dividend-Account Car-Parking Systems, that replace vehicle trips with active transportation and/or transit trips, is one of the ways the Partners can help to reduce emissions while offering more efficient and more affordable transportation modes for residents, employees, and visitors. A Dividend-Account Car-Parking System is a system which operates employee car parking for the financial gain of the employees by value-pricing the parking and distributing the earnings, which are the revenue minus a fair cost of operation, among employees. The earnings are provided in proportion to the time an employee spends on the work premises. There may also be an "add in" payment provided by either the employer or from a grant, such as a Greenhouse Gas Reduction Fund (GGRF) grant, sized so that an employee that continues to drive every day will lose no money under the system. This system will in effect pay each employee an additional amount of income for each day they get to work without relying on the single occupancy vehicle (SOV) mode. See Reference 1 for more details on the Dividend-Account Car Parking System. The References are listed at the end of Section II, Request for Information.

C. Purpose and Objectives of the RFI

The purpose of this Request for Information (RFI) is to identify vendors with the resources to pilot a Dividend-Account Car-Parking System program in the Partners' jurisdictions, in accordance with the objectives set forth in this RFI.

The Partners seek a qualified vendor to design, establish, implement, operate, and maintain an innovative, valuable, and mutually-beneficial Dividend-Account Car-Parking System pilot program. The pilot should enable and encourage residents, employees, and visitors to affordably and conveniently travel by car pool, transit, active transportation or some combination of these modes. The pilot should also facilitate a decrease in vehicular parking demand, vehicular traffic, and (GHG) emissions, while promoting active and healthy transportation options.

Qualified vendors are invited to submit proposals based on the information provided in this RFI.

This RFI is a mechanism for gathering information and does not constitute a binding procurement process, however, selection of goods and/or services may result from information obtained through this RFI process, where deemed appropriate. The Partners, jointly or individually, are not obligated to make an award or issue a Request for Proposal as part of this process. In addition, the Partners, in their sole discretion, may decide to engage in direct question and answer sessions with one or more vendors and may decide to enter into an agreement or issue permits based upon those discussions/interviews or a resulting proposal.

If a single demonstration pilot project or multiple demonstration pilot projects were successful, given the severity of our anthropogenic climate change crisis, it is anticipated that other employers will decide to install Dividend-Account car-parking systems. Since municipal governments are required under CEQA to adopt General Plan Updates (GPUs) that include, perhaps using a Climate Action Plan, a set of enforceable measures that will achieve climate-stabilizing targets, and since cars and light-duty trucks (LDVs) are the largest category of GHG emissions, it is further anticipated that municipal governments will, over time, update their off-street parking ordinances to include requirements for Dividend-Account Car Parking systems. Reference 2 shows that this system is adaptable to all types of parking. A selected vendor would have access to a market of more than 365,000 residents living in the north coastal region, more than 135,000 employees that work in the region, and others that visit the region for leisure.

Potential Dividend-Account Car-Parking Systems program marketing opportunities may include, but are not limited to: being listed as a preferred vendor on the Partners websites, co-branded sustainability campaigns, signage, event sponsorship, press releases, and social media announcements.

D. Obtaining RFI Documents

The website for this RFI and related documents is: PlanetBids (http://www.encinitasca.gov/bids). All correspondence will be posted on the PlanetBids website. It is the responsibility of Proposers to check the website regularly for information updates and RFI clarifications, as well as any RFI addenda. To submit a proposal, a Proposer must be registered with the City of Encinitas as a vendor. To register as a vendor, go to the following link (http://www.encinitasca.gov/bids), and then proceed to the "New Vendor Registration" link. All addenda will be available on the PlanetBids website.

E. RFI Contact

The City of Encinitas will receive questions and information requests on this RFI up to **5:00 p.m. on some TBD Month "n", 2018**. All questions regarding the RFI documents shall be submitted through PlanetBids. All project correspondence will be posted on the PlanetBids website. It is the responsibility of the Proposers to check the website regularly for information updates, clarifications, and addenda.

II. REQUEST FOR INFORMATION or REQUEST FOR INDICATION OF INTEREST

This section describes the information being requested by the Partners to learn about prospective **Dividend-Account Car-Parking System ("System")** vendors and optionally to select a vendor to operate in the Partners' jurisdictions. Interested vendors must include all

information outlined below in a submitted proposal.

A. Dividend-Account Car-Parking System ("System") Pilot Program Requirements

Vendors responding to this RFI must describe their proposed system that is capable of providing the following services and shall describe these services in their submission:

1. System pilot program(s), as described in Reference 1, to include the following installed and maintained capabilities:
2. A capability to establish and maintain a database of System Vehicles, System Members, System Parking and System Accounts. A System Account includes the mailing name and address of a person that has agreed to receive payments and pay bills that are the result of the implementation of the System and the actions taken by the person, or some other person driving the System Vehicle or System Vehicles, as described herein. Such a person is a "System Member." A "System Vehicle" is one that can be identified when it is parked in the System and one that is associated with a System Account and System Member. A System Member may take responsibility to pay for the cost of parking for multiple System Vehicles.
3. A capability to provide an easy method for Employees and others to become System Members by establishing a System Account with their chosen System Vehicles.
4. A capability to provide signage to designate System Parking areas well enough to prevent nearly all accidental entries by unauthorized vehicles, meaning vehicles that are not System Vehicles.
5. A capability to provide written materials to explain to employees and others that may want to become System Members how the System will work and why it is an important improvement to economic fairness and environmental outcomes, assuming a reasonable level of cooperation with the City and other affected groups, such as City vendors and sub-contractors.
6. A capability to operate the system for an agreed-upon amount of time, with no money exchanges, to establish a pre-install database of commute behavior including using questionnaires to determine how non-drivers say they are getting to work.
7. A capability to identify a System Vehicle within a minute of its being parked in a System Parking space and to store the System Vehicle identifier and the time it was recognized as being parked.
8. A capability to recognize when a System Vehicle exits a System Parking space, within a minute and to store the vehicle identifier and the recognized exit time.
9. A capability to identify vehicles that are NOT System Vehicles when they are in the System Parking area and are therefore trespassing, while they are in the System Parking area.
10. A capability to record the start time and end time of the trespassing vehicle's trespassing, to within an accuracy of 1 minute, as well as its license plate image, sufficient to support a conviction of trespassing.
11. A capability to send the license plate of the trespassing vehicle and its start time and end time of its trespassing to law enforcement officials with 5 minutes of the recorded start time of the trespass.
12. A capability to provide notice and evidence of this trespassing in real time and as stored

information for law enforcement so that they can then ticket and prosecute the owners of any and all vehicles that have been illegally parked in a System Parking space. It is anticipated that this would include the capture and storage of the license plate numbers of the vehicles that are parked in the System Parking lot whenever it is the case that the vehicle is not a System Vehicle.

13. A capability to compute an instantaneous charge rate (cost per minute) for the case of an application of “congestion pricing”, whereby an agreed-upon base price is increased by an agreed-upon congestion-pricing algorithm, designed to prevent the occupancy rate from exceeding an agreed-upon upper bound value, such as 90% occupied. An example of such an algorithm is in Reference 2.
14. A capability to compute and store the time that the charge rate changes, for the case of an application of a congestion-pricing algorithm. Note that this time is called the Rate Change Time. At these times, the rate could either increase, by the addition of a car being parked in a System Space or the rate could be decreased, by the subtraction of a car in a System Space.
15. A capability to accumulate a total charge for each System Member, where the total charge is the sum of the products of each parked duration time over which a fixed charge rate applies and the length of that time duration, for all the System Vehicles associated with the System Member, over a month. This total charge is called the System Member Monthly Charge (“SMMC”). Note that the Member may or may not be an employee.
16. A capability to compute the total charges, for all System Members over a month for the System. This amount is the Total System Monthly Charge (“TSMC”).
17. A capability to compute a Total System Monthly Earnings (“TSME”), which is the TSMC, reduced by a agree-to amount, such as 5%, where the 5% is taken out of the TSMC to cover the operator’s expenses.
18. A capability to record all the times an employee enters and leaves the work premises. One way to do this is to require employees to have an RFID. There may also be an GPS or a license plate reading solution. Note that a privacy requirement will prevent this information from being shared, with the employer, for example, with the exception of providing it to a law enforcement person, in the event a warrant is signed by a presiding judge.
19. A capability to use the times an employee enters and leaves the work premises to compute the time, over a month, an employee has spent at or within the work premises. This time is known as the Employee Monthly Time (“EMT”).
20. A capability to compute the total time all employees spent at the premises over a month, to be known as the Total Employee Monthly Time (“TEMT”).
21. A capability to compute an Employee’s Monthly System Earnings (“EMSE”) as the Total System Monthly Earnings (“TSME”), multiplied by the employee’s Employee Monthly Time, EMT divided by the TEMT. This is also described in Reference 1.
22. A capability to compute an Employee’s Add-In “EAI”, as follows. If the employee’s System Member Monthly Charge, SMMC, value is greater than the employee’s earnings, TSME; then, for that case, the EAI is equal to the employee’s SMMC minus the employee’s TSME. If the employee’s System Member Monthly Charge, SMMC value is not greater than the employee’s earnings, TSME; then the employee’s EAI is equal to zero. This is also described in Reference 1.
23. A capability to accept Employee’s Add-In, EAI money from the Employer, with the

expectation that the money would originate from a grant funded by, for example, the Greenhouse Gas Reduction Fund (GGRF), or could come from the Employer's budget, as a Climate Action Plan (CAP) or other expense. It could also be generated by converting some "free" parking to be a different Account Parking System Parking (System Parking), thereby generating new money to the City.

24. A capability to compute an employee's monthly payment ("EMP"), as follows: It is equal to the Employee's Monthly System Earnings, EMSE plus the employee's Add-In, EAI minus the System Member Monthly Charge, SMMC. This is also described in Reference 1.
25. A capability to automatically send out monthly statements to all System Members. System Members who are not employees will receive a bill if they have parked in the System parking during the month. The bill will then be for the member's SMMC. Each employee will receive a statement showing SMMC, EMSE, and EAI. If the employee's EAI is zero, then the employee will receive a payment in the form of cashable check for the employee's EMP. This is also explained in Reference 1.
26. A capability to protect employee privacy where privacy means that the employee's data will never be shared, with the sole exception of sharing with law enforcement officials in accordance with a valid court order requesting the data. For example, at no time will the data be shared with other employees, including those working in the management of the employer that is providing the employee parking that is the System Parking.
27. A capability to protect System Member privacy where privacy means that the System Member's data will never be shared, with the sole exception of sharing with law enforcement officials in accordance with a valid court order requesting the data.
28. A capability to allow visitors, vendors, and others, that are identified by the Company management, to be treated as employees. There could also be "visitor" parking that is not associated with the System.
29. A capability to identify System Vehicles that are parked in the visitor parking or other inappropriate parking places, since it is expected that it will required as a part of City Policy that System Vehicles that are associated with employees will be required to be parked in the System Parking. Since employees are earning money from the System Parking, it would be inappropriate for them to not use the System Parking. This information would be shared with City Management, as soon as it is collected.
30. A capability to perform regular inspection, maintenance, and repair of all System Parking facilities and associated capabilities often enough to eliminate nearly all system failures.
31. A capability to perform vendor-managed methods of enforcement.
32. A capability to have demonstrated secured financial backing with the ability to operate at full capacity for the life of the pilot program and beyond with a sustainable business model.
33. A capability to provide close coordination with all Partners, including real-time sharing of System Parking data collected, active promotion of the Dividend-Account Car-Parking Systems program in coordination with each Partner, and timely response to any complaints received or requests made by the Partners and Dividend-Account Car-Parking Systems users. Describe the type of data that is collected and can be provided to the Partners. Promotion and advertisement of the Dividend-Account Car-Parking Systems program must comply with all Partners' municipal codes and ordinances.
34. A capability to offer a Dividend-Account Car-Parking Systems program that can be deployed, operated, managed, and maintained by the vendor at no cost, except for the

possibility of the EAI payments, to the Partners and with minimal oversight needed from the Partners.

35. A capability to establish and operated multiple Dividend-Account Car-Parking Systems programs including for for cases other than employee parking, as described in Reference 2, that can be deployed, operated, managed, and maintained by the vendor at no cost, except for the EAI payment, for employee parking, to the Partners and with minimal oversight needed from the Partners.
36. A capability to conform to contract specifications, including general liability insurance, worker's compensation, automobile liability insurance, indemnification, and termination clauses. Sample contract attached.

B. Proposal Elements

Vendors interested in responding to this RFI must prepare a proposal that includes the following information:

1. Describe how drivers can become System Members.

2. Provide a detailed System maintenance plan.

3. Describe the vendor's capability to provide data and reports to the Partners, including raw and summarized data. Summarized data could include both user data (e.g., demographics, trip purpose, repeat usage, percent of trips starting and ending in close proximity to transit, mode shift, and transit usage) and trip data (e.g., average trip length, average trip time, trip start and end hotspots, trip path, estimated GHG emissions per trip). Ideally, this data should be provided via a publicly accessible API in your suggested General Dividend-Account Car-Parking Systems Feed Specification (GBFS) format. Describe vendor's ability to collect quantitative and qualitative data and report out findings from users (e.g. in-app surveys).

4. Describe how the vendor will employ anti-theft and anti-vandalism measures to ensure Systems do not pose a nuisance to the community.

5. Since the establishment of Dividend-Account Parking systems will increase bike usage, describe how the vendor will address bicycle safety concerns, including helmet use, riding at night and other safety concerns that may or may not be regulated by state vehicle codes.

6. Describe how the Dividend-Account Car-Parking Systems program may operate in conjunction with existing bike rental businesses operating in the Partners' cities.

7. Describe the vendor's plans for future growth and expansion, including possible anticipated increases in demand for good car parking systems as the public becomes more aware of the threat of anthropogenic climate change and how good systems improve economic fairness, etc.

8. Provide an estimated timeline for a twelve-to-twenty-four-month pilot Dividend-Account Car-Parking System program, including any needed permitting, set-up, promotion, advertising, maintenance and servicing, data delivery to Partners, summary and reporting on the outcome of the pilot program and possible continuation of the program.

9. Describe a recommended minimum Dividend-Account Car-Parking Systems size for the North County Coastal operating area.

10. Describe strategies for effectively educating users on proper System Parking use and the reason that society needs to improve the way we pay for the use of car parking.

11. Describe any approach you would recommend to enhance access and fairness for disadvantaged communities.

12. Describe time required to deploy a Dividend-Account Car-Parking Systems pilot program if selected based on System Parking size, etc.

13. Describe an approach to increasing the use of Dividend-Account Parking to include most city car parking, then across City boundaries, and then across County, State, and international boundaries, with the final system being one wherein nearly all System Vehicles have a single, world-wide, System Account.

References Providing Additional Description

1. ***Eliminating the Harm of Bundled-Cost or Bundled-Benefit Parking***, Presentation to the 2018 Energy Utility Environment Conference (EUEC), Mike Bullock, March 2018
2. ***A Plan to Efficiently and Conveniently Unbundle Car Parking Costs***, paper presented to the Air and Waste Management Association (AWMA) Conference in 2010, Mike Bullock and Jim Stewart, June 2010
3. ***Oceanside Civic Center Garage Space Allocation***, EXCEL Spread Sheet, Bullock, based on a file provided by Oceanside staff, July 2018

III. INSTRUCTIONS

A. Proposal Due Date

Proposals must be submitted electronically no later than **5:00 p.m. on TBD Month 2018 or 2019**. Proposals must be submitted electronically via the PlanetBids system used to download the RFI. The maximum file size for submittal is 50 megabytes, and the file type shall be Portable Document Format (PDF). The electronic system will close submissions exactly at the date and time set forth in the RFI or as changed by addenda.

B. Proposal Acceptance

Respondents are responsible for submitting and having their submittal accepted before the closing time set forth in this RFI or as changed by addenda. NOTE: Pushing the submit button on the electronic system may not be instantaneous; it may take time for the Respondent's documents to upload and transmit before the submittal is accepted. It is the Respondent's sole responsibility to ensure their document(s) are uploaded, transmitted, and arrive in time electronically. The City of Encinitas will have no responsibility for submittals that no not arrive in a timely manner, no matter what the reason.

C. Page Limit

No submissions exceeding twenty-five (25) pages will be accepted (excluding attachments). In addition, attachments may not exceed twenty-five (25) pages. The City of Encinitas discourages "padding" of proposals with brochures, extensive literature, and boilerplate material not applicable to a pilot Dividend-Account Car-Parking Systems program.

D. Proposal Format

Proposals must be organized in the following format and include the following content:

1. Letter of transmittal signed by an individual authorized to bind the proposing entity stating the firm has read and will comply with all terms and conditions of the RFI.

2. General information about the firm, including the size of the organization, location of offices, number of years in business, organizational chart, name of owners and principal parties, number and position titles of staff.

3. Qualifications of principals, project managers and key personnel who would be assigned to this project. Include their position in the firm, and types and amount of relevant experience operating a Dividend-Account Car-Parking Systems program or similar program. Identify the primary contact that will be the overall project manager. Resumes are not required, but may be included as attachments. The selected respondent may not substitute personnel without written authorization from the Partners.

4. A work plan that establishes the Respondent's understanding of, and ability to satisfy Partners' objectives. Respondent shall succinctly describe the proposed approach for implementing a Dividend-Account Car-Parking Systems program, outlining the activities, including innovative ideas that would be undertaken in completing the various tasks and specifying who would perform them.

5. A preliminary estimated schedule for deployment of a pilot Dividend-Account Car-Parking Systems program. Show all critical paths, major milestones, and decision points in pilot schedule.

6. A list of the municipal or other government agencies your firm has worked with during the past three years. Provide the following information for at least one operational system that has at least some of the similar components as would a Dividend-Account Car-Parking System program that is managed by the respondent:

    a) Name, address, and telephone number of the agency;
    b) Time period for the project;
    c) Brief description of the scope of the services provided;
    d) Identify the staff members on the project and their specific responsibilities; and
    e) Person and contact information for a reference.

IV. PROPOSAL EVALUATION

A. Proposal Evaluation

A review committee comprised of representatives from each of the potential Partner cities will judge the merit of proposals received in accordance with the general criteria defined herein. Failure of proposers to provide in their proposal any information requested in this RFI may result in disqualification of the proposal. The sole objective of the review committee will be to select the proposal that is most responsive to the Partners' needs. The Partners reserve the right to elect to not proceed with a pilot Dividend-Account Car-Parking System program and reject all proposals received through this RFI process.

1. Experience of the vendor and proposed staff. Experience of project staff with similar scope of services. Level of education, training, licensing and certification of staff

2. Approach to the project. Demonstrated understanding of the Partners' needs and solicitation requirements. Approach is well organized and presented in a clear, concise and logical manner.

3. Availability and proposed use of technology and methodologies. Quality control and thoroughness is well defined.

4. Capability to Perform. Ability to complete work within deadlines. Availability and continuity of staff during the course of the project, if selected. Unsatisfactory past performance with the City of Encinitas (or any of the Partner cities) may be considered as determined by the City of Encinitas (or any of the Partner cities) in their sole and absolute discretion.

5. Relevant Experience. Experience in performing similar services for organizations of similar size to the Partner cities. Experience with public agencies. Years of experience with these types of services.

6. Innovation. Innovative ideas on the development, operation, promotion, and sustainability of Dividend-Account Car-Parking System programs.

B. Final Negotiation

As reflected above, vendor selection will be based on a combination of factors as determined to be in the best interest of the Partners. After evaluating the proposals and discussing them further with the finalists, or the tentatively selected vendor, the City of Encinitas reserves the right to further negotiate the proposed program.

V. CONDITIONS GOVERNING THIS PROCUREMENT

A. Scope Changes, Additions and Deletions

All changes in proposal documents shall be through written addendum and furnished to all proposers. Verbal information obtained otherwise will NOT be considered in the evaluation process.

B. Rejection of Proposals

The City of Encinitas reserves the right to reject any or all Proposals and to waive informalities and minor irregularities in Proposals received and to accept any portion of Proposal or all items of Proposal if deemed in the best interest of the City of Encinitas to do so.

C. Proprietary Information

Any restrictions on the use of data contained within a Proposal must be clearly stated in the Proposal itself. Proprietary information submitted in response to this RFI will be handled in accordance with applicable City of Encinitas Procurement Regulations and the California Public Records Act.

D. Response Materials Ownership

All materials submitted regarding this RFI become the property of the City of Encinitas. Responses may be reviewed by any person at Proposal opening time and after final selection has been made. The City of Encinitas has the right to use any or all ideas presented in reply to this request, subject to the limitations outlined in Proprietary Information above. Disqualification of a proposer does not eliminate this right.

E. Acceptance of Proposal Content

The contents of the Proposal of the successful proposer will become contractual obligations if contractual agreements action ensues. Failure of the successful proposer to accept these obligations in a permit to operate, purchase agreement, purchase order, contract, delivery order or similar acquisition instrument may result in cancellation of the award and such proposer may be removed from future solicitations.

F. Cost of Proposal Preparation

The City of Encinitas shall not be liable for any pre-contractual expenses incurred by any submitting vendor. Each submitting vendor shall protect, defend, indemnify, and hold harmless the City of Encinitas from any and all liability, claims or expenses whosoever incurred by, or on behalf of, the entity participating in the preparation of its response to this RFI. Pre-contractual expenses are defined as expenses incurred by vendors in:

1. Preparing the proposal in response to this RFI;
2. Cost to acquire a permit; and
3. All other expenses incurred by a vendor related to preparation of proposal or establishment of a Dividend-Account Car-Parking System program.

G. Interview

Interviews with the top respondents may be requested. The selection of vendors invited to interview will be solely based on the Partners' discretion. The vendors asked to interview will be notified in advance.

ATTACHMENT 1

Sample License Agreement for Dividend-Account Parking Services

This License Agreement for Dividend-Account Car-Parking Sytsem Services (“Agreement”) is made this this day of September 2017, by and between the City of Encinitas ("City") and ____ ("Dividend-Account Car-Parking System Vendor").

RECITALS

1. A goal of City is to provide safe and affordable multi-modal transportation options to all residents, reduce traffic congestion, and maximize carbon free mobility.
2. Dividend-Account Car-Parking System services are a component to help the City achieve its transportation goals and the City desires to make this System available to residents and those who work or otherwise drive and park in the City.
3. Dividend-Account Car-Parking System Vendor proposes to operate a Dividend-Account Car Parking program within the City at an agreed-to location with an agree-to number of System parking spaces within the designated location or locations. As an example, based on Reference 3, there could be 239 spaces designated as System Parking, out of a total of 284 spaces in the Oceanside Civic Center Parking Garage. Note further, that if there are 259 employees that work for the City and are given parking spaces, there would be a need to establish 20 additional System Parking spaces outside of the Oceanside Civic Center Parking Garage.
4. Dividend-Account Car-Parking System Vendor will abide by all City ordinances and rules governing the use of public space.
5. Dividend-Account Car-Parking System Vendor possesses the technology necessary to install operate, maintain, and expand such a system and multiple systems as demand expands.

AGREEMENT

1. Initial Term. This Agreement is effective for twelve to eighteen months from the date of execution (“Initial Term, Phase 1”), which will include a duration of installation during which no money is exchanged so as to establish a baseline of modal splits for employee commuting, and then a year of full operation to document the modal split changes and an estimated amount of greenhouse gas (GHG) emissions saved by the program. At the conclusion of the Initial Term Phase 1, the Agreement may be extended by mutual written agreement of the parties for an additional two-year term (Initial Term, Phase 2), subject to any new terms agreed between the parties, unless either party notifies the other party of its intent not to continue with the Agreement no later than 30 days before the expiration of the Initial Term, Phase 1 and Phase 2.
2. Exclusive Operator. During the Initial Term’s Phase 1 and Phase 2, the City designates Dividend-Account Car-Parking Systems Vendor as the exclusive provider of the System services within its city limits. This designation is personal to Dividend-Account Car-Parking Systems Vendor and may not be assigned or transferred to any party. This exclusivity provision shall expire and not be renewed past the Initial Term’s Phase 1 and Phase 2 unless agreed in writing by the parties.

3. Use of City Property. City authorizes Dividend-Account Car-Parking Systems Vendor to use ("License") City property, including the public right-of-way and System Parking areas that are suitable, solely for the purposes set forth in Section 4 of this Agreement. This authorization is not a lease or an easement, and is not intended and shall not be construed to transfer any real property interest in City Property.

4. Permitted Use. Dividend-Account Car-Parking System's System Members may use City Property solely for parking System Vehicles. The City Property is maintained by the City. Dividend-Account Car-Parking Systems Vendor may operate an agree-to amount of System Parking places on City Property as set forth in Exhibit A. If at any time during the term of the Agreement Dividend-Account Car-Parking Systems Vendor desires to place additional System Parking within the City limits, Dividend-Account Car-Parking Parking Systems Vendor must request and receive authorization from the city to do so in writing. The City may limit the number of System Parking places upon identifying a potential harm to public health or safety. Dividend-Account Car-Parking Systems Vendor shall not place or attach any personal property, fixtures, or structures to City Property without the prior written consent of City.

    a. Use of City Property and Dividend-Account Car-Parking Systems Vendor's operations within the City, shall, at a minimum: a) not adversely affect City Property or the City's streets, or sidewalks; b) not adversely affect the property of any third parties; c) not inhibit pedestrian or vehicular movement, as applicable, within City Property or along other property or rights-of-way owned or controlled by the City; d) not create conditions which are a threat to public safety and security. Dividend-Account Car-Parking Systems Vendor shall instruct its customers not to park or leave any System Vehicle where they would impede pedestrian or vehicular traffic.

    b. Upon termination of this Agreement by either party, Dividend-Account Car-Parking Systems Vendor shall, at its sole cost and expense, immediately restore City Property to a condition which is visually and structurally indistinguishable from the immediately surrounding area.

5. System Parking. The City, at its own discretion, may support the System with the installation of signs and painting to further the orderly operation of the System Parking.

6. Condition of City Property

    a. City makes City Property available to Dividend-Account Car-Parking Systems Vendor in an "as is" condition. City makes no representations or warranties concerning the condition of City Property or its suitability for use by Dividend-Account Car-Parking Systems Vendor or its customers, and assumes no duty to warn either Dividend-Account Car-Parking Systems Vendor or the System Members concerning conditions that exist now or may arise in the future.

    b. City assumes no liability for loss or damage to Dividend-Account Car-Parking Systems System Members. Dividend-Account Car-Parking Systems Vendor agrees that City is not responsible for providing security at any location where Dividend-Account Car-Parking Systems Vendor's System Vehicles are parked, and Dividend-Account Car-Parking Systems Vendor hereby waives any claim against City in the event Dividend-Account Car-Parking System's System Vehicles or other property are lost, stolen, or damaged.

7. Maintenance and Care of Portion of City Property; Dividend-Account Car-Parking Systems Vendor shall be solely responsible for: (i) maintaining City Property to the City standards applicable for use by the Dividend-Account Car-Parking Systems Vendor as

permitted under Section 3; and (ii) obtaining from the City any applicable permits or approvals required by the City. Dividend-Account Car-Parking Systems Vendor shall exercise due care in the use of City Property and shall be responsible for maintaining City Property in good condition and repair. Dividend-Account Car-Parking Systems Vendor shall not act, or fail to act, in any way that result in excessive wear or damage to City Property. Dividend-Account Car-Parking Systems Vendor expressly agrees to repair, replace or otherwise restore any part or item of real or personal property that is damaged, lost or destroyed as a result of the Dividend-Account Car-Parking Systems Vendor's use of City Property. Should the Dividend-Account Car-Parking Systems Vendor fail to repair, replace or otherwise restore such real or personal property, Dividend-Account Car-Parking Systems Vendor expressly agrees to pay City's costs in making such repairs, replacements or restorations. The obligations under this Section apply to all City facilities, infrastructure, or appurtenances located on City Property.

8. Operations & Maintenance. Dividend-Account Car-Parking Systems Vendor will cover all maintenance costs for the System and maintenance to minimum level of service and reporting outlined in Exhibit A.

9. License Fee. The parties intend to agree to a license fee before the Agreement may be extended beyond the Initial Term.

10. Indemnification. Dividend-Account Car-Parking Systems Vendor shall defend, pay, indemnify and hold harmless City, its officers, officials, employees, agents, invitees, and volunteers (collectively "City Parties") from all claims, suits, actions, damages, demands, costs or expenses of any kind or nature by or in favor of anyone whomsoever and from and against any and all costs and expenses, including without limitation court costs and reasonable attorneys' fees, resulting from or in connection with loss of life, bodily or personal injury or property damage arising directly or indirectly out of or from or on account of:

    a. Any occurrence upon, at or from City Property or occasioned wholly or in part by the entry, use or presence upon City Property by Dividend-Account Car-Parking Systems Vendor or by anyone making use of City Property at the invitation or sufferance of Dividend-Account Car-Parking Systems Vendor, except such loss or damage which was caused by the sole negligence or willful misconduct of City.

    b. Use of Dividend-Account Car-Parking Systems Vendor's System Parking by any individual, regardless of whether such use was with or without the permission of Dividend-Account Car-Parking Systems Vendor.

11. Insurance. Dividend-Account Car-Parking Systems Vendor shall procure and maintain for the duration of this agreement insurance against claims for which Dividend-Account Car-Parking Systems Vendor has indemnified the City pursuant to Section 10 of this Agreement. Dividend-Account Car-Parking Systems Vendor shall maintain general liability and automobile liability insurance policies with limits of no less than one million dollars ($1,000,000.00) per occurrence for bodily injury or death, personal injury and property damage, and two million dollars ($2,000,000.00) aggregate. Each insurance policy shall name the City as an additional insured and it shall be endorsed to state that:

    (i) coverage shall not be suspended, voided, or cancelled by either party, or reduced in coverage or in limits except after thirty (30) calendar days prior written notice by certified mail, return receipt requested, has been given to City; and (ii) for any covered claims, the Dividend-Account Car-Parking Systems Vendor's insurance coverage shall be primary insurance as respects the City and any insurance or self-insurance maintained by the City shall be in excess of the Dividend-Account Car-Parking Systems Vendor's

insurance and shall not contribute with it. The insurance required to be provided herein, shall be procured by an insurance company approved by City, which approval shall not be unreasonably withheld. Additionally, before Dividend-Account Car-Parking Systems Vendor shall employ any person or persons in the performance of the Agreement, Dividend-Account Car-Parking Systems Vendor shall procure a policy of workers' compensation insurance as required by the Labor Code of the State of California, or shall obtain a certificate of self-insurance from the Department of Industrial Relations.

12. Compliance with Law. Dividend-Account Car-Parking Systems Vendor at its own cost and expense, shall comply with all statutes, ordinances, regulations, and requirements of all governmental entities applicable to its use of City Property and the operation of its System program, including but not limited to laws governing operation of vehicles. If any license, permit, or other governmental authorization is required for Dividend-Account Car-Parking Systems Vendor's lawful use or occupancy of City Property or any portion thereof, Dividend-Account Car-Parking Systems Vendor shall procure and maintain such license, permit and/or governmental authorization throughout the term of this Agreement. City shall reasonably cooperate with Dividend-Account Car-Parking Systems Vendor, at no additional cost to City, such that Dividend-Account Car-Parking Systems Vendor can properly comply with this Section and be allowed to use City Property as specified in Section 4, above.

13. Business License. Dividend-Account Car-Parking Systems Vendor is required to obtain and maintain a City Business License during the duration of this Agreement.

14. Required Reports. Dividend-Account Car-Parking Systems Vendor shall provide reports to the City concerning utilization of its System Parking not less than monthly, and shall cooperate with the City in the collection and analysis of any aggregated data concerning its operations.

15. No Joint Venture. Nothing herein contained shall be in any way construed as expressing or implying that the parties hereto have joined together in any joint venture or liability company or in any manner have agreed to or are contemplating the sharing of profits and losses among themselves in relation to any matter relating to this Agreement.

16. Termination. This Agreement may be terminated prior to the expiration date set forth in Section 1, above, upon the occurrence of any of the following conditions:

    a. Upon delivery of written notice from City to the Dividend-Account Car-Parking Systems Vendor terminating this agreement for any reason, or for no reason, by giving at least sixty (60) days' notice to the Dividend-Account Car-Parking Systems Vendor of such termination.

    b. An attempt to transfer or assign this Agreement.

    Dividend-Account Car-Parking Systems Vendor shall not terminate this Agreement without first by giving at least 180 days' written notice of plans for termination.

17. Amendment. This Agreement may be amended by mutual agreement of the parties. Such amendments shall only be effective if incorporated in written amendments to this agreement and executed by duly authorized representatives of the parties.

18. Applicable Law and Venue. The laws of the State of California shall govern the interpretation and enforcement of this Agreement. Any action to interpret or enforce the terms or conditions of this Agreement shall be brought in the Superior Court for the County of San Diego, or in the United States District Court for the Southern District of California. Dividend-Account Car-Parking Systems Vendor hereby waives any right to remove any such action from San Diego County as is otherwise permitted under

California Code of Civil Procedure Section 394.

19. Counterparts. This Agreement may be executed simultaneously or in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same agreement.

IN WITNESS WHEREOF THE PARTIES HERETO have executed this Agreement on date first above written.

CITY OF ENCINITAS	**DIVIDEND-ACCOUNT CAR-PARKING SYSTEMS VENDOR**
_____	_____
Karen Brust, City Manager	[Title]
_____	_____
Date	Date

ATTEST:

_____

City Attorney

Exhibit A

Description of Dividend-Account Car-Parking Systems Vendor's Service Level Agreement

The following performance indicators shall be met and reported to help the City measure our success serving its citizens and improving the livability and mobility of Encinitas. Dividend-Account Car-Parking Systems Vendor will maintain it's System in an excellent state of functionality and repair, with a minimum of error-free operation 95% of the time.

Performance Indicator	Description	Measurement Tool	Minimum Performance Standard	Reporting Frequency
App & customer service support portal: phone and internet. The portal will support the establishment of an account and editing an account	A new account can be entered and audited. It can be edited and an audit can verify the edits. The time and method of the submissions can be retrieved	Tool to audit accounts either by name or unique account number	Accurate 99.5% uptime.	monthly
Ability to set the value price of the parking, a per minute value	The system can accept a "value price" and use the number as described in this report	Tool to audit the fact of and the proper use of the value price	Accurate 99.5% uptime.	monthly
Ability to set the base multiplier, which is used in the congestion pricing algorithm as shown in Table 2 of Reference 2. It is expected to be a number between 1.5 and 2.5. It can be adjusted upwards if the parking is getting too full too often	The system can accept a "base multiplier" and use the number as described in Table 2 of Reference 2.	Tool to audit the fact of and the proper use of the value base multiplier	99.5% of the time	monthly
Ability to report out monthly statements	A feature to display each statement that	Interface to allow a specification of	Statements can be viewed and verified for accuracy with an accuracy of 99.5%	monthly

	was sent out to all employees and all users that are not employees, to verify accuracy	account and month to view the statement that was mailed, for verification		
Ability to accept money into an account and to pay earnings and “add-ins”, out of the account, as described in this report	Most of the money accepted will be car-parking charge but there will also money that is sent in to cover the “Add-in” payments. Most of the money will be via an automated transfere as is done for dockless bike rentals. However, an ability to accept a mailed check will also be required	Transactions will be put into a file that can be audited	Money transfers will occur and be observable with an accuracy of 99.5%	Monthlyt
Ability to report out the percent of employees at their work location that are using their allocated parking over any duration, from specific days to longer specified durations	This tool supports a request for the percent of employees that are at work without using car parking in the employee parking spaces	Software interface that will show the results on a screen and allows for the result file to be stored or printed	Functional 99.5% of the time	monthly

Ability to report out the total amount charged to employees, paid to employees as earnings and, separately, as “add ins”, over any duration, from specific days to longer specified durations	This tool supports a request for the described data	Software interface that will show the results on a screen and allows for the result file to be stored or printed	Functional 99.5% of the time	monthly
Parking spot usage rate	The monthly use rate is reported for any single parking place or for a set of parking places	The result can be viewed on screen or in a file that can be stored or printed	Data collection failure would be reported within two (2) hours during business hours between 8am to 8pm Monday through Friday except for State and Federal holidays. Direct 24/7 contact line for true emergencies, either by phone, text, and/or email Failure outside of business hours reported within two hours (2) of start of business hours	Monthly
System failure detected or reported by a member	Error either automatically reported to the person responsible and their back-ups, as a text on their phones and an email to their computer, to include the error report time	A program collects the time of the data error recognition and the time of the correction	Within two (2) hours during business hours between 8am to 8pm Monday through Friday except for State and Federal holidays. Direct 24/7 contact line for true emergencies, either by phone, text, and/or email For complaint outside of business hours, within two hours (2) of start of business hours	Monthly

From: Keith B. Jones
To: mike_bullock@earthlink.net
Subject: Re: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system
Date: Friday, March 11, 2022 2:51:00 PM
Attachments: image001.jpg

Mike,

Happy Friday afternoon to you. Thank you for your thoughtful and well crafted response.

Yes, please feel free to share ACE's interest in participating in an opportunity to provide these parking solutions.

Have a great weekend,
Keith

Keith B. Jones
Owner | ACE Parking
ACE Parking
645 Ash Street
San Diego, CA 92101
T: 619.233.6624

On Sat, Mar 5, 2022 at 5:41 PM <mike_bullock@earthlink.net> wrote:

> Keith,
>
> Thank you so much for getting back to me.
>
> No, there is no RFP.
>
> However, the North County Transit District (NCTD), the agency doing the Transit Center project, has a representative on the Oceanside Bike-Ped Committee who seems interested. The Bike-Ped Committee supports the Dividend Account Parking (DAP) system. The Chair of the NCTD, Tony Krantz, who is an Encinitas Councilman, should be supportive, but I have not presented to him. I have presented to the Mayor of Encinitas.
>
> I have put more work into this for the City of Oceanside, for their Civic Center

Parking Garage, which is supposed to be City Employee parking, but is also free to the public. On Thursdays, when Oceanside has its Farmers Market, late-arriving employees sometimes find no vacant parking and then park in the neighborhood. Oceanside is not planning to issue an RFP. However, I may be able to coax one out of them if they know you are interested. I need 3 votes and I estimate that I have only 1 right now. However, several on the Council have expressed interest in the Dividend Account Parking (DAP) system. At the Oceanside Climate Action Plan (CAP) meeting, where I was hoping to get three votes, only one Council Member expressed interest. If DAP were installed at the Civic Center Parking Garage, the Transit Center should follow. They are about 4 blocks away.

Most realize that our climate emergency is getting more acute. However, no city has ever done this, and it is tough to ask an elected official to do something new. Most Climate Action Plans have a Transportation Demand Management (TDM) ordinance, where DAP would fit.

Oceanside has parking meters and pay-station parking close to the Civic Center Parking Garage and close to the Transit Center. Both the parking meter parking and the pay-station parking could be automated with DAP, so the user could take their pick. I predict that younger people would tend to choose DAP; older drivers would tend to use the meters and the pay station. Over time, DAP would win out.

Regarding climate, humanity needs the private sector to do the design and operation of the needed systems (parking and roads.) (Where would we be without Elon Musk?)

Would it be OK for me to disclose your interest in submitting a proposal for a DAP system RFP? Your interest would be important, it seems to me. I have also raised this issue in Encinitas and Carlsbad. Barbara and I were strategizing on how to introduce this to San Diego, when the pandemic hit. San Diego is known to have a poor Climate Action Plan when it comes to driving. Driving is the category that emits the most GHG. A reduction of 10% at a location would be very significant and be a good verification of the system. And employees would have to be pleased with the new system.

The County might be interested, especially if they knew you were interested. DAP was ruled to be a feasible mitigation measure in the lawsuit against their first CAP. There are 3 members on the BOS who claim to be very concerned about climate. You have probably read about their “framework for decarbonization by 2035.” After

nearly 10 years of trying, the County still has no legal CAP.

Ukraine (Putin) has presented another argument for having meaningful TDM measures to reduce gasoline use. In any case, any measure adopted would need to increase choice and equity. DAP would do that.

Regards,

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054
760-421-9482

Former California Democratic Party Delegate, 76th Assembly District

Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee

Satellite Systems Engineer, 36 years (Now Retired)

Air and Waste Management Association published and presented papers:

Author, ***The Development of California Light-Duty Vehicle (LDV) Requirements to Support Climate Stabilization: Fleet-Emission Rates & Per-Capita Driving***

Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***

Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

From: Keith B. Jones <kjones@aceparking.com>
Sent: Thursday, March 3, 2022 2:06 PM
To: mike_bullock@earthlink.net
Subject: Fwd: FW: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system

Mike,

Good afternoon. Barbara Bry sent me your email regarding Oceanside Transit Center. Is there an RFP for the car parking you suggest I respond to?

Thanks,

Keith

Keith B. Jones
Owner | ACE Parking
ACE Parking
645 Ash Street
San Diego, CA 92101
T: 619.233.6624

---------- Forwarded message ---------
From: **Barbara Bry** <bbry@blackbirdv.com>
Date: Sun, Feb 27, 2022 at 6:36 PM
Subject: FW: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system
To: Keith Jones <kjones@aceparking.com>

Fyi, from Mike Bullock, hope you're having a great time visiting islands!

Barbara Bry

Chief Operating Officer

Chief Financial Officer

Blackbird Ventures

(858) 248-9465

https://www.linkedin.com/in/barbarabry/

From: Mike Bullock <mike_bullock@earthlink.net>
Date: Sunday, February 27, 2022 at 4:24 PM
To: Barbara Bry <bbry@blackbirdv.com>
Subject: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system

http://enewspaper.sandiegouniontribune.com/infinity/article_share.aspx?guid=0dbb7ab6-0514-4bc1-b06b-4d7d1894f882

Please forward this to Keith. Would he submit a response to an RFP if the NCTD issued one for a good car-parking system? This is a bit of a chicken and egg situation.

Putin gives us one more reason to stop using a car-parking system that incentivizes driving. Our climate emergency is all the reason we need.

We need a car parking vendor to take over the world of bad car-parking systems.

Mike

From:	Kirsten Uchitel
To:	Lauren Lee
Subject:	Amendment Comment
Date:	Friday, January 27, 2023 11:32:45 AM
Attachments:	SANDAG Amended RP scope comments 1.9.23.pdf

From: Robert Efird III <robert.efird@carlsbadca.gov>
Sent: Monday, January 9, 2023 3:39 PM
To: Kirsten Uchitel <kirsten.uchitel@sandag.org>
Cc: Eric Lardy <Eric.Lardy@carlsbadca.gov>; Scott Donnell <Scott.Donnell@carlsbadca.gov>
Subject: City of Carlsbad 2021 Regional Plan Amendment SEIR NOP Comments

Kirsten:

Please see attached for the City of Carlsbad's NOP comments for the 2021 Regional Plan Amendment SEIR.

Please let me know if you have any questions.

Thanks,

Robert Efird, AICP, LEED Green Associate
he/him/his
Principal Planner
Community Development Department
Advance Planning & Special Projects
City of Carlsbad
1635 Faraday Ave.
Carlsbad, CA 92008

www.carlsbadca.gov | robert.efird@carlsbadca.gov
442-339-5148 (o) | 760-602-8560 (f)

January 9, 2023

SANDAG
Attn: Kirsten Uchitel
401 B Street, Suite 800
San Diego, CA 92101

City of Carlsbad comments on Notice of Preparation of Supplement to the Environmental Impact Report for the 2021 Regional Plan

Dear Ms. Uchitel:

Thank you for the opportunity to provide comments on the scope and content of the SEIR underway for an amendment to the 2021 Regional Plan. The amendment is necessary to implement SANDAG Board direction to prepare a focused amendment to the 2021 Regional Plan without the regional road usage charge (Project), and an environmental analysis for the Board's consideration. The city is familiar with the Project and this NOP, having provided comments on the 2021 Regional Plan prior to its adoption and attending the scoping meeting on December 21, 2022. Below are considerations the city would like to submit as SANDAG moves forward with the preparation of its SEIR:

1. At the scoping meeting, SANDAG noted its intent to analyze several environmental topic areas in the SEIR, including air quality, energy, greenhouse gas emissions, noise and vibration, and transportation. Land use as well as population and housing are two other topic areas that should be considered. If the removal of the road user charge may result in further adjustments to SANDAG's land use alternatives to meet Greenhouse Gas reductions, analysis should include a study of inconsistencies and impacts to Carlsbad's adopted land use plans and policies and/or induce unplanned population growth.

2. Please ensure the SEIR considers the impact of proposed alternatives to the city's land use plans, including the General Plan, Habitat Management Plan, and Local Coastal Program.

3. Please ensure the SEIR considers the impact of proposed alternatives to the McClellan-Palomar Airport Land Use Compatibility Plan (adopted by the county Airport Land Use Commission and amended Dec. 1, 2011) and the constraints identified therein. Alternatives included in the previous plan assumed housing in locations that were inconsistent with this plan.

Should you have any questions, please contact me at eric.lardy@carlsbadca.gov or 442-339-2712.

Sincerely,

Eric Lardy

ERIC LARDY
City Planner

From: Kirsten Uchitel
To: Lauren Lee
Subject: 2021 Amendment Comment
Date: Friday, January 27, 2023 11:20:58 AM

From: Tanner Perfect <tperfect2593@gmail.com>
Sent: Friday, December 16, 2022 3:03 PM
To: Kirsten Uchitel <kirsten.uchitel@sandag.org>
Subject: VMT tax

My name is TANNER PERFECT
and I do not agree with or support the proposed
Vehicle Miles Traveled tax.

From:	Kirsten Uchitel
To:	Lauren Lee
Subject:	2021 Amendment Comment
Date:	Friday, January 27, 2023 11:23:18 AM
Attachments:	22.12.21 TDBSANDAG.pdf

From: vote@obsoft.net <vote@obsoft.net>
Sent: Wednesday, December 21, 2022 4:01 PM
To: Kirsten Uchitel <kirsten.uchitel@sandag.org>
Cc: Clerk of the Board <ClerkoftheBoard@sandag.org>; Kirsten Uchitel <kirsten.uchitel@sandag.org>
Subject: Climate Issues

SANDAG,

Please find some recent articles regarding dalting with CLimate Damage for interested parties

Tim Bilash
Del Mar, CA

Comment

Policies that support degrowth include the provision of high-quality, affordable public housing, such as that in Vienna.

Degrowth can work – here's how science can help

Jason Hickel, Giorgos Kallis, Tim Jackson, Daniel W. O'Neill, Juliet B. Schor, Julia K. Steinberger, Peter A. Victor & Diana Ürge-Vorsatz

Wealthy countries can create prosperity while using less materials and energy if they abandon economic growth as an objective.

The global economy is structured around growth – the idea that firms, industries and nations must increase production every year, regardless of whether it is needed. This dynamic is driving climate change and ecological breakdown. High-income economies, and the corporations and wealthy classes that dominate them, are mainly responsible for this problem and consume energy and materials at unsustainable rates[1,2].

Yet many industrialized countries are now struggling to grow their economies, given eco-

pandemic, Russia's invasion of Ukraine, resource scarcities and stagnating productivity improvements. Governments face a difficult situation. Their attempts to stimulate growth clash with objectives to improve human well-being and reduce environmental damage.

Researchers in ecological economics call for a different approach – degrowth[3]. Wealthy economies should abandon growth of gross domestic product (GDP) as a goal, scale down destructive and unnecessary forms of production to reduce energy and material use,

projected to cost US$93 billion by 2025, but so far the costs are building slowly enough that members of Congress are allowing NASA small annual budget increases for it. The rise of powerful private companies such as Elon Musk's SpaceX, based in Hawthorne, California, has brought new public enthusiasm for space exploration, as well as new ways of delivering it. NASA has contracted SpaceX to deliver Artemis astronauts to the lunar surface using the enormous Starship, with which Musk dreams of colonizing Mars.

And then there is the looming influence of China, which has just finished building the main phase of its first space station and might be planning to land astronauts on the Moon in the 2030s. To the more hawkish members of the US Congress, sending astronauts to other worlds is once again a geopolitical statement. A not-insignificant reason for the revival of human space exploration is that it is once more being seen as a space race.

Some remain unconvinced that Artemis is fit for purpose. Critics such as Lori Garver, a former NASA deputy administrator, says the agency could move faster and more nimbly in its partnerships with aerospace companies. Many would prefer NASA to forget deep space and spend more time and money on Earth, including space-based climate monitoring. Such comments echo criticisms from the 1960s, when much of the US public wanted the government to focus not on the space race, but on Earth-bound problems such as civil rights.

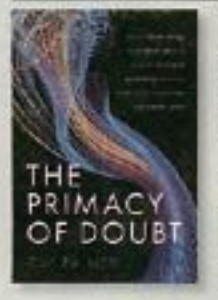
Despite those criticisms, the launch of the Artemis I mission on 16 November has given the programme a huge boost. NASA's new Moon rocket – a Frankenstein's creature cobbled together from previous rocket programmes, including the one started by George W. Bush – sent the as-yet uncrewed Orion capsule to orbit the Moon, to see how it would hold up in the hostile environment of deep space. The second Artemis mission should fly around the Moon no earlier than 2024, this time with astronauts on board. The third mission will land people on the Moon – including the first woman and the first person of colour.

What permanent significance that will have is anyone's guess. But it does mean that, after half a century, we are finally recapturing some of the wonders of human space exploration. We are once again seeing live streams from lunar orbit – not from a robotic orbiter, but from a capsule that is steered remotely by humans and will one day carry them. We are seeing the pale blue dot of Earth, in the cold depths of interplanetary space, in real time, contextualizing our fragile presence on a vulnerable planet. These might be smaller steps for humankind than they once seemed – but they are steps, nevertheless.

Alexandra Witze writes for *Nature* from Boulder, Colorado.

Books in brief

The Song of the Cell
Siddhartha Mukherjee *Scribner* (2022)
In 1837, botanist Matthias Schleiden and zoologist Theodor Schwann saw an "uncanny" microscopic similarity between plant and animal tissues: they had discovered the unity of the cell across living beings. This complex portrait illuminates cells' roles in immunity, reproduction, sentience, cognition, repair and rejuvenation, malfunctions such as cancer, and treatments such as blood transfusions, drawing on author Siddhartha Mukherjee's varied experience as an immunologist, stem-cell scientist, cancer biologist and medical oncologist.



The Primacy of Doubt
Tim Palmer *Basic* (2022)
Anyone intrigued by the uncertainty of weather forecasts will appreciate this important, if complicated, book. Physicist Tim Palmer has spent much of his career researching ensemble prediction — using many models with varying initial conditions, rather than a single model. Here he ranges over climate change, conflicts, consciousness, financial crashes and pandemics. Uncertainty is, he argues, more complicated than is often assumed; in his view, inspired by physicist Richard Feynman, doubt is the primary essence of knowing.

Science Fiction
Ed. Glyn Morgan *Thames & Hudson* (2022)
"Science and science fiction spark off one another endlessly," writes Ian Blatchford, director of the Science Museum Group, in his introduction to this stunningly illustrated companion to an exhibition at London's Science Museum, edited by curator Glyn Morgan. Many scientists have written science fiction, including Isaac Asimov, Arthur C. Clarke, James Lovelock and Carl Sagan. And this can influence science: Clarke's 1965 short story 'Dial "F" for Frankenstein' helped inventor Tim Berners-Lee to imagine the 1990s World Wide Web.

COVID-19
Hugh Pennington *Polity* (2022)
Perhaps the most remarkable aspect of COVID-19 is the speed of vaccine development. This was enabled by the success of genome sequencing, including the Human Genome Project, essentially completed in 2003. COVID-19 is therefore the first "postgenomic pandemic", notes microbiologist Hugh Pennington in his informative, if sometimes technical, short study. Yet many other aspects resemble previous pandemics, as he discusses — mask wearing caused controversy during the 1918–19 influenza pandemic, for example.

The Mind of a Bee
Lars Chittka *Princeton Univ. Press* (2022)
A bee flying through a meadow is bombarded with stimuli — colour patterns, scent mixtures and electric fields — from multiple flowers of several species. It must attend only to the most productive. While visiting 1,000 flowers, it might reject 5,000 others that are unfamiliar or that it knows to be unrewarding at that time of day. Such facts fill ecologist Lars Chittka's devoted, accessible analysis. They show that bees' minds are much more complex than generally recognized, and might even have consciousness. **Andrew Robinson**

hard drive available to the computer, it could handle the computation in a few days. Now, Pan Zhang, a statistical physicist at the Institute of Theoretical Physics at the Chinese Academy of Sciences, and colleagues have shown how to beat Sycamore in a paper in press at *Physical Review Letters*.

Following others, Zhang and colleagues recast the problem as a 3D mathematical array called a tensor network. It consisted of 20 layers, one for each cycle of gates, with each layer comprising 53 dots, one for each qubit. Lines connected the dots to represent the gates, with each gate encoded in a tensor—a 2D or 4D grid of complex numbers. Running the simulation then reduced to, essentially, multiplying all the tensors. "The advantage of the tensor network method is we can use many GPUs to do the computations in parallel," Zhang says.

Zhang and colleagues also relied on a key insight: Sycamore's computation was far from exact, so theirs didn't need to be either. Sycamore calculated the distribution of outputs with an estimated fidelity of 0.2%—just enough to distinguish the fingerprintlike spikiness from the noise in the circuitry. So Zhang's team traded accuracy for speed by cutting some lines in its network and eliminating the corresponding gates. Losing just eight lines made the computation 256 times faster while maintaining a fidelity of 0.37%.

The researchers calculated the output pattern for 1 million of the 9 quadrillion possible number strings, relying on an innovation of their own to obtain a truly random, representative set. The computation took 15 hours on 512 GPUs and yielded the telltale spiky output. "It's fair to say that the Google experiment has been simulated on a conventional computer," says Dominik Hangleiter, a quantum computer scientist at the University of Maryland, College Park. On a supercomputer, the computation would take a few dozen seconds, Zhang says—10 billion times faster than the Google team estimated.

The advance underscores the pitfalls of racing a quantum computer against a conventional one, researchers say. "There's an urgent need for better quantum supremacy experiments," Aaronson says. Zhang suggests a more practical approach: "We should find some real-world applications to demonstrate the quantum advantage."

Still, the Google demonstration was not just hype, researchers say. Sycamore required far fewer operations and less power than a supercomputer, Zhang notes. And if Sycamore had slightly higher fidelity, he says, his team's simulation couldn't have kept up. As Hangleiter puts it, "The Google experiment did what it was meant to do, start this race." ■

U.S. CLIMATE POLICY

Ambitious bill leads to 40% cut in emissions, models show

But more action is needed to reach Biden's pledge to halve greenhouse gas emissions by 2030

By **Erik Stokstad**

For climate advocates in the United States, the past month felt like a roller coaster. In early July, negotiations in Congress on clean energy legislation of historic proportions collapsed, and the effort seemed doomed. But backroom talks continued and last week key senators suddenly announced an agreement on a $369 billion bill that would provide the most climate funding ever seen in the United States. "It was the best kept secret, potentially, in Washington history," says Leah Stokes, a political scientist at the University of California (UC), Santa Barbara.

The backers—Senate Majority Leader Chuck Schumer (D–NY) and Senator Joe Manchin (D–WV)—who had initially balked at the cost—announced that the draft bill would ensure U.S. carbon dioxide (CO_2) emissions would fall by 40% by 2030, compared with 2005.

Sponsors of the bill, which must still pass the full Senate and the House of Representatives, might be expected to oversell its impact. But energy and climate modelers have now scrutinized its 725 pages and concluded the 40% claim is about on target. They plugged major provisions, including subsidies for renewable energy and tax cuts for electric vehicles, as well as controversial incentives for the fossil fuel industry, into their models. Three models now agree that if the bill's provisions are carried out, U.S. greenhouse gas emissions would fall by perhaps 40% by 2030, although only part of that stems from the bill alone. One model also finds that the renewable energy subsidies will likely create 1.5 million jobs and prevent thousands of premature deaths from air pollution, especially in disadvantaged communities.

"It's a historic step, no doubt about it," says Marshall Shepherd, an atmospheric scientist at the University of Georgia and former head of the American Meteorological Society. "It really does a lot to enhance the transition to a renewable energy economy."

U.S. emissions have been falling by about 1% per year since 2005, when they peaked, largely because of replacing coal power with wind and solar, as well as natural gas, and rising fuel economy in light cars. But this pace is nowhere near fast enough to meet President Joe Biden's goal of a 50% to 52% cut in emissions by 2030 relative to 2005. Officials pledged that dramatic

PHOTO: PAUL HOWELL/GETTY IMAGES FOR LIGHTSOURCE BP

Research highlights

SHARP LASER BEAM IMAGES ORGANS IN EXQUISITE 3D DETAIL

A needle-shaped laser beam boosts the performance of a biomedical imaging method called photoacoustic microscopy.

Photoacoustic microscopy uses laser-induced vibrations in biological tissue to make images of that tissue's structure. The method has many applications, from detecting blood-flow dynamics to identifying cancer cells. But it has a disadvantage. Its depth of field — the distance between the closest and farthest objects that are in focus — is quite limited. As a result, it can usually visualize only one thin layer of tissue in high resolution at a time.

Rui Cao at the California Institute of Technology in Pasadena and his colleagues developed a type of photoacoustic microscopy that uses a long, ultra-thin laser beam. They found that this approach provides a depth of field that can be up to 14 times longer than previously achieved. Consequently, the method can generate high-resolution images of samples with uneven surfaces and high-quality 3D depictions of organs.

The researchers say that using a similar needle-shaped laser beam in other microscope technologies could also improve their depth of field.

Nature Photon. https://doi.org/grc2zk (2022)

TURKISH CARVINGS COULD BE FIRST COMIC STRIP

An 11,000-year-old carving in Turkey is the earliest known portrayal of a narrative scene.

Archaeologists have uncovered other etched images in southeastern Turkey from the Neolithic period, which in the Near East stretched roughly from 10,000 BC to 7,000 BC and includes the transition from nomadic life to settlements. But, unlike previously identified images, the latest discovery consists of two adjacent panels with a progressing storyline.

Eylem Özdoğan at Istanbul University in Turkey found the panels carved on the side of a limestone bench while excavating a building at the Sayburç archaeological site. The right panel features a male figure facing forwards, its shape protruding from the flat surface. The individual is flanked on each side by a leopard gazing towards it (pictured). In the left panel, another male figure holds a snake or rattle while approaching a bull.

Because the panels sit side by side and portray similar narratives — people encountering dangerous animals — they probably represent a progressing scene from a story. The author says that these works are the first known examples of an extended narrative.

Antiquity **96**, 1599–1605 (2022)

PERSONALIZED T CELLS TACKLE DEADLY SKIN CANCER

In a clinical trial, personalized anti-cancer treatment prolonged the time that people with advanced melanoma live without further tumour spread.

For therapy based on tumour-infiltrating lymphocytes (TILs), immune cells called T cells are harvested from a person's tumour and multiplied in the laboratory. The patient has chemotherapy to kill their remaining T cells and then gets an infused of the lab-grown cells.

Maartje Rohaan at the Netherlands Cancer Institute in Amsterdam and her colleagues ran a clinical trial to compare TILs therapy with ipilimumab, a standard immune-boosting therapy for late-stage melanoma (pictured, a melanoma cell). Both treatment groups contained 84 people.

In the 6 months after treatment, tumours disappeared in 20% of people who received TILs and in 7% of those who took ipilimumab. In the same period, there was no tumour spread in 53% of those who had TILs and 21% of those who took ipilimumab.

The results suggest that TILs therapy can be used as a first- or second-line treatment for people with advanced melanoma.

N. Engl. J. Med. **387**, 2113–2125 (2022)

SLUGGISH LANDSLIDE SPEEDS UP AS CITY EXPANDS

A slow-motion landslide has been creeping for decades down the hills of Bukavu in the Democratic Republic of the Congo — but it is accelerating as the city grows.

Bukavu's population has more than quadrupled since 1995, driven in part by people fleeing violence in nearby regions. The city (pictured) was founded on the shores of Lake Kivu and has sprawled uphill. One-third of Bukavu is built on large, deep landslides, some of which are still active.

Antoine Dille at the Royal Museum for Central Africa in Tervuren, Belgium, and his colleagues used images from satellites and aeroplanes to study seven decades of activity of a large landslide in Bukavu. They found that over the decades, the slide has been gradually speeding up, particularly after changes in the flow of groundwater near the surface.

But the city's growth has accelerated that destabilization: the spread of buildings and roads changes how water drains. Residents could reduce the risk of a devastating fast collapse by improving the flow of surface water, the authors say.

Nature Geosci. **15**, 1048–1055 (2022)

Comment

Steel coils in a plant in Duisberg, Germany, produced using methods with low carbon dioxide intensity.

Going net zero for cement and steel

Paul Fennell, Justin Driver, Christopher Bataille & Steven J. Davis

It is possible — and crucial — to green the building blocks of the modern world.

Cement and steel are essential ingredients of buildings, cars, dams, bridges and skyscrapers. But these industries are among the dirtiest on the planet. Production of cement creates 2.3 billion tonnes of carbon dioxide per year, and making iron and steel releases some 2.6 billion tonnes — or 6.5% and 7.0% of global CO_2

That's in part owing to the large quantities in which these materials are used: concrete is the second-most-consumed product on the planet, after clean water. It's also thanks to their carbon-intensive methods of production. The chemical reactions involved give off CO_2, as does burning fossil fuels to deliver the extreme temperatures required in the manufacturing processes.

Cleaner ways of making and using cement and steel are urgently needed. The world must reach net-zero carbon emissions by 2050, even as industrial demand is growing and energy prices are spiking. Infrastructure, technology transfer and mechanisms for reducing financial risks must be established to allow

Here, we highlight nine priorities for research and action. Steel manufacturing processes need a rethink; cement's biggest gains will require carbon capture and storage (CCS). Together, these steps could take steel close to being carbon neutral and cement to becoming a carbon sink.

Use the latest technologies

Ensuring that production plants are fitted with the best available technology offers immediate gains. Improving insulation of industrial plant can save 26% of the energy used; better boilers cut energy needs by up to 10%; and use of heat exchangers can decrease the power demands of the refining process by 25% (ref. 2). Old

more modern facilities, so industries become more efficient over time. However, gains diminish as industries mature and improvements become incremental. Today, the most efficient cement plants can squeeze only 0.04% of energy savings per year by upgrading technologies[3]. More needs to be done.

Use less

Smaller quantities of steel and cement can be used for the same job. Today, the world produces 530 kilograms of cement and 240 kilograms of steel per person per year. Small but significant changes to building codes and education for architects, engineers and contractors could reduce demand for cement by up to 26% and for steel by 24%, according to the International Energy Agency[4]. Many building codes rely on over-engineering for safety's sake. That margin could be limited by using modern materials and computer modelling to whittle down designs to use only the necessary amount of resources. Alternative materials with a smaller carbon footprint for a given use, such as aluminium, might replace steel in some products, including cars. Professionals would have to shift their practices and re-train.

Reinvent steel production

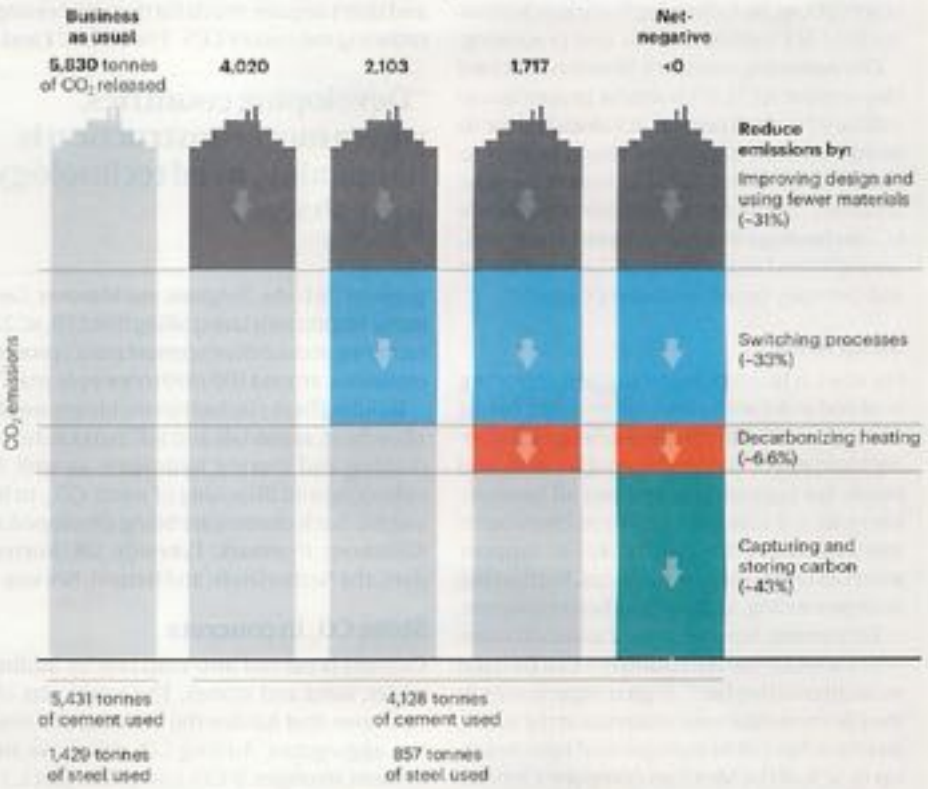
Carbon is at the core of conventional steel production. Coke (derived from coal) fuels blast furnaces in which iron ores are chemically reduced to metallic iron at temperatures of up to 2,300 °C. Coke burns to produce carbon monoxide, which reduces the ore to iron and CO_2. Molten iron is then refined into steel, usually in a coal-fired furnace, but sometimes (especially when recycling scrap) in an electric arc furnace (EAF). The process emits about 1,800 kilograms of CO_2 or more per tonne of steel.

Other substances can be used to reduce the ores. About 5% of the world's steel is already made through 'direct reduced iron' (DRI) processes that don't require coke and typically use hydrogen and CO (derived from methane or coal). By using methane-derived gas and renewable electricity to power an electric furnace, such steel plants emit about 700 kilograms of CO_2 per tonne of steel[5] – 61% less than coke-based ones.

Better still, using only hydrogen for DRI should reduce CO_2 emissions to 50 kilograms or less per tonne of steel – a 97% reduction. Firms in Europe, China and Australia are piloting such plants, with several slated to open in 2025 or 2026. The challenge is that this process requires a lot of hydrogen.

DECARBONIZING A SKYSCRAPER

It takes around 5,400 tonnes of cement and 1,400 tonnes of steel to construct a 30-storey high-rise building that is about 100 metres tall. Producing these materials releases 5,830 tonnes of carbon dioxide. That can be brought to below zero by four steps: using fewer materials, switching production processes, using low-carbon heat sources and carbon capture and storage.



almost tripling global hydrogen production, from 60 to around 135 million tonnes annually. And most cheap hydrogen today comes from natural gas, which releases CO_2. A greener option – splitting water with electrolysers – is around 2.5 times as expensive. Costs should come down as more plants are built.

> **"Together, these steps could take steel close to being carbon neutral and cement to becoming a carbon sink."**

Other options are worth pursuing. In 2004, the Ultralow-CO_2 Steelmaking Consortium – 48 companies and organizations in 15 European countries – evaluated the options. Tata Steel, based in Jamshedpur, India, built a pilot plant in 2010 in the Netherlands for one advanced steel-making process, still based on coal but simplified to make carbon capture easier. The falling price of green hydrogen – produced using renewable energy – is now

One promising alternative to hydrogen is using electricity to reduce iron ore through electrolysis. This method is being explored by Boston Metal in Massachusetts, and Luxembourg-based Arcelor Mittal.

Reinvent cement

Production of ordinary Portland cement – the most common type of cement – begins with the calcination of limestone, which is heated to temperatures above 850 °C to form lime and CO_2. The lime is combined with sand and clay in a 1,450 °C kiln to create clinker. A few other ingredients are mixed in to make cement. About 60% of the emissions from a top-quality plant come from the calcination reaction, and most of the rest from burnt fuel. In total, the process produces about 800 kilograms of CO_2 per tonne of cement[6] in an average plant, and 600 kilograms in a best-in-class plant.

Cement can be made without limestone. Magnesium oxychloride cement (called sorel), for example, has been around since 1867, but it hasn't been commercialized because it has a low water tolerance. Dozens of cement var-

construction, however, building codes, designs and practices will have to be altered to account for these materials' different strengths and properties. This will take more than a decade.

Another option is replacing some of the clinker with more sustainable materials[7]. Common ones include blast-furnace slag and ash from coal-fired power stations. But those materials will become scarce when fossil fuels are phased out. Researchers are investigating other options, including slag from recycled iron made in EAFs and from DRI EAF steel processing.

One promising example is limestone calcined clay cement (LC^3). With similar properties to ordinary Portland cement, it's already close to being commercialized and would be easy to switch to. Up to half of the clinker in it can be replaced[8]. Some companies already include LC^3 technology in their net-zero strategies, among them French company LafargeHolcim and Germany-based Heidelberg Cement.

Swap fuels

For steel, it is tempting to suggest replacing coal and coke with charcoal or other forms of biomass. But there are challenges. Growing biomass for energy can conflict with land needs for agriculture, and not all biomass harvests are sustainable. Wood charcoal is too weak (compared with coke) to support material layers in blast furnaces. Rethinking steel processing, as above, is a better solution.

For cement, however, municipal solid waste – or carefully sorted rubbish – can be used as an alternative fuel[9]: high temperatures in the kiln incinerate toxic materials in the waste, and the ashes can be incorporated into clinker. Up to 57% of the Mexican company Cemex's energy in cement plants in the United Kingdom is derived from these alternative fuels, and UK company Hanson's alternative-fuel consumption is at 52%. This strategy should be encouraged, including by passing appropriate regulations at a national level.

Capture carbon

CCS – taking CO_2 and locking it away underground – will be essential to lowering cement-production emissions, and is important for steel, too.

CCS is relatively advanced in some other industries. The Norwegian state oil company Equinor has operated a CCS project since the late 1990s, burying around one million tonnes of CO_2 per year. But the technology is underused: just 0.1% of all global emissions are currently captured and stored. Only a few steel and concrete plants are trialling CCS. For example, one modern DRI steel plant in Abu Dhabi has used CCS since 2016. CCS must be scaled up rapidly.

One major issue is that the stream of CO_2 needs to be more than 99.9% pure to reduce costs for compressing and storing the gas. Typical steel- and cement-plant flues consist of about 30% CO_2, the rest is mainly nitrogen and steam. One option for the cement industry is to burn fuel in a mixture of oxygen and recycled flue gas, leaving a relatively pure stream of CO_2. But this is challenging: it involves scaling a very hot, rotating kiln.

Another way to isolate CO_2 from the calcination process is to heat the limestone indirectly (through a wall) so that emissions from heating are separated from those from the limestone. The emissions from limestone are nearly pure and don't require much further processing, reducing the cost of CCS. The LEILAC 1 and 2 projects (in Lixhe, Belgium, and Hanover, Germany, respectively) are trialling this: LEILAC 2 is capturing about 20% of a cement plant's process emissions, around 100,000 tonnes per year[10].

> **"Developing countries, where most construction is happening, need technology to be shared."**

Building heavy industries in clusters would allow heat, materials and infrastructure for making and storing hydrogen, as well as collecting and disposing of waste CO_2, to be shared. Such clusters are being developed at Kalinborg, Denmark; Tyneside, UK; Rotterdam, the Netherlands; and Bergen, Norway.

Store CO_2 in concrete

Cement is turned into concrete by adding water, sand and stones. The water sets off reactions that harden the material and bind the aggregates. Adding CO_2 can make the cement stronger. If CO_2 comprises just 1.3% of the weight of concrete, the material's hardness can increase by around 10%. That reduces the amount of cement needed in a structure – along with net emissions – by about 5%.

Optimizing carbon capture in concrete is an active area of research. Leaders such as CarbonCure in Dartmouth, Canada, are already injecting CO_2 in concrete at a large scale: it reports that it has delivered nearly 2 million truckloads of CarbonCure concrete, saving 132,000 tonnes of CO_2.

Cement and concrete both absorb CO_2 from the air by converting calcium-based components back into limestone. The potential there is huge: in theory, roughly half of the process CO_2 emissions from cement manufacturing could be re-absorbed. But the materials would have to be ground up at the end of their lives to make the concrete particles smaller so that CO_2 can diffuse in better. That's expensive – and it requires energy.

Because the amount of CO_2 that could be taken up by crushed concrete is uncertain, this is not yet included in emissions inventories from the United Nations Framework Convention on Climate Change. But the UK government is looking into it, in collaboration with the Mineral

Products Association in London, and the Global Carbon Project has begun including it in its annual carbon budgets. We urge caution, to avoid disincentivizing CCS and more traceable means of reducing cement's carbon footprint.

Recycle steel

Steel can be efficiently recycled using an EAF. One-quarter of steel production today is based on recycled scrap. Globally, recycled production is expected to double by 2050 (ref. 11), reducing emissions by 20–25% from today (depending on how the electricity is produced).

However, it is not currently possible to recycle steel endlessly. 'Tramp' species – undesirable compounds (particularly copper) – build up. Their accrual can be slowed by better sorting scrap and by redesigning products so that copper wiring is easier to remove.

Subsidize changes

Together, the potential of these eight steps is vast (see 'Decarbonizing a skyscraper'). But further economic hurdles must be overcome if low-carbon heavy industries are to reach mega-

Limestone is the source of most of the carbon dioxide emissions from cement production.

Hydrogen-only DRI plants for steel and CCS facilities for cement exist only at pilot to early commercial stages. Scaling them up is expensive and risky. Low-carbon products lack competitive advantage and markets. Developing countries, where most construction is happening, need technology to be shared and implementation of mechanisms to lessen financial risks.

One step in the right direction is a small refund under the European Union Emissions Trading Scheme (ETS) for swapping fossil fuels with biomass or hydrogen, or for undertaking CCS. That's not enough. Conditional, scaled government subsidies – similar to feed-in tariffs, which incentivize investment in wind and solar technologies – would be more effective[42].

Full decarbonization with CCS is expected to double the cost of Portland cement, now about US$100 per tonne. Cement subsidies would need to match that. Zero-emissions steel is expected to cost 20–40% more than standard steel, which is typically about $600 per tonne – so steel subsidies would need to reach $240 per tonne. For the EU, we estimate that could cost up to $200 billion over 10 years. those costs. Users and manufacturers will be less affected. Decarbonized steel would add just 0.5–2% to the price of a vehicle, and up to 15% of the cost of constructing a building (which itself is only 1–3% of total property value)[43].

Policies should be put in place to encourage these developments. The time has come for steel and cement production to help, rather than hinder, the race to net zero.

The authors

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Supplementary information accompanies this article: see

Comment

A gas flare at an oil well in North Dakota.

Make greenhouse-gas accounting reliable — build interoperable systems

Amy Luers, Leehi Yona, Christopher B. Field, Robert B. Jackson, Katharine J. Mach, Benjamin W. Cashore, Cynthia Elliott, Lauren Gifford, Colleen Honigsberg, Lena Klaassen, H. Damon Matthews, Andi Peng, Christian Stoll, Marian Van Pelt, Ross A. Virginia & Lucas Joppa

Global integrated reporting is essential if the planet is to achieve net-zero emissions.

In March, the United Nations took its first meaningful step to hold investors, businesses, cities and regions accountable for reducing greenhouse gas emissions, when UN secretary-general António Guterres asked an expert panel to develop standards for 'net-zero' pledges by these groups. A challenge now is how to count emissions coherently.

Nations, companies and scientists each use different, disjointed methods to tally greenhouse-gas emissions. These numbers cannot easily be compared or combined. The existing patchwork of greenhouse-gas inventories is woefully inadequate. From governments to businesses, information on these emissions is inconsistent, incomplete and unreliable.

To design effective carbon taxes, border tariffs and other zero-carbon policies or investments, the numbers need to be reconcilable across all levels, from product supply chains all the way up to planetary scale. The sum of national emissions should tally with growth in atmospheric carbon dioxide and estimates of carbon sinks.

We are researchers and practitioners from academia, industry and non-profit organizations who have developed a vision for an integrated global system of greenhouse-gas 'ledgers' that can balance the books of emissions and removals across the planet. Using interoperable accounting methods adapted from the financial sector, this system must create inventories of greenhouse gases emitted by nations and companies, catalogue emissions embodied in global supply chains and track fluxes of these gases in and out of ecosystems. Recent advances in remote sensing and digital technologies put this vision within reach. Here we outline a road map for doing so.

Global patchwork

Greenhouse-gas accounting is the measurement, analysis and reporting of data on

and methane that cause climate change. The atmospheric concentration of greenhouse gases is the bottom line. It holds humanity to account for how we use our remaining 'carbon budget' – the total amount of CO_2 that can be emitted over a period of time while avoiding a dangerous rise in global temperatures above a certain threshold.

Scientists monitor global carbon sources and sinks. For example, the Global Carbon Project measures, analyses and reports flows of CO_2, methane and nitrous oxide into and out of the atmosphere from human activities (such as transport, industry and land use) and natural environments (such as forests, soils and oceans)[1].

At the national level, governments follow UN guidelines to self-report emissions from human activities in their territories. Most rely on tables of 'emissions factors' for these calculations. These factors give typical rates of greenhouse-gas emissions for various activities, such as using different energy sources or producing particular farm crops.

Businesses, cities and other non-state actors follow other standards adapted from UN guidelines (such as ghgprotocol.org). These also rely on emissions factors to count direct and indirect emissions from supply chains and the use of products. For example, when a company makes a pair of jeans, it must account for its own emissions from sewing and delivering the trousers to stores. It should also count emissions from growing the cotton and converting it to fabric, as well as laundering by the consumer and the ultimate disposal of the clothing. Often, more than 80% of a company's emissions are indirect.

Inconsistent and incomplete ledgers, among both businesses and governments, prevent accurate assessments of decarbonization policies and investments. For example, adding ethanol produced from maize (corn) to petrol might not provide any carbon benefit when emissions from land-use change and other activities involved in its production are accurately counted[2].

Reliability constraints

Emissions of CO_2 from fossil fuels and industry can be tallied with relatively high confidence. But it is difficult to account reliably for non-CO_2 gases and for emissions across the land sector and in supply chains and carbon offsets (see 'Carbon accounting: five fixes'). Inventories are rife with measurement errors, inconsistent classification and gaps in accountability.

Poor data can lead to inaccurate emission factors, such as when emissions are measured at only a few locations over brief time intervals. For example, one analysis in February used the latest satellite data to show that methane emissions from the energy sector were 70% higher than those reported by national accounts, which use emissions factors that are based on idealized conditions and don't include leaks from fossil-fuel operations[3].

Data gaps and inconsistent application of accounting standards lead to widespread undercounting of emissions. For example, only one-third of suppliers provide information on their indirect emissions to customers[4], leading companies to report different levels of emissions for similar activities. In the technology sector, proper inclusion of indirect emissions from purchased goods and product usage can double emissions estimates[4].

Inconsistent classifications make it hard to compare emissions. For example, following UN guidelines, many national inventories classify conservation areas as managed lands. The carbon absorbed there is then considered as human-derived removal, which can be used to offset fossil-fuel emissions. Scientists, by contrast, classify emissions and removals from conservation lands as natural[5].

Ambiguity in human versus natural sources of some emissions leads to gaps in accountability. For example, wildfire emissions are typically classified as natural, and are thus not counted in national, provincial or corporate ledgers, even though they can be significant[6]. According to California's Air Resources Board, the state's emissions from wildfires in 2020 exceeded those generated from electricity. In Canada in 2018, British Columbia's wildfires emissions were three times greater than all other emissions in the province combined (see go.nature.com/3zewvna).

The atmospheric impact of nature-based carbon removal is poorly quantified. For example, evaluations of steps to increase forest cover must account for the possibility that such changes might have occurred anyway, that they might be reversed by fire, or that they could cause more forest clearance elsewhere. These risks are captured inconsistently in current accounting practices[7].

Insufficient transparency creates opportunities for misrepresentation, by making it difficult to use scientific observations to verify emissions reported by businesses. For instance, in 2021, the Oil and Gas Climate Initiative, which represents about 30% of oil and gas producers globally, reported that methane emissions by its members were 0.2% of gas production[8]. Without disclosure of the underlying data, this low value is difficult to reconcile with scientific assessments, which range from 3.7% (ref. 9) to 9.4% (ref. 10) of gas production in different regions.

Scientific uncertainties limit how observations can be used for verification. For example, the amount of carbon taken up by forests and soils can vary from year to year in ways that are difficult to predict, and can differ by more than annual increases in human-caused emissions[11].

There is also little oversight. Under the Paris climate agreement, nations' self-reported emissions are reviewed but rarely verified independently. For companies, nearly all greenhouse-gas reporting is voluntary and not externally reviewed.

Some progress

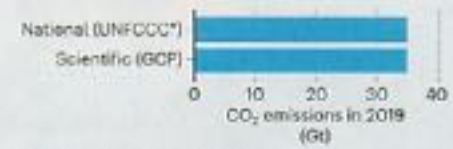
Things are getting better. At the UN's COP26 climate meeting in November 2021, new rules were established to prevent double counting in international carbon-offset markets. The International Sustainability Standards Board (ISSB) was launched to support the financial sector in reporting sustainability metrics consistently. In 2023, the Greenhouse Gas Protocol will issue corporate-accounting guidance for land use and carbon removal.

CARBON ACCOUNTING: FIVE FIXES

The following steps will lead to better accuracy.

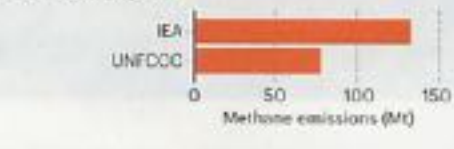
Use reliable measures

Carbon dioxide emissions from fossil fuels, based on the type and quantity of fuel combusted, are reliably measured across national and scientific inventories.



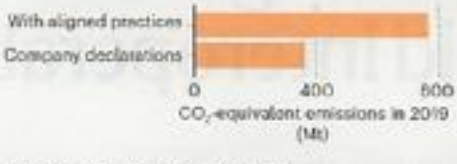
Invest in new data streams

Using satellite data, the IEA showed that global methane emissions in the energy sector in 2021 were 70% higher than national reports.



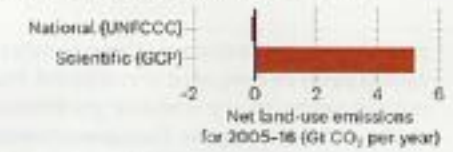
Harmonize reporting practices

Businesses struggle to track emissions along their value chains. Consistent reporting requirements would help.



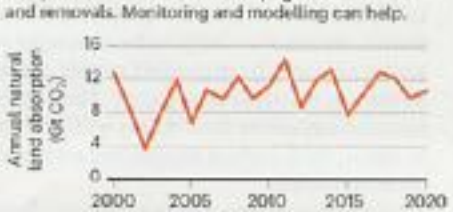
Use consistent classifications

National inventories classify carbon absorption in conservation areas as human-derived, reducing their overall tally for human-derived emissions.



Narrow scientific uncertainties

Natural variations in yearly CO_2 absorption by land complicates detection of anthropogenic emissions and removals. Monitoring and modelling can help.



*UNFCCC, UN Framework Convention on Climate Change; GCP, Global Carbon Project; Gt, gigatonnes; IEA, International

Smoke from wildfires plagued San Francisco in September 2020. The effect on regional emissions tallies can be significant.

this year, the US Securities and Exchange Commission proposed a rule mandating that corporations disclose information on their emissions; the United Kingdom and European Union are advancing similar rules.

And scientific uncertainties are narrowing. Satellites can now provide measurements of atmospheric greenhouse-gas concentrations almost in real time. Remote sensing and advanced analytics help to track terrestrial emissions more accurately, with increasing global coverage[12].

Digital tools that automate greenhouse-gas accounting are proliferating. Platforms are emerging from companies such as SAP, Salesforce and Microsoft (where A.L. and L.J. work) to allow businesses to combine data on their activities with emissions factors compiled from government, private and non-profit sources. These tools are reducing the time and expertise needed for such accounting.

But much work remains. Even with improved standards and mandatory reporting, many companies and nations might not have the resources to be able to comply. Digital platforms are at risk of facilitating inaccurate emissions accounting if underlying data are unreliable. National and corporate accounting systems often use outdated emissions factors and data. Scientific studies are often misaligned with national and corporate accounting needs. Data across corporate, national and planetary ledgers are difficult to compare, combine and share.

Global integration

We propose a more holistic approach, in which each greenhouse-gas ledger – whether for a company, city or nation – is one node of an interconnected global system. From consumers choosing low-carbon products to nations imposing regulations on trade, decisions require information drawn from multiple ledgers to reliably assess the consequences for the planetary carbon budget. For example, emissions data from thousands of products and companies would be needed to fully implement a carbon border adjustment mechanism. (This levies a carbon tariff on imports to protect domestic companies from competition by producers in countries with weaker climate policies.)

Interoperability is key. The capacity to exchange data and process information from multiple sources is essential for integrated emissions accounting, just as it underpins the financial sector[13]. Most businesses worldwide use the eXtensible Business Reporting Language (XBRL) for digital financial reporting to regulators and investors. XBRL, which is free and managed by an international not-for-profit consortium, provides an open standard for defining terms, exchanging data between information systems and creating shared, searchable data repositories. With XBRL, financial information can be rapidly and accurately aggregated, transmitted and analysed. This facilitates transactions across borders, enables peer-to-peer transactions and extends access to the financial system to communities that are underserved by banks.

A similar system for greenhouse-gas accounting, with emissions data for products held in interoperable repositories, would make it easier to track emissions across value chains. Emissions-reporting companies would direct purchasing and investment towards low-carbon innovations more effectively. Interoperability would allow reporting platforms to access the most current and reliable data. Oversight and accountability would be improved. Greater transparency would build public confidence.

Scientists would gain access to larger, more compatible data sets at higher temporal and spatial resolution. Artificial intelligence (AI) and machine learning could be used, for example, to update and tailor emissions factors to changing conditions and local contexts. As a result, forecasting of the impacts of policies and climate change itself would improve.

Next steps

Four components are essential for this system to work.

Data. Researchers and practitioners need to assess the opportunities for and constraints on improving the quality of data and data products in greenhouse-gas accounting, especially concerning land, non-CO_2 gases, offsets and indirect emissions. Those engaged in all aspects of greenhouse-gas measurement, accounting and reporting, from product to planetary scales, should first identify which data gaps most undermine the reliability of emissions accounting. They should ask: where should investments in research and development be targeted to close gaps? What are the best prospects for improvements using the latest technologies? How can new data streams and knowledge be most rapidly integrated into emissions-accounting infrastructure? And how

Interoperability. Protocols and principles for enabling the interoperability of a digital infrastructure for greenhouse-gas accounting need to be agreed. This should be done in an open and inclusive process overseen by an independent governing body, such as the ISSB in partnership with the UN.

Three sets of protocols will be needed. First, technical and syntactic rules are required that specify how information is to be read by humans and machines. Data must be formatted for seamless exchange between ledgers, platforms and data libraries. A starting point could be the Sustainability Accounting Standards Board's proposed XBRL-based guidelines for corporate sustainability reporting.

Second, there need to be clearer definitions of the myriad metrics and terms used so that systems can unambiguously exchange information — known as semantic interoperability. Examples include how uncertainty is quantified, how offsets are classified and how emissions are parsed between managed or unmanaged lands. An ontology will be required to align the meanings of terms. A common set of metrics must be agreed, which will provide the greenhouse-gas record of any entity. This would mirror the US health sector's Common Clinical Data Set for any patient.

Third, protocols and principles for institutional interoperability are needed. These include policies and regulations to facilitate data exchange across borders and between companies. Different frameworks need to be harmonized. Decisions need to be made on how to govern AI and distributed digital ledgers (such as blockchain) within the system.

Trust. Greenhouse-gas reports must be trusted by decision-makers, regulators and the public. Transparency is key. Data on emissions, removals and progress by nations and companies towards their commitments should be publicly available in an interoperable, machine-readable form. This could be achieved by collecting emissions reporting in one global registry, or in an interoperable network of national registries (through the UN Framework Convention on Climate Change) and sectoral ones (such as the disclosure system CDP; https://cdp.net). Open access to data would enable independent verification, for example by comparing reported emissions with satellite-based measurements, as the Verify project has done for countries in the EU from 2018 to 2022 (see https://verify.lsce.ipsl.fr).

Although companies have legitimate privacy concerns related to business operations, these could be overcome by standards for emissions audits that maintain confidentiality. Audits must go beyond confirming that the correct procedures were followed, and should encompass checks on the quality and completeness of the data. Transparency and independent verification are needed to assure the trustworthiness of emissions data, as well as the emissions factors and other data products used in accounting.

Finance. New funding models are needed to support the generation of emissions data and information products as digital public goods. Current models have limitations. For example, private satellite services delay the release or degrade the resolution of public versions to protect profits. And government research and philanthropic seed money are neither sufficient nor appropriate for operationalizing emissions data and accounting services.

Public–private partnerships could offer a solution. For example, the US National Weather Service uses application programming interfaces to make real-time data available to businesses that package and market data products to consumers. Philanthropists fund collaborations between academic, government and industry partners, such as MethaneSat, Carbon Monitor and Carbon Mapper, to track methane and CO_2 emissions. Blended-finance models, which leverage public funds and loan guarantees to reduce risk and attract capital investment to sustainable development projects, could be adapted for greenhouse-gas information systems. Challenges to be overcome include intellectual-property rights and data sovereignty.

> **"Transparency and independent verification are needed to assure the trustworthiness of emissions data."**

Such steps will make greenhouse-gas accounting more reliable. That alone won't solve the climate crisis, but it is essential for implementing strategies that could.

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Atmospheric science

Cause of the 2020 rise in atmospheric methane

George H. Allen

Atmospheric methane concentrations rose unexpectedly during the lockdowns of 2020. It now seems that this was due to warm, wet weather in the Northern Hemisphere and, ironically, a slowdown in air-pollutant emissions. See p.477

The mysterious acceleration in the growth of atmospheric levels of methane (CH_4) in 2020 received widespread media attention and has been a topic of ongoing speculation (see go.nature.com/3xvv5at). This acceleration was puzzling, considering that methane emissions decreased as a result of the economic slowdown during the COVID-19 pandemic lockdowns. On page 477, Peng *et al.*[1] make considerable headway in explaining the cause of the phenomenon.

Methane is a potent greenhouse gas that is responsible for about one-fifth of the atmospheric warming associated with human activities[2]. Its atmospheric concentration has nearly tripled since pre-industrial times, from 700 parts per billion (p.p.b.) to more than 1,900 p.p.b. today[3] (see also go.nature.com/3xmldx4). During 2007–19, the concentration rose at a rate of 7.3 ± 2.4 p.p.b. per year. Then, in 2020, the methane growth rate increased dramatically to 15.1 ± 0.4 p.p.b. per year. This jump surprised some scientists, given that the pandemic lockdowns were thought to have reduced anthropogenic methane emissions.

Knowledge of the sources and sinks of methane in the atmosphere is key to understanding the causes of changing methane concentrations. The largest sources of methane in the atmosphere are wetlands, freshwater areas, agriculture, fossil-fuel extraction, landfills and waste, and fires[2]. Once in the atmosphere, methane persists for an average of nine years (ref. 4) before it breaks down through reaction with short-lived hydroxyl radicals ($OH^{\bullet}$), which are the main sink for methane. Small changes in $OH^{\bullet}$ concentration cause large changes in the methane sink.

Peng *et al.* analysed the causes of the anomalously high atmospheric methane growth observed in 2020 by combining two approaches: bottom-up and top-down methane estimates. Bottom-up estimates involve using inventories of methane sources and sinks and then applying process-based models to estimate the amount of methane entering and exiting the atmosphere. Top-down estimates typically use an atmospheric-inversion model to infer the spatial distribution of methane fluxes by extrapolating from observations of atmospheric methane.

By updating and expanding bottom-up inventories, Peng *et al.* show that there was only a slight decrease in anthropogenic methane emissions (those associated with fossil fuels, agriculture, landfill and waste) in 2020 compared with 2019. Wetland emissions rose sharply because of unusually warm and wet weather in the Northern Hemisphere, especially in the Arctic, whereas emissions due to fires dropped in 2020. Emissions from other natural sources of methane (freshwater and melting permafrost) remained relatively unchanged. Cumulatively, the bottom-up estimates account for only about half (47 ± 16%) of the observed increase in atmospheric methane growth rate from 2019 to 2020.

To assess the changes in the atmospheric methane sink in 2020, the authors adopted a top-down approach using an atmospheric-inversion model to simulate the chemistry and physics of the atmosphere. This model accounts for the formation and chemical interactions of $OH^{\bullet}$, as well as the lower-than-normal emissions from fires and reduced fossil-fuel combustion that accompanied the pandemic lockdowns. The levels of $OH^{\bullet}$ in the atmosphere depend in part on the concentrations of carbon monoxide and nitrogen oxides, pollutants that are released from fossil-fuel combustion. Reduced emissions of carbon monoxide and nitrogen oxides decrease $OH^{\bullet}$ concentrations, thereby increasing methane levels. Ultimately, the top-down estimate indicates that the reduced $OH^{\bullet}$ sink accounted for approximately half (53 ± 10%)

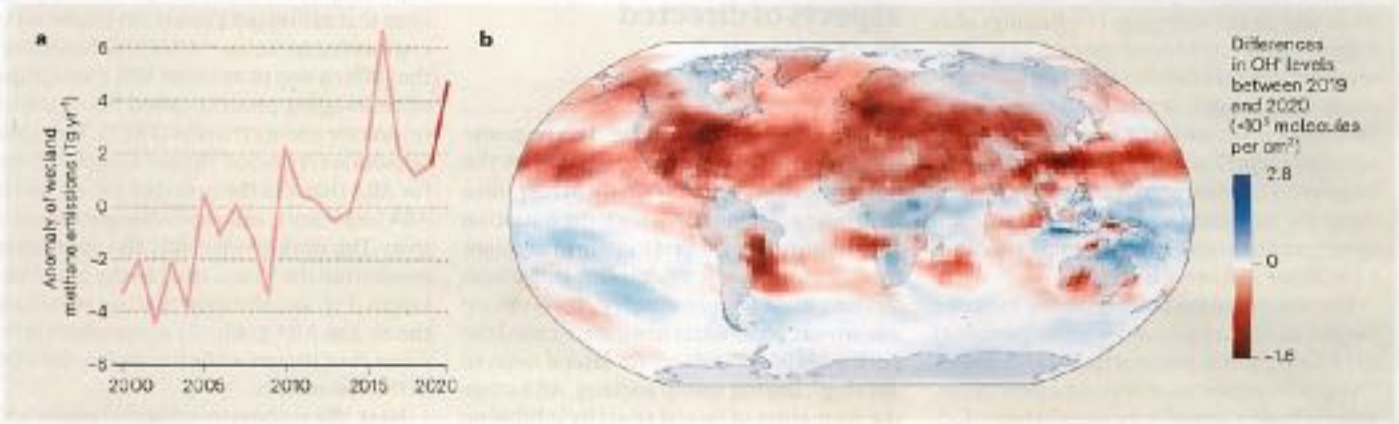

Figure 1 | The main contributors to the rapid increase in atmospheric methane concentrations in 2020. Peng *et al.*[1] quantified changes in the sources and sinks of atmospheric methane between 2019 and 2020, to establish why methane levels increased so quickly when human activities had been curtailed by pandemic lockdowns. **a**, About half of the increase was due to a rise in emissions from Northern Hemisphere wetlands associated with high temperatures and precipitation in that region in 2020. Data shown [illegible] measured emissions and the historical annual average) at latitudes of 30° N to 90° N, measured in teragrams of methane per year (1 Tg is 10^{12} grams). **b**, The other approximately half of the increase was due to an overall reduction in global atmospheric levels of hydroxyl radicals ($OH^{\bullet}$, which break down methane), caused by reduced levels of atmospheric pollutants. The map shows the difference in $OH^{\bullet}$ levels (molecules per cubic centimetre) between 2019 and 2020, plotted across the globe. (Graphics adapted from Fig. 2a and [illegible]

of the observed growth in atmospheric methane in 2020.

Scientists often struggle to balance top-down and bottom-up methane estimates. Peng and colleagues' study is remarkable in that it successfully matches the two estimates in a geographically accurate analysis. The findings allow us to understand the relative contributions from changes in sources and the OH^- sink during the pandemic.

Despite these advances, some sources of uncertainty remain. For example, Peng *et al.* used only rough estimates for methane emissions from freshwater areas (lakes, reservoirs, ponds, rivers) and melting permafrost, which are thought to be major sources of natural emissions – arguably just as important as wetlands[2]. A more refined approach that considered, for example, the length of time for which lakes were covered by ice in 2019 compared with that in 2020 would have produced a more accurate emissions estimate. To be fair to the authors, there is still substantial uncertainty associated with estimates of methane emissions from these sources, making it difficult to incorporate such emissions into methane budgets.

Generally, it remains challenging to achieve a predictive understanding of the complex sources, sinks and feedbacks in the global methane budget. More field observations are needed to constrain bottom-up estimates, and more observations from networks of surface sensors and satellites are required to better constrain atmospheric-inversion models – particularly in Central and South Asia, the Middle East, Africa and tropical South America, as the authors recognize.

Peng and colleagues' findings imply that wetland methane emissions are sensitive to a warmer, wetter climate, and thus might fuel a positive feedback loop between methane emissions and global warming. The findings also suggest that future improvements in air quality, resulting in reduced emissions of carbon monoxide and nitrogen oxides, could extend the lifetime of methane in the atmosphere. Thus, a greater reduction in methane emissions than is currently targeted would be required to meet the goal of the United Nations 2015 Paris climate agreement to keep global warming to within 1.5 °C of pre-industrial levels.

The concentration of atmospheric methane surged again (see go.nature.com/3xm1dx4) to 18.2 ± 0.5 p.p.b. per year in 2021 – another mysterious acceleration without a clear cause, and the fastest rate of increase ever recorded. Further investigations into the sources and sinks of methane are clearly needed.

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Plant sciences

How roots go with the flow

Christa Testerink & Jasper Lamers

How do environmental cues steer the branching of plant roots? Insights into how water availability shapes root growth reveal an unexpected mechanism behind the hormone-mediated regulation of this process.

Plants need their roots to branch out in different directions so that they can explore the soil in their search for nutrients and water. Writing in *Science*, Mehra *et al.*[1] have uncovered the system that determines whether the main root of a plant invests in a new side branch for exploration or continues growing and waits for a better opportunity for side branching. The regulation of this process depends on water flow in the root.

In natural soils, plants experience variation in water availability. When root tips that are growing downwards lose contact with moist soil (for example, in an air gap), they respond by halting the formation of side (lateral) roots that branch out horizontally until contact of the root tip with moisture is re-established. The suppression of root branching in air gaps in soil is called xerobranching[2]. This response was previously proposed to depend on the hormone ABA, which is made in response to drought. ABA inhibits both the initiation and the growth[3] of lateral roots in many plant species, including the model plant *Arabidopsis thaliana*, maize (corn) and barley[2]. The hormone auxin must accumulate in what are called the pericycle cells of the root for lateral roots to develop[4]. During xerobranching, ABA stops the formation of lateral roots by inhibiting auxin accumulation[2].

> **"This principle might have relevance for other aspects of directed root growth."**

Mehra *et al.* confirmed that when the roots of tomato and maize plants cross an air cavity in soil, they need ABA for a xerobranching response – ABA-deficient plant mutants made lateral roots in air gaps. To predict how water flows through the root depending on exter-

simulations. Their findings indicate that when there is sufficient water, it flows in an inward direction, and when the roots are exposed to drought, the flow is reversed. In drought, a water-stressed root depends on water from shoots that reach the root tissues through a water-conducting internal tissue network called the vasculature (or vascular tissue). On the basis of these results, the authors hypothesized that ABA would travel with this water flow from the vasculature to the outer root tissues if the root crosses an air gap.

Previously, xerobranching could be studied only in soil, which limits the options for using *A. thaliana*, high-throughput analyses and tools such as plants with fluorescent markers because of the opacity of the soil. To overcome these constraints, the authors developed a laboratory approach to mimic root exploration over an air gap using an *in vitro* plate assay. Mehra and colleagues used this set-up to explore the role of ABA in *A. thaliana* seedlings that expressed a newly developed set of engineered proteins – ABACUS2 biosensors – that offer a way to monitor ABA through use of an imaging process called fluorescence resonance energy transfer (FRET). These biosensors are reported[5] to have a higher affinity for ABA than did the previous generation of ABA biosensors, and so provide greater sensitivity. This work revealed that ABA does indeed move from the vasculature to the outer root layers (Fig. 1a), showing that, on traversing the air gap, ABA gradually accumulates in the outer root tissues while becoming depleted in the vasculature.

Next, the authors investigated plants with signalling deficiencies in ABA arising from mutations in the *SnRK2* gene family. As was the case for plants with mutations affecting ABA production, the mutant plants did not show xerobranching. To elucidate which tissues require ABA signalling, Mehra and colleagues selectively restored ABA signalling in

Article

Wetland emission and atmospheric sink changes explain methane growth in 2020

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Atmospheric methane growth reached an exceptionally high rate of 15.1 ± 0.4 parts per billion per year in 2020 despite a probable decrease in anthropogenic methane emissions during COVID-19 lockdowns[1]. Here we quantify changes in methane sources and in its atmospheric sink in 2020 compared with 2019. We find that, globally, total anthropogenic emissions decreased by 1.2 ± 0.1 teragrams of methane per year (Tg CH_4 yr^{-1}), fire emissions decreased by 6.5 ± 0.1 Tg CH_4 yr^{-1} and wetland emissions increased by 6.0 ± 2.3 Tg CH_4 yr^{-1}. Tropospheric OH concentration decreased by 1.6 ± 0.2 per cent relative to 2019, mainly as a result of lower anthropogenic nitrogen oxide (NO_x) emissions and associated lower free tropospheric ozone during pandemic lockdowns[2]. From atmospheric inversions, we also infer that global net emissions increased by 6.9 ± 2.1 Tg CH_4 yr^{-1} in 2020 relative to 2019, and global methane removal from reaction with OH decreased by 7.5 ± 0.8 Tg CH_4 yr^{-1}. Therefore, we attribute the methane growth rate anomaly in 2020 relative to 2019 to lower OH sink (53 ± 10 per cent) and higher natural emissions (47 ± 16 per cent), mostly from wetlands. In line with previous findings[3,4], our results imply that wetland methane emissions are sensitive to a warmer and wetter climate and could act as a positive feedback mechanism in the future. Our study also suggests that nitrogen oxide emission trends need to be taken into account when implementing the global anthropogenic methane emissions reduction pledge[5].

Methane (CH_4) contributes 15–35% of the increase in radiative forcing from greenhouse gases emitted by human activities[6]. The atmospheric methane growth rate (MGR) has been high over the past decade, probably owing to the combined increases in fossil fuel and microbial sources[7–11]. In 2020, the MGR observed from surface sites of the NOAA Global Monitoring Laboratory (GML) network reached 15.1 ± 0.4 parts per billion per year (ppb yr^{-1}), the highest value from 1984 to 2020 (Extended Data Fig. 1)[12]. The MGR was larger in the Northern than in the Southern Hemisphere, which suggests at first glance an increase of northern sources (Fig. 1). A similar, abnormally large, growth rate of 14.8 ppb yr^{-1} was also detected from total column concentration measurements (XCH_4) by the Greenhouse Gases Observing Satellite (GOSAT; Supplementary Fig. 1). In the same year, the coronavirus pandemic led to a strong reduction of fossil fuel use, probably accompanied by a drop of CH_4 emissions by 10% from oil and gas extraction, according to reports from the International Energy Agency (IEA)[1] and regional estimates of emissions over extraction basins, such as the Permian Basin[13]. The reduced combustion of carbon fuels[14] and lower fire emissions[15] also caused less carbon monoxide (CO) and nitrogen oxides (NO_x) to be released to the atmosphere during the first half of 2020[16,17]. Both CO and NO_x affect the atmospheric concentration of the hydroxyl radical (OH), which is the main sink of CH_4. Even a small change in OH has a large impact on the MGR[8]. Meanwhile, the atmospheric CH_4 concentration also feeds back on the OH available to remove air pollutants such as CO and NO_x (refs. [18,19]). Reduced CO emissions should increase the concentration of OH, whereas reduced NO_x emissions should decrease OH (ref. [5]), except in very polluted areas[20]. Thus, the net effect of COVID-19 emission changes on the MGR is uncertain. In addition, the year 2020 was exceptionally hot from early spring to late summer over northern Eurasia, a sensitive region for CH_4 emissions from biogenic sources such as wetlands, permafrost slumps and arctic lakes, which are expected to emit more CH_4 as the temperature increases. Determining whether the high MGR anomaly in 2020 was due to less atmospheric removal resulting from a decrease in OH or to enhanced biogenic sources is key to developing our understanding of the complex interplay of the anthropogenic and natural drivers of

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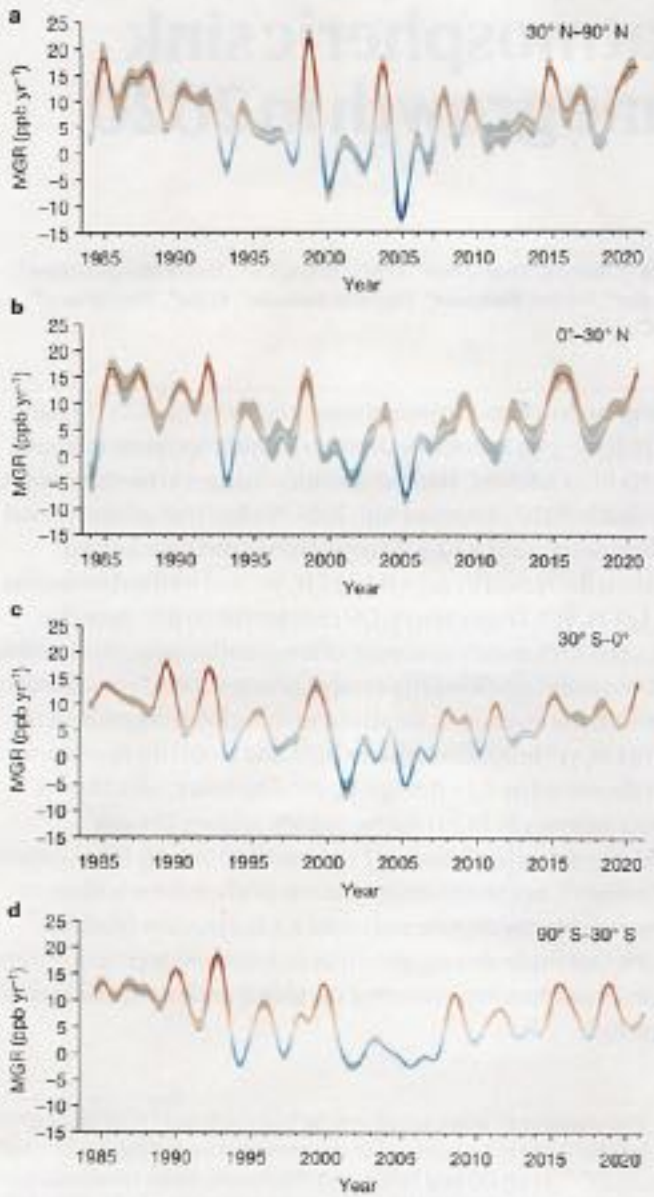

Fig. 1 | Atmospheric MGRs of four latitudinal bands. a–d, The annual growth rate is derived from weekly average marine surface atmospheric methane concentrations at NOAA's surface sites in the four latitudinal bands following a previous work[45]. The colours correspond to the annual growth rate: warm colours for higher growth rate and cool colours for lower growth rate. The grey shaded area shows the standard deviation of the annual growth rate.

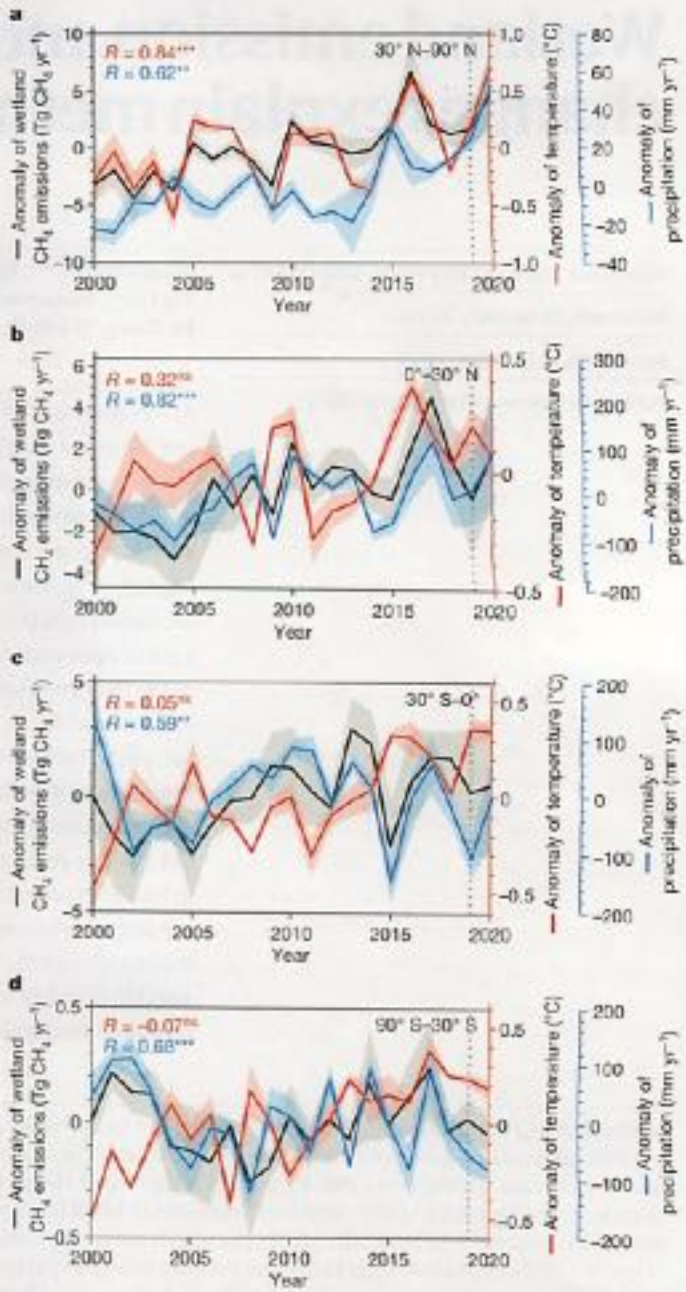

Fig. 2 | Wetland methane emissions and temperature and precipitation in the four latitudinal bands during the period 2000–2020. a–d, The black lines show the anomalies of average wetland emissions simulated from the two WEMs with four climate forcing. The temperature anomalies over wetlands, from CRU TS v4.05, ERA5 and MERRA2, and the precipitation anomalies over wetlands, from these three datasets and MSWEP, are shown in red and blue, respectively. The shaded area shows the standard deviation of 12 simulations for wetland emissions (eight from ORCHIDEE-MICT and four from LPJ-wsl, see Methods). The correlation coefficients between wetland emissions and temperature (red) and precipitation (blue) are also marked in the upper left of each panel, with *** for $P < 0.001$, ** for $P < 0.01$ and ns for not significant. The vertical dashed line marks the year of 2019 for reference.

the methane budget required for the upcoming Global Stocktake of the Paris Agreement. Here we combined bottom-up and top-down approaches to understand the high MGR anomaly in 2020 relative to 2019 and quantified anomalies in the surface sources and in the global atmospheric OH sink.

A bottom-up view of emission anomalies

First, we estimated the change in anthropogenic CH_4 emissions in 2020 from the fossil fuel, agriculture and waste sectors. To do so, we combined national greenhouse gas inventories (NGHGIs) submitted to the United Nations (UN) Framework Convention on Climate Change (UNFCCC) for Annex-I countries and the updated Emissions Database for Global Atmospheric Research (EDGAR) v6.0 inventory[28] with new

(FAO)[29] of the UN for other countries (see Methods). In the category of fossil fuel extraction activities, global coal production decreased by 4.6% in 2020 compared with 2019, and global oil production and natural gas production decreased by 7.9% and 3.8%, respectively[22]. We inferred a decrease of CH_4 emissions from oil and natural gas (−3.1 Tg CH_4 yr^{-1})

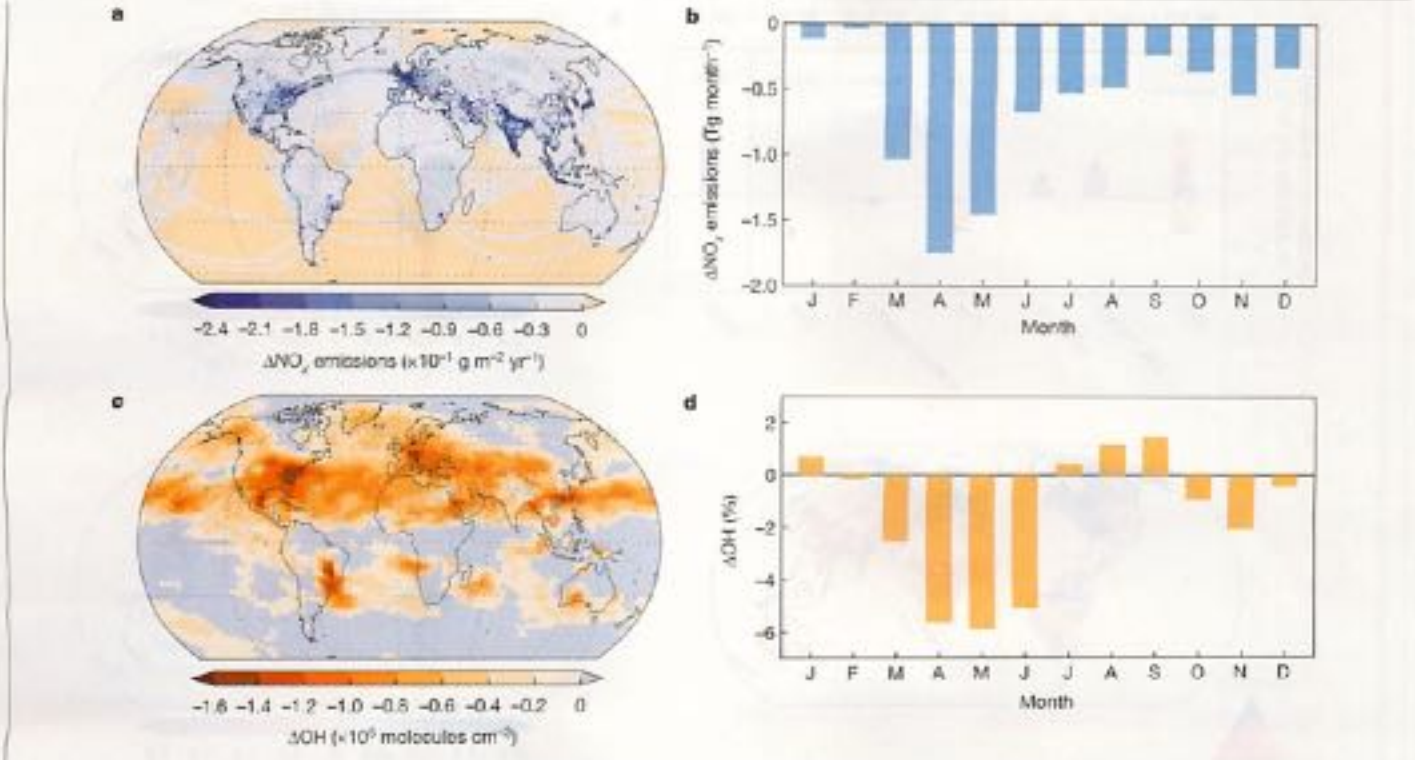

Fig. 3 | Anomaly of NO_x emissions and tropospheric hydroxyl radical (OH) in 2020 relative to 2019. a–**c**, Spatial patterns of NO_x emissions anomaly (ΔNO_x emissions; **a**) and OH anomaly (ΔOH; **c**) in 2020 relative to 2019. **b**,**d**, Difference in monthly global NO_x emissions (**b**) and monthly tropospheric OH (**d**) between 2020 and 2019. The NO_x emissions data are from the Community Emissions Data System dataset[16].

the global rice cultivation area slightly increased according to FAO[23] by 1% (+0.5 Tg CH_4 yr^{-1}), and an increase in livestock stock and slaughter numbers was reported as well (+1.6 Tg CH_4 yr^{-1}). Statistical data are not yet available for the waste sector for non-Annex-I countries, so we used the linear trends from EDGAR v6.0 for 2014–2018 to project a small global increase of +1.0 Tg CH_4 yr^{-1} in 2020 compared with 2019. In summary, the anthropogenic CH_4 emissions in 2020 decreased by 1.2 ± 0.1 Tg CH_4 yr^{-1} (± standard deviation, hereinafter) (Extended Data Fig. 2), which at steady state would lead only to a 0.4 ± 0.0 ppb yr^{-1} decrease of growth in the atmosphere relative to 2019, based on the conversion factor of 2.75 Tg CH_4 ppb^{-1} (ref. 24). This shows that the observed MGR anomaly of 5.2 ± 0.7 ppb yr^{-1} in 2020 compared with 2019 (15.1 ± 0.4 ppb yr^{-1} of MGR in 2020 relative to 9.9 ± 0.6 ppb yr^{-1} of MGR in 2019) must be attributed to a change of natural emissions and/or OH sink.

We then estimated biogenic and fire CH_4 emissions in 2020 from bottom-up models. The year 2020 was wetter than normal in northern and tropical regions (Supplementary Fig. 2), and extremely warm in northern Eurasia from early spring to late summer[25] (Extended Data Fig. 3). Two satellite-based fire emission datasets, the Global Fire Assimilation System (GFAS) and the Global Fire Emissions Database (GFED4.1s), consistently show that the global fire emissions in 2020 were lower by 6.5 ± 0.1 Tg CH_4 yr^{-1} than in 2019 (Extended Data Fig. 4). The southern tropical regions (30° S–0°) dominated the 2020 decrease in fire emissions in both datasets, although in the USA there were fewer fires in the first half of the year but more in the second half of the year[26]. The GFAS data show that eastern Siberia had higher fire emissions in 2020 compared with 2019, by 0.4 Tg CH_4 yr^{-1}. This anomaly is related to the heatwave in the region (Extended Data Fig. 3)[25], where the fire season advanced by two months in 2020 and began in May[27]. Globally, fire emissions appear to have dropped in 2020 compared with 2019, implying other processes must explain the large positive MGR anomaly in 2020.

We found that most wetland areas of the world were exposed to warmer and wetter conditions in 2020 than normal years (Fig. 2 and Extended Data Fig. 3). Northern wetlands were exposed to warmer temperatures (+0.43–0.58 °C) relative to 2019 as shown in Fig. 2 (Supplementary Table 1). Precipitation over global wetlands[28] had a 2–11% annual increase relative to 2019, mainly in the northern high latitudes and in the tropics (Supplementary Table 1). With increased precipitation, an expansion of wetland area and more shallow water tables promoting emissions are expected. In addition, the earlier soil thaw and later soil freeze in 2020 resulted in a longer emission season in the high northern wetlands (Supplementary Fig. 3), and possibly in increased emissions from permafrost and thermokarst lakes. To quantify wetland emissions from 2000 to 2020, we used two process-based wetland emission models (WEMs) forced by different climate datasets (see Methods). These models show that wetland emissions significantly and positively correlate with precipitation in the tropics (30° S–30° N)[29] and in the southern extra-tropics (90° S–30° S) and with both temperature and precipitation in northern wetlands (30° N–90° N) (Fig. 2). Warmer and wetter wetlands over the Northern Hemisphere in 2020 (Supplementary Table 1) increased emissions by 6.0 ± 2.5 Tg CH_4 yr^{-1} relative to 2019, dominating the net increase in global wetland emissions (6.0 ± 2.3 Tg CH_4 yr^{-1}) in 2020 (Extended Data Fig. 5). The spread in the estimates of WEMs is mainly due to differences in wetland area related to differences in the precipitation forcing (Supplementary Fig. 2), and partly to model structure, even though the two models have similarities in parameterizations. With a 4% increase in precipitation over wetlands from the Multi-Source Weighted-Ensemble Precipitation (MSWEP) precipitation field, which merges gauge, satellite, and reanalysis data to obtain accurate precipitation estimates[30,31], wetland emissions increased by 5.8 ± 1.5 Tg CH_4 yr^{-1}. Using root-zone soil moisture from Global Land Evaporation Amsterdam Model (GLEAM) v3.5a[32] as a proxy to calculate the expansion of wetland areas in 2020 (see Methods), we found a larger wetland emission increase of 7.4–9.3 Tg CH_4 yr^{-1}, mainly in the Northern Hemisphere (Extended Data Fig. 5). Observed land liquid water mass change from the GRACE-FO satellite[33] confirms

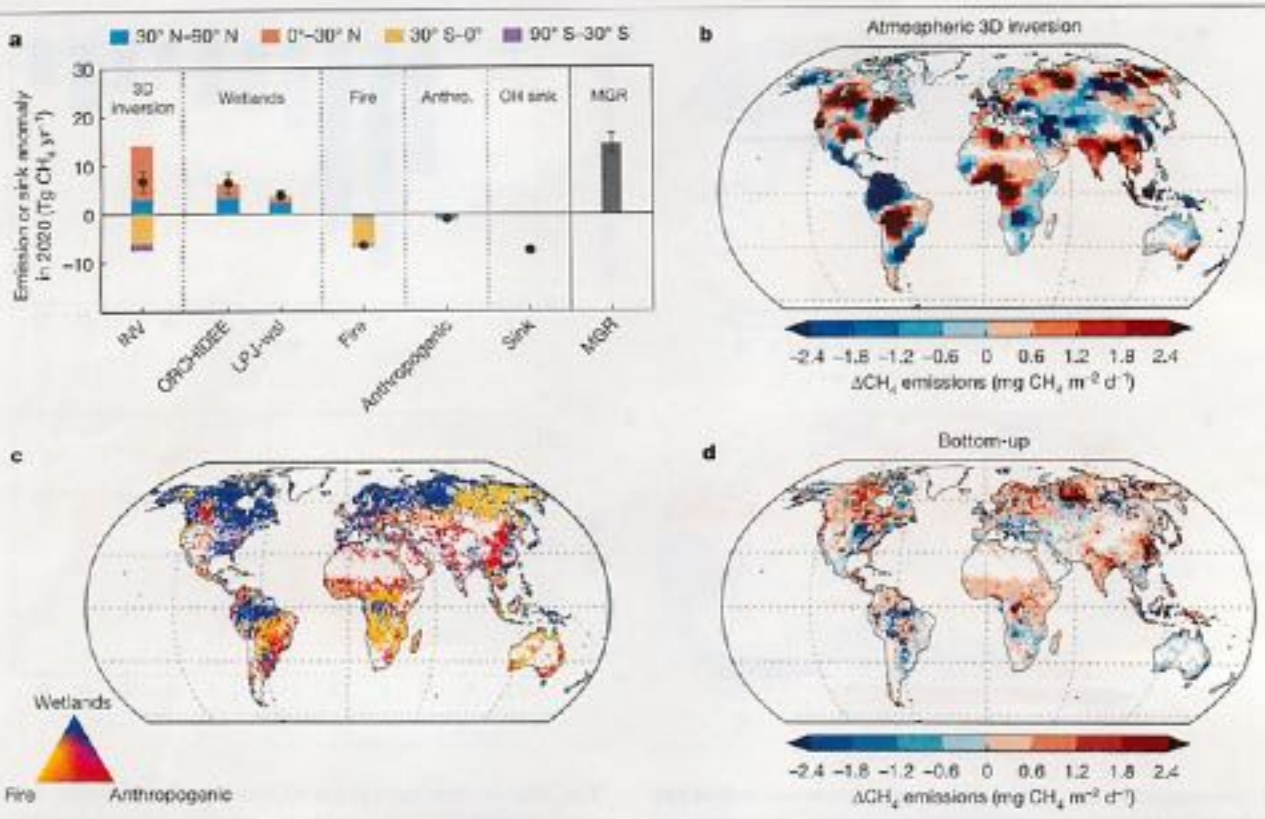

Fig. 4 | Methane emissions and sink anomaly in 2020 relative to 2019. **a**, Methane emissions anomaly of four latitudinal bands derived from atmospheric 3D inversions with OH field from LMDZ-INCA simulations (INV), wetland emissions anomaly from two WEMs, fire emissions anomaly from GFED4.1s and GFAS, and anthropogenic (Anthro.) emissions anomaly. The black dots show the net changes in global CH_4 emissions between 2020 and 2019. The sink anomaly is calculated by a 1.6 ± 0.2% decrease in OH in INV. The observed MGR anomaly (14.4 ± 2.0 Tg CH_4 yr^{-1}) from surface sites is defined as the difference in MGR between 2020 (15.1 ± 0.4 ppb yr^{-1}) and 2019 (9.9 ± 0.6 ppb yr^{-1}) with a conversion factor of 2.75 Tg CH_4 ppb^{-1}. The error bars represent one standard deviation. **b**, Spatial pattern of emissions anomaly from top-down INV. **c**, Spatial distribution of contribution sources (wetlands, fire and anthropogenic) to change in emissions derived from bottom-up estimates. **d**, Spatial pattern of emissions anomaly from bottom-up estimates including wetland, fire and anthropogenic emissions.

that wetlands water storage increased in the Northern Hemisphere. The increase in soil moisture over wetlands in the Northern Hemisphere simulated by the two WEMs is less than the liquid mass change observed from GRACE-FO, especially north of 30° N (Supplementary Figs. 4 and 5), suggesting that the expansion of Northern Hemisphere wetlands or the water table levels—and thus emissions in 2020—may be underestimated by WEMs. Overall, it is probable that wetland emissions made a dominant contribution to the soaring level of atmospheric methane in 2020, although there is uncertainty regarding the magnitude of the contribution, mainly owing to uncertainty in the precipitation data.

According to our ensemble of bottom-up estimates, an increase in wetland emissions (6.0 ± 2.3 Tg CH_4 yr^{-1}) does not fully explain the increased methane emissions (14.4 ± 2.0 Tg CH_4 yr^{-1}) inferred from the MGR anomaly (5.2 ± 0.7 ppb yr^{-1}) between 2020 and 2019 under the assumption that the sink remains unchanged. Considering a decrease in anthropogenic emissions of 1.2 Tg CH_4 yr^{-1} and fire emissions of 6.5 Tg CH_4 yr^{-1}, even with our largest estimate of wetland emissions (9.4 Tg CH_4 yr^{-1}), the bottom-up budget is still not closed, revealing a missing source anomaly of more than 12.7 Tg CH_4 yr^{-1}, which must be attributed to a decrease in the atmospheric CH_4 sink, to additional sources such as lakes or permafrost or to extra-wetland emissions that were missed by the WEMs.

Atmospheric constraints in 2020

The increase in wetland emissions is mainly located in the Northern Hemisphere, whereas the decrease in fire emissions is mainly in southern tropical regions, and so we expect that the MGR in the Northern Hemisphere should be higher than the MGR in the Southern Hemisphere. Indeed, the latitudinal averaged growth rate of methane observed from the surface sites confirms that the Northern Hemisphere had a higher growth rate than the Southern Hemisphere in 2020 (Supplementary Fig. 6). The GOSAT data, which provide an MGR integrated over the whole column, and are thus much less sensitive to changes in the depth of the boundary layer at continental stations, also show a similar latitudinal pattern to the data from the surface sites, with a peak in the column growth rate at 10° N–50° N (Supplementary Fig. 7).

To quantify the spatial and temporal distribution of emission anomalies in 2020 from atmospheric observations, we used a three-dimensional (3D) atmospheric inversion assimilating surface CH_4 observations from a total of 103 stations (see Methods). Inversions have the advantage over bottom-up methods to match the observed MGR and gradients between all stations. We performed a 3D atmospheric inversion (INV) that prescribes changes in the OH concentration field, as simulated by a full chemistry transport model (LMDZ-INCA)[34,35] with realistic CO, hydrocarbons and NO_x anthropogenic emissions derived from gridded near-real-time fossil fuel combustion data that include lockdown-induced reductions in 2020[36,37]. The chemistry transport model is driven by meteorology from ECMWF ERA5 data[38] and biomass burning emissions from GFED4.1s[85]. Figure 3 shows a decrease in NO_x emissions by 6% in 2020 relative to 2019, which is particularly apparent in the spring (March, April and May) when COVID-19 lockdown measures were imposed in many Northern Hemisphere countries (Extended Data Fig. 6). The decrease in global NO_x emissions in 2020 relative to 2019

was seven times larger than the decreasing trend from 2005 to 2019 (Supplementary Figs. 8 and 9). Both the global NO_x emissions and satellite-derived tropospheric NO_2 concentration from Ozone Monitoring Instrument (OMI) in 2020 were the lowest during the period 2005–2020 (Supplementary Fig. 9). Our chemistry transport model LMDZ-INCA produced a globally averaged 1.6% decrease in annual tropospheric OH concentration in 2020 relative to 2019. The decrease in monthly tropospheric OH reached as high as 6% in April, May and June (Fig. 3d) over the Northern Hemisphere (0°–60° N; Extended Data Fig. 7), suggesting that the drop of NO_x emissions in 2020 outweighed the effects of a decrease in anthropogenic and fire CO emissions (Supplementary Fig. 10) and made OH lower. To independently verify this modelled decrease of global OH in 2020, we used a 12-box model to infer changes in OH[9,39] by simultaneously optimizing OH concentration and the emissions of two HFC and one HCFC species (HCFC-141b, HFC-32 and HFC-134a) using atmospheric observations of these three species from the NOAA and AGAGE networks including the latest data for 2020. This diagnostic of OH is based on the premise that errors in the prior emissions should be largely independent between the three gases, but errors in OH will be correlated for all of them (see Methods). The box model shows a net decrease in OH of 1.6–1.8% in 2020 relative to 2019 after the optimization. This estimate of the OH decrease in 2020 is independent and consistent with the full chemistry model simulation.

Prescribed with the decrease of OH and its spatial pattern from the chemistry transport model, the INV gives a global increase of 6.9 ± 2.1 Tg CH_4 yr^{-1} for surface emissions and a decrease of 7.5 ± 0.8 Tg CH_4 yr^{-1} for the weaker atmospheric CH_4 sink. Considering the uncertainty of the decrease in OH and of the observed MGR[12], the global increase in surface emissions and decrease in the atmospheric CH_4 sink contributed, respectively, 47 ± 16% and 53 ± 10% of the total positive MGR anomaly in 2020 relative to 2019 (Fig. 4). The global increase of surface emissions is decomposed into an increase in the Northern Hemisphere of 14.3 Tg CH_4 yr^{-1}, partly offset by a decrease in the Southern Hemisphere of 7.4 Tg CH_4 yr^{-1} (Fig. 4a). The spatial pattern of emission anomalies produced by INV confirms enhanced emissions in northern North America, and western and eastern Siberia hinted by the bottom-up wetland models. In the Northern Hemisphere, our maximum bottom-up estimate of the increase in wetland emissions (11.2 Tg CH_4 yr^{-1}) is, however, smaller than the solution of INV. This suggests that either wetland models underestimated emissions, possibly because of underestimated soil water content (see above), too deep water table, missed emissions from small wetlands and/or other sources spatially collocated with northern wetlands such as lake and pond emissions[40], aquaculture emissions[41] and thawing permafrost slump emissions[42]. The largest temperature anomaly of the past two decades was also indeed found over permafrost regions in 2020, particularly in Russia (Extended Data Fig. 3a and Supplementary Fig. 11), which could have increased methane emissions from upland permafrost soils[43] and lakes, including thermokarst lakes[44]. Estimation of changes in emissions from lakes (including reservoirs) and permafrost shows limited contributions from these two sources (<0.1 Tg CH_4 yr^{-1}) to fill the gap in the emission changes between bottom-up and top-down approaches, although with large uncertainties (Supplementary Information). We note that owing to the sparse atmospheric networks in Central and South Asia, Middle East, Africa and tropical South America (Supplementary Fig. 12), the inferred fluxes and therefore flux changes in these regions may have large uncertainties. The evaluations against independent observations revealed that emission changes over large latitudinal bands or at hemispheric scales are robustly constrained (Supplementary Figs. 13–18). In addition, an extension of our 3D inversion and analyses to cover the period 2015–2020 also showed similar attribution of the MGR anomaly in 2020 (Supplementary Fig. 19).

In summary, our results show that an increase in wetland emissions, owing to warmer and wetter conditions over wetlands, along with decreased OH, contributed to the soaring methane concentration in 2020. The large positive MGR anomaly in 2020, partly due to wetland and other natural emissions, reminds us that the sensitivity of these emissions to interannual variation in climate has had a key role in the renewed growth of methane in the atmosphere since 2006. The wetland methane–climate feedback is poorly understood, and this study shows a high interannual sensitivity that should provide a benchmark for future coupled CH_4 emissions–climate models. We also show that the decrease in atmospheric CH_4 sinks, which resulted from a reduction of tropospheric OH owing to less NO_x emissions during the lockdowns, contributed 53 ± 10% of the MGR anomaly in 2020 relative to 2019. Therefore, the unprecedentedly high methane growth rate in 2020 was a compound event with both a reduction in the atmospheric CH_4 sink and an increase in Northern Hemisphere natural sources. With emission recovery to pre-pandemic levels in 2021, there could be less reduction in OH. The persistent high MGR anomaly in 2021 hints at mechanisms that differ from those responsible for 2020, and thus awaits an explanation. Our study highlights that future improvements in air quality with reduced NO_x emissions may increase the lifetime of methane in the atmosphere[5], and therefore would require more reduction of methane emissions to achieve the target of Paris Agreement.

Online content

Any methods, additional references, Nature Portfolio reporting summaries, source data, extended data, supplementary information, acknowledgements, peer review information; details of author contributions and competing interests; and statements of data and code availability are available at https://doi.org/10.1038/s41586-022-05447-w.

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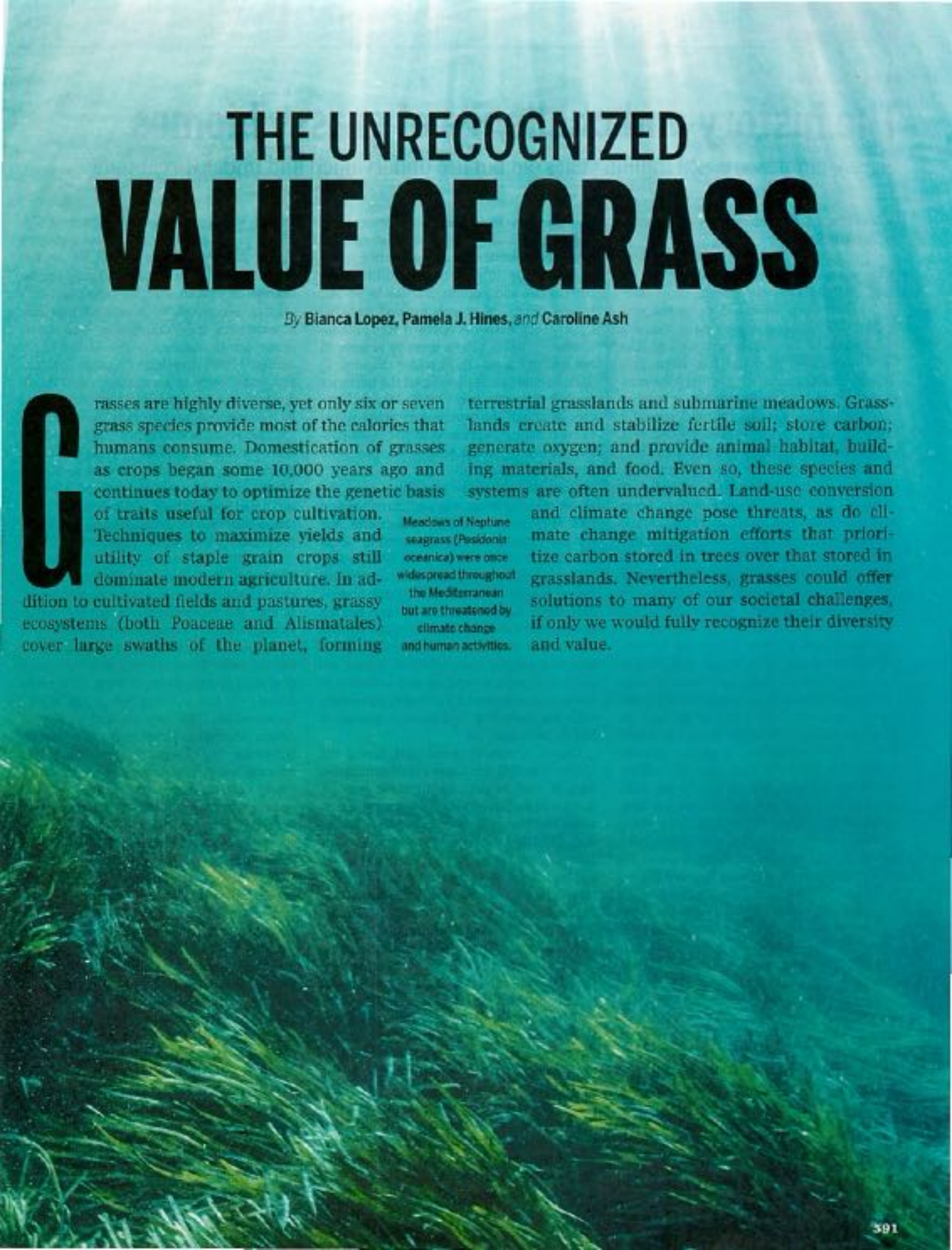
THE UNRECOGNIZED VALUE OF GRASS

By **Bianca Lopez, Pamela J. Hines,** *and* **Caroline Ash**

Grasses are highly diverse, yet only six or seven grass species provide most of the calories that humans consume. Domestication of grasses as crops began some 10,000 years ago and continues today to optimize the genetic basis of traits useful for crop cultivation. Techniques to maximize yields and utility of staple grain crops still dominate modern agriculture. In addition to cultivated fields and pastures, grassy ecosystems (both Poaceae and Alismatales) cover large swaths of the planet, forming terrestrial grasslands and submarine meadows. Grasslands create and stabilize fertile soil; store carbon; generate oxygen; and provide animal habitat, building materials, and food. Even so, these species and systems are often undervalued. Land-use conversion and climate change pose threats, as do climate change mitigation efforts that prioritize carbon stored in trees over that stored in grasslands. Nevertheless, grasses could offer solutions to many of our societal challenges, if only we would fully recognize their diversity and value.



Meadows of Neptune seagrass (Posidonia oceanica) were once widespread throughout the Mediterranean but are threatened by climate change and human activities.

PERSPECTIVE

The history and challenge of grassy biomes

Grassy biomes are >20 million years old but are undervalued and under threat today

By Caroline A. E. Strömberg[1] and A. Carla Staver[2,3]

Grassy biomes—from the steppes of Mongolia to the savannas of Tanzania—are predicted to be the ecosystems hardest hit by the ongoing climate and land use crises. The history of humans has been profoundly intertwined with grassy biomes. *Homo* evolved in the savannas 2 million years ago (Ma), and agricultural societies arose through the domestication of grasses, such as wheat and barley, 10,000 years ago. These grass crops, as well as corn and rice, remain dominant staple foods globally (*1*). Livestock production also centers in areas that were once (and sometimes still are) native grasslands. Grassy biomes harbor distinct and diverse sets of plants and animals that have adapted to these environments through millions of years of evolution (*2*). As the biodiversity and economic prominence of grassy biomes are increasingly being recognized, there is a demand for better understanding of their past and present function to inform policy and management.

Grassy biomes are biogeographically widespread, accounting for >25% of all land on Earth, including 35% of the tropics and subtropics. The emergence of grassy systems during the Cenozoic (the past 66 million years) was complex, shaped by climate, soils, fire, and herbivory in ways that are not fully understood (see the figure). Clarifying these mechanisms will be key for managing the fate of grassy biomes under ongoing and future environmental changes that are driven by human activities.

Grasses, defined as plant species in the family Poaceae, originated by the Late Cretaceous (100 Ma) (*3*) but did not become ecologically dominant until >70 million years later, in the later Cenozoic. This exceptionally long lag has prompted evolutionary biologists and paleontologists to search for the drivers that allowed grass to reach its current global prominence. Today, most grasses are associated with open-canopy habitats, owing to several traits acquired relatively early in Poaceae evolution (100 to 60 Ma) (*1*, *3*). For example, grasses may have quickly evolved a rapid life cycle and persistent buds, permitting quick regrowth after drought, frost, or disturbances such as fire and grazing. Starting by 55 Ma, several groups of grasses evolved so-called C_4 photosynthesis (as opposed to C_3 photosynthesis), which allows them to prosper in hot and dry areas (*1*). In colder climates, C_3 open-habitat grasses developed the tolerance needed to survive frosts by 30 Ma (*4*). However, although the evolutionary traits suited to open habitats appeared earlier, open-habitat grasses remained ecologically rare until later in the Cenozoic.

Once grasses started spreading across the globe, their takeover was asynchronous and followed continent-specific trajectories. For instance, grassy habitats appeared in North America by 25 Ma but not until 7 Ma in Australia (*5*, *6*). However, the first subtropical grassy biomes were unlike anything observable there today, featuring C_3 open-habitat grasses that today are found in colder regions (*6*). It was not until several million years later that tropical open-habitat C_4 grasses expanded to form grasslands and savannas at low to mid-latitudes (*5*, *7*), roughly coincident with the spread of frost-tolerant grasses at higher latitudes.

Grassy biomes thus emerged during the Cenozoic at different times in different places and, at least in part, for different reasons. Studies in modern grassy biomes suggest that aridity and rainfall seasonality, as well as fire and herbivory, could all favor grasses over trees (*2*), with even larger benefits at lower atmospheric CO_2 concentrations. The fossil record shows that many of these conditions did occur in the late Cenozoic. By 34 Ma, atmospheric CO_2 levels had dropped, and the globe underwent a period of cooling. In many areas, altered atmospheric circulation and mountain uplift (e.g., of the Tibetan Plateau) resulted in aridification or seasonal drought, and fossil evidence indicates increased fire activity near the end of the Cenozoic (*5*). Further, large grassland-type mammal herbivores (e.g., bovids) diversified during the mid- to late Cenozoic (*8*).

Asynchrony in the emergence of grasses on different continents suggests that, although global factors such as low-CO_2 conditions may have spurred the diversification and expansion of open-habitat and especially C_4 grasses (*7*), changes in CO_2 were typically not enough to allow grasses to dominate. A rapidly expanding geochemical and paleontological tool kit has allowed for more detailed insights. Studies have shown that regional changes in climate and fire interacted with existing vegetation to influence trajectories of emerging grass dominance, with divergence across continents. For example, the earliest North American C_3 grassy habitats replaced forests as seasonal drought developed (*6*), and in Australia, C_4 grasses favored by pronounced aridification overtook fire-adapted eucalypt woodlands that had existed there for tens of millions of years before (*5*). By contrast, in South Asia and southwest Africa, more frequent and intense wildfires promoted replacement of fire-sensitive vegetation with grasses (*9*), suggesting a substantial regional, if not global, role for fire.

In addition to environmental conditions, herbivores may also have directly contributed to the spread of grassy vegetation, although the mechanisms are not yet understood. Defense strategies against herbivores by savanna trees, such as growing spines or thorns, evolved concurrently with the spread of grasses and the diversification of bovids in Africa (~17 Ma) but long before fire activity increased (*8*). This suggests that, at least in Africa, herbivores structured grassy biomes before fire did. However, just how important animals were in shaping the evolution of grassy vegetation remains untested and will require adapting methods of estimating past herbivore intensity (such as studying fungal spores in fossilized dung) for Miocene and older samples.

Since they first appeared, grassy biomes have continued to shift in extent, structure, and composition, prompted by advancing and retreating ice sheets during the global Ice Age (2.6 Ma onward). Today, they are widely distributed on every continent except Antarctica, with a range in part associated with aridity and rainfall seasonality. Some 60% of grassy ecosystems receive <750 mm of annual rainfall, most with a dry season that shapes plant physiology. This provides a rationale for the argument that aridity drove late Cenozoic grassland expansion. However, 40% of grassy ecosystems extend into higher-rainfall regions with >750 mm of annual rainfall that can support forests. These moderately wet, or "mesic" grassy ecosystems are biogeographically distinct from semiarid ones, but both are evolutionarily ancient (*1*). Yet, whereas

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SPECIAL SECTION

cal designs offers a promising opportunity to better steer the plasticity mechanisms of human cognition.

We recently discovered that synchronization-dependent neural coding schemes underlie poorer memory function in people aged 60 to 76 years and developed advanced neuromodulation protocols that target these motifs for memory enhancement (see the online figure, top). Before neuromodulation, these individuals showed poorer working memory performance compared with younger adults (*2*). These impairments were found to be associated with reduced theta-gamma phase-amplitude coupling (PAC) in the temporal cortex (*2*). PAC is a well-studied neural coding motif that occurs when the amplitude of a high-frequency rhythm synchronizes with the phase of a low-frequency rhythm. This form of synchronization facilitates the integration of information across spatiotemporal scales within a nested cortical network (*6*, *12*). We found that local PAC deficits in the temporal cortex arose because of deficient prefrontal control marked by reduced theta-phase synchronization between the frontotemporal areas. Phase synchronization—when two or more rhythmic neuronal signals tend to cycle with consistent relative phase—is another leading neural coding motif for coordinating spatiotemporal neuronal activity (*1*, *6*, *12*). These synchronization schemes thus serve as potential targets for neuromodulation to improve memory function.

Guided by electric field modeling, we developed a personalized HD-tACS protocol to rescue theta-phase synchronization in the frontotemporal cortex. The frequency of synchronization was individually determined for each participant to maximize the likelihood of entrainment. Simultaneous in-phase entrainment of both frontal and temporal regions at personalized theta frequencies induced in this manner restored intrinsic frontotemporal theta-phase synchronization, recovered the deficient theta-gamma PAC in the temporal cortex (see the online figure, top), and improved working memory performance in older adults (*2*). Even though neuromodulation was performed for ~25 min, improvements in memory function were sustained for at least 50 min, suggesting that the protocol produced neuroplastic changes outlasting the modulation period (*2*). Moreover, an additional experiment in younger adults with antiphase synchronization of frontotemporal regions demonstrated that memory performance can even be down-regulated. This finding suggests that cognitive function can be bidirectionally manipulated using phase-dependent interregional synchronization. This may be useful in pathologies where overactive memory processes need to be regulated, such as in posttraumatic stress disorder.

Our precision neuromodulation approach identified that it was essential to perform HD-tACS using personalized theta frequencies. By contrast, control experiments with a fixed theta frequency for all participants did not produce any improvements in memory function in older adults. Thus, advances in noninvasive neuromodulation that leverage the spatial and spectral parameters of individual neurophysiology offer a promising opportunity to effectively synchronize large-scale brain rhythms and rapidly improve memory function in older people.

"The rapid reduction in obsessive-compulsive behaviors...lasted for at least 3 months..."

Such developments are especially valuable considering the rapidly aging global population and its associated personal, social, health care, and economic costs.

Current theories in biological psychiatry on the nature of compulsivity, including obsessive-compulsive disorder (OCD), view symptoms as outcomes of dysregulated habits and atypical reward processing due to abnormalities in cortico-basal ganglia networks (*13*, *14*). In parallel, fundamental neuroscience research has identified a neural signature in the form of medial-frontal beta-gamma rhythms, presumed to arise from the orbitofrontal cortex (OFC) during reward processing (see the online figure, bottom) (*15*). Combining these insights, we proposed that beta-gamma rhythms may constitute the neural code underlying orbitofrontal-striatal interactions that give rise to abnormal reward processing and OCD symptoms. To test this theory, we devised a personalized model-guided HD-tACS protocol for targeting individual beta-gamma rhythms of the OFC (see the online figure, middle) and demonstrated rapid, reversible, frequency-specific modulation of reward-guided choice behavior and learning in healthy young adults (*4*). Next, by repeatedly modulating personalized OFC beta-gamma rhythms over 5 days, we effectively reduced obsessive-compulsive behaviors in a nonclinical population. The rapid reduction in obsessive-compulsive behaviors—including hoarding, ordering, and checking—lasted for at least 3 months (*4*), and the largest improvements were experienced in people with more severe symptoms. These sonalized neuroscience intervention to people with clinical OCD and other compulsivity disorders, such as behavioral addiction (e.g., gambling, internet), eating disorders, substance use or abuse, and Tourette syndrome. More broadly, because the OFC is increasingly recognized to play a central role in the pathophysiology of mood, anxiety, psychosis, and other major categories of psychiatric disorders (*14*), the noninvasive procedure we developed for selectively modulating OFC beta-gamma rhythms could lay the basis for future nonpharmacological therapeutics that are applicable to a wide range of psychiatric illnesses.

The fields of fundamental and clinical neuroscience have made extraordinary advances in understanding the dynamic structure of the neuronal network activity that underlies cognitive function and dysfunction. Leveraging these insights has allowed us to develop neuromodulation protocols, personalized to individual neurophysiology, that can selectively augment components of rhythmic cortical networks and improve cognitive function and adaptive behavior in a rapid and sustainable fashion. Although it is challenging to predict the future, we are optimistic that personalization rooted in the neuroscience of network dynamics will rise to the forefront of next-generation noninvasive neuromodulation and pave the way toward future use of precision electroceuticals in neurology and psychiatry. ■

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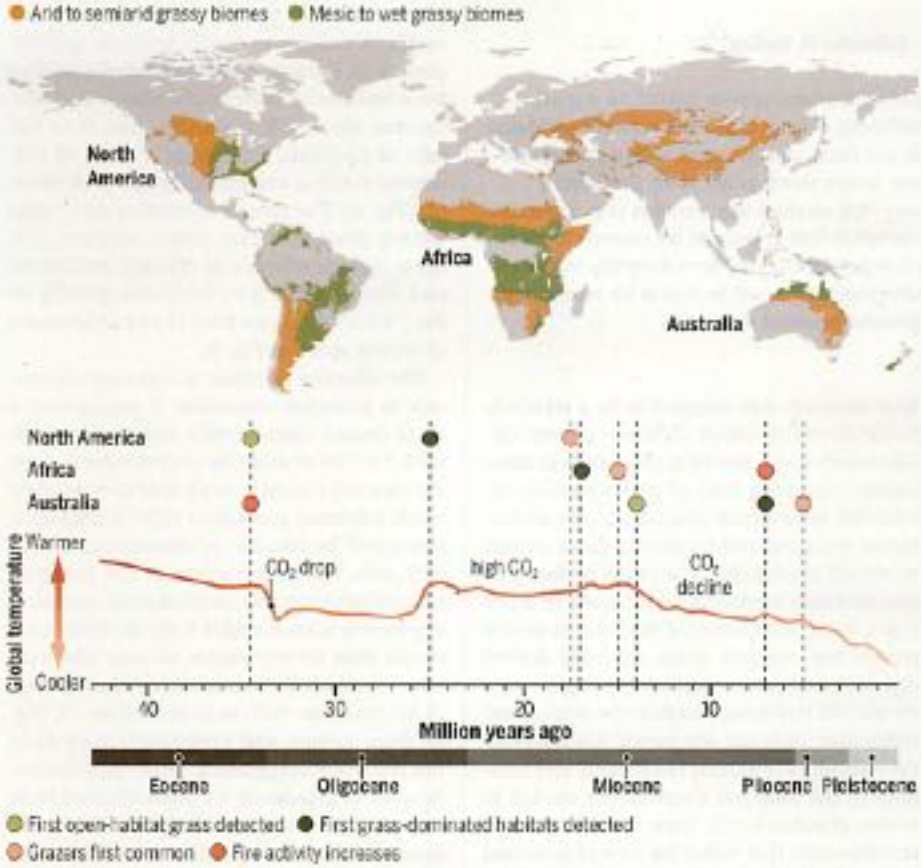
FULL ARTICLE WITH FIGURES AT

The history and legacy of grassy biomes

Grassy biomes exist in a wide range of climates, from cold to hot and arid to wet (top). Although changing environmental conditions through time have shaped their past and present distribution, disturbance regimes (fire, herbivory) and vegetation histories also shaped their evolution and current and future function (bottom).



semiarid savannas are widely accepted as the native vegetation of large areas of the globe, mesic savannas were long assumed to represent degraded forests. Only recently have mesic savannas been acknowledged for their contributions to endemic biodiversity and distinctive ecosystem function.

As their antiquity is increasingly recognized, the ecological processes that promote mesic savanna stability have come into increasing focus (*2*). Fire likely plays an important role in stabilizing mesic savannas, excluding forests by preventing tree establishment or killing trees, thereby favoring grasses. In total, grassy biomes make up >80% of the global burned area annually. Experiments, field observations, and remote sensing analyses all support fire as a mechanism allowing grassy ecosystems to expand into mesic regions. Plant traits are consistent with the history of fire in mesic savannas. The distinct, diverse, and ancient tree and shrub communities (*8*) are well adapted to enduring fires with thick bark, large belowground nonstructural carbohydrate reserves, and bud banks that promote resprouting. In addition to tolerating fire, many grasses actively spread fire (*10*). These fire adaptations have major implications for the ecosystem functioning of grassy biomes. For instance, the large belowground reserves in grassy biomes may mean a substantially larger belowground carbon storage compared with that in other biomes (*11*). Current estimates suggest that grassy biomes hold at least 17% of global biomass carbon (*12*), but this is certainly an underestimate (*11*) that needs to be adequately quantified so that the potential role of grassy biomes as carbon sinks can be fully appreciated.

Herbivores that graze on grass and eat tree leaves also influence grassland function (*13*), especially in semiarid savannas, where grass eaters decrease grass biomass accumulation and tree eaters prevent trees from establishing. Abundant herbivory-related traits have accumulated over evolutionary time in grassland plants, including herbivory defenses in trees (e.g., spines) (*8*) and grass morphologies that withstand intense grazing (e.g., growing from the base instead of from shoot tips and bud banks for resprouting) (*1*). Nevertheless, the importance for grassy biome distributions of herbivory relative to other factors, such as climate and soil conditions, remains an open question.

Overall, evidence is converging around the idea that grassy ecosystems are complex, with ecologies that depend not just on climate but also on interactions and feedbacks with fire and herbivory. These ecologies are profoundly influenced by the evolutionary history and resulting trait diversity of regional biota (*1*). Their complexity makes predicting the responses of grassy biomes to global change a particular challenge. Nonetheless, studies have shown that the combination of CO_2 fertilization, fire suppression, and livestock extensification has resulted in widespread woody encroachment (*14*) and associated degradation of grassy biomes—a trend that will likely continue into the near future.

Grassy biomes are also threatened by ongoing land use conversions and degradation while being among the least protected globally (*2*). For example, 90% of temperate grasslands have been transformed into agricultural or urban areas, with <1% of remnants currently protected from land development. Whereas rainforests in the Amazon have attracted widespread attention from the popular media, the ongoing threat to savannas, especially in Africa, South America, and Asia from afforestation, fire exclusion, and land use conversion, has gone unnoticed. The effects on savanna and grassland biodiversity will be devastating; for instance, 40% of grassland vertebrate species are projected to be lost by 2070 (*15*). Thus, the fate of evolutionarily ancient grassy biomes hangs in the balance, with terminal consequences for their functionally and evolutionarily distinct biota. ■

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REVIEW

Ancient grasslands guide ambitious goals in grassland restoration

Elise Buisson[1]†, Sally Archibald[2], Alessandra Fidelis[3], Katharine N. Suding[4,5]*†

Grasslands, which constitute almost 40% of the terrestrial biosphere, provide habitat for a great diversity of animals and plants and contribute to the livelihoods of more than 1 billion people worldwide. Whereas the destruction and degradation of grasslands can occur rapidly, recent work indicates that complete recovery of biodiversity and essential functions occurs slowly or not at all. Grassland restoration—interventions to speed or guide this recovery—has received less attention than restoration of forested ecosystems, often due to the prevailing assumption that grasslands are recently formed habitats that can reassemble quickly. Viewing grassland restoration as long-term assembly toward old-growth endpoints, with appreciation of feedbacks and threshold shifts, will be crucial for recognizing when and how restoration can guide recovery of this globally important ecosystem.

Grasslands are essential components of Earth's system, supporting a biodiverse array of plants, birds, insects, and other animals and providing important ecosystem services such as pasture forage, water regulation and freshwater supply, erosion control, pollinator health, and carbon sequestration (*1*, *2*). Yet high rates of land cover conversion for intensive agriculture and silviculture, combined with woody encroachment and species invasion driven by altered fire and grazing regimes, threaten these systems (*3*, *4*). For instance, the Cerrado has been extensively cleared for agriculture, with more than half lost in the past 50 years, exceeding the rate of forest loss in the Brazilian Amazon (*5*). The Great Plains of North America has also lost more than half its original grasslands and continues to lose 2% each year (*6*).

As we enter the United Nations Decade on Ecosystem Restoration, much of the emphasis has been on the restoration of forests (*7*). Ironically, this emphasis presents an additional threat to grasslands: Careless or poorly planned tree-planting efforts in the name of restoration can establish forests in natural grassland and savannah ecosystems. For instance, almost 1 million km^2 of Africa's grassy biomes have been targeted for tree planting by 2030 (*8*). This practice ignores the value of protecting and restoring grasslands.

The conversion and degradation of grasslands can occur rapidly, yet restoring lost ecosystem services and diversity is often a discounted or underestimated challenge. Until recently, grassland assembly was assumed to be a relatively straightforward—albeit difficult—process (*9*): Allow herbaceous species to recolonize, at times augmenting with seed of native species; reestablish appropriate grazing and fire disturbance regimes; and control ruderal, exotic, or woody species. Because many herbaceous species reach reproductive maturity in a few years, it was also assumed that this assembly process was relatively quick, achieving desired diversity and function within several years to a decade. We now know that this view of grassland restoration does not adequately acknowledge the difficulty of restoring biodiversity and functions or the time and interventions needed to restore grasslands (*10*). Here, we review recent developments that widen the view of grassland restoration to include grassland age and development, describe how this lens identifies important but overlooked restoration interventions, and highlight several key unknowns for grassland restoration into the future.

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Refining the reference: The old-growth concept for grasslands

Grasslands occur in a range of biogeographical contexts (Fig. 1) including the tropical and subtropical savannas in Africa, Australia, Asia, and South America; the boreal, temperate, and southern prairies in North America; and the steppes in Eurasia. Grasslands have a continuous herbaceous layer of graminoids and herbaceous dicots, either without trees or, in the case of savannas, supporting a range of tree densities with a continuous grassy understory (*3*) (Fig. 2). The processes creating and maintaining grasslands vary across locations (*11*); these include edaphic or climatic conditions and disturbances (i.e., herbivore grazing or fire), all of which can limit the establishment of woody species (Fig. 3).

The reference condition is a cornerstone concept in ecological restoration; it encapsulates a set of desired characteristics and provides guidance for how to evaluate project success, even if a restored system is rarely able to completely reach reference conditions (*12*). In grasslands structured by edaphic or climatic conditions, with soils, low temperatures, or low precipitation constraining tree establishment, grassland is generally acknowledged to be the desired reference state for restoration. In cases where climate is suitable for forests but herbivore grazing or fire maintain them in an open state (*10*) (Fig. 3), more debate and uncertainty surrounds the reference designation. These disturbance-dependent grasslands are often assumed to be a result of deforestation (i.e., derived grasslands; grass-dominated vegetation resulting from human-caused deforestation) in an early successional stage on a forest trajectory (Fig. 4). However, climate suitability for tree growth does not preclude the likelihood that old-growth grasslands exist (or used to exist) in the region (*13*).

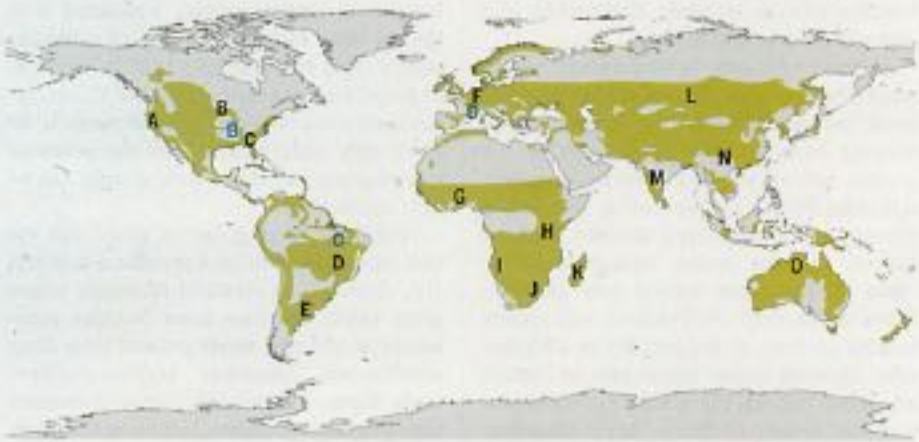

Fig. 1. The distribution of grasslands spans temperate and tropical regions of the globe. Green areas estimate the extent of grassland distribution. We note, however, that all maps of grasslands should be considered imprecise: Grasslands occur mixed within landscapes with other vegetation types and are often disturbed to an extent that masks historic distributions. Letters in black are grasslands represented in Fig. 2; letters in blue are grasslands represented in Fig. 3.

Moreover, these disturbance-dependent grasslands are often at risk from factors driving woody invasion, rearranging landscape mosaics and shifting grass-forest boundaries (*14*). If afforestation policies under the guise of restoration disregard these dynamics, irreversible damage will occur (*7*).

In forest ecosystems, old-growth forests are often used as references for restoration. These are mature forests composed of large and old trees, large snags, and a diverse tree community with structural complexity, all of which require long time periods to develop. Recent work has made it abundantly clear that the "old growth" concept is not limited to forests (*4*, *11*): Old-growth grasslands, also called ancient or pristine grasslands, assemble over centuries and contain high species diversity, long-lived perennial plants, and a substantial proportion of well-developed belowground structure from which species can resprout after natural disturbance. Old-growth grasslands are unique in their underground structures and biodiversity: They store carbon and reallocate resources aboveground after disturbances and drought. All biogeographic contexts where grasslands are present (Fig. 1) support ancient old-growth grasslands that have persisted for millennia.

As with old-growth forests, there should be little expectation that restored grasslands will ever completely recover to resemble old-growth grasslands. Even so, old-growth grasslands provide a suite of characteristics that can be the aim in restoration: long-lived perennial plants; a complex diversity of belowground structures that enable resprouting after aboveground disturbances such as fire and grazing; and substantial belowground carbon stores. Traditional management can usefully target these old-growth characteristics even in cultural landscapes where grasslands are created and maintained by human activity, and regardless of historical analogs (*15*).

With maps of grasslands contested and overlapping those of forests (*8*, *13*), it can be challenging to determine whether a grassland is one that formed after the degradation of an old-growth grassland (i.e., a secondary grassland; grass-dominated vegetation resulting from the degradation of old-growth grasslands) or a derived grassland formed after deforestation. Paleoenvironmental methods, considering

Fig. 2. The incredible diversity of old-growth grasslands. See Fig. 1 for locations. Whether these grasslands are maintained by disturbance (such as grazing or fire) or are environmentally constrained (EC, edaphic or climatic; see Fig. 3 for details) is indicated within brackets. **(A)** California coastal grasslands on Mount Tamalpais, USA (disturbance). **(B)** Curtis Tallgrass Prairie Restoration, Wisconsin, USA (disturbance). **(C)** Longleaf pine (*Pinus palustris*) savanna, North Carolina, USA (disturbance). **(D)** Grassland in the Espinhaço mountain range, Minas Gerais, Brazil (EC, edaphic + disturbance). **(E)** Subtropical grasslands in Rio Grande do Sul, southern Brazil (disturbance). **(F)** Alpine meadow in the Alps, Vanoise National Park, France (EC, climatic). **(G)** A high-rainfall grassy savanna in Mole National Park, Ghana (disturbance). **(H)** The Serengeti ecosystem in Tanzania (EC, edaphic + disturbance). **(I)** The grasslands in the Kavango Catchment, Angola (EC, edaphic and climatic + disturbance). **(J)** Grassland in the Drakensberg, South Africa (disturbance). **(K)** Grassland and tapia savannas on Ibity mountain, Madagascar (disturbance). **(L)** Petrophytic steppe in Khakassky Zapovednik State Nature Reserve, Russia (EC, climatic). **(M)** Eravikulam Shola grasslands, India (EC, climatic + disturbance). **(N)** Oak savanna in South Yunnan, Yuanjiang region, China (disturbance). **(O)** Mesic savanna in the Northern Territory, Australia (disturbance). These grasslands vary widely in composition and structure yet share key characteristics that can guide restoration: high belowground allocation, complex resprouting structures, and unique functional and taxonomic diversity.

lengthy records of pollen, phytoliths, charcoal, and *Sporormiella* fungi specific to herbivore guts, can provide evidence for past grasslands and their disturbance history (*16*). Species composition and functional diversity (e.g., of belowground structures), as well as phylogenetic studies dating the origins of endemic grassland species, can also indicate antiquity and conservation value (*17, 18*). There are also contexts where grasslands are the desired ecosystem state for cultural or social reasons despite being created or maintained by humans.

Pathways and thresholds of grassland degradation

Grasslands are increasingly degraded by land-use change and altered disturbance regimes, which can fundamentally alter their structure and functioning (Fig. 4). Such degradation increases the need for grassland protection and restoration but can also decrease the capacity of restoring old-growth grassland characteristics.

Grazing and fire are dominant aboveground disturbances that have coevolved with grassland plants, maintaining diversity and function in grasslands (*4*). Changes to these disturbance regimes can gradually alter grasslands. Although this results in the loss of biodiversity and simplification in composition, structure, and functioning, altered grassland often maintains some belowground structures (Fig. 4). Lack of grazers (or of particular suites of grazing species) can homogenize grasslands and increase fire occurrence. On the other hand, overgrazing, particularly in grasslands with no evolutionary history of grazing, can result in loss of basal cover, soil compaction, and increased erosion (*19*). Defining the degradation point in these circumstances is difficult; for instance, naturally occurring "grazing lawns" have many of the biophysical characteristics associated with degradation (low aboveground biomass, soil compaction, sometimes even increased bare ground) even though their unique biodiversity and ecological importance is now increasingly recognized. Fire regimes can also become too frequent or infrequent or occur during the wrong season. The longer these altered disturbance regimes persist, the more risk to belowground structure (e.g., bud banks) that speed recovery. Altered disturbance regimes can also facilitate exotic grass invasion and woody encroachment (*20*), which can compound impacts to belowground structure over time.

The most detrimental disturbances are those that rapidly destroy belowground structure, such as tillage agriculture, mining, and afforestation (*10, 21*). For instance, 50 years of pine plantation completely eliminated the viable bud bank in a once-open savannah (*22*). Several decades after cultivation or mining, the composition of secondary grassland plant communities remains very different from that of nearby old-growth grasslands, lacking species with poor dispersal abilities and species regenerating from belowground organs (*10, 23*). Belowground degradation can therefore cause grasslands to cross a hard-to-reverse threshold where restoration may be difficult or impossible within decades of these disturbances. Given the apparent existence of this threshold, it is vital that remaining old-growth grasslands are protected, particularly from the threats that affect belowground processes and structure, as we cannot rely on restoration to guide complete recovery after such degradation.

Interventions toward old-growth characteristics

In contrast to the early successional view of derived grasslands as a stage on their way to forests, restoring old-growth characteristics to altered or secondary grasslands requires attention to the development of a complex belowground structure akin to the aboveground complexity in an old-growth forest (*24*). A synthesis of 31 studies, including 92 time points on six continents, indicates that secondary grasslands may typically require at least a century, and more often millennia, to recover their former species richness (*25*). Even as their richness increases over decades to centuries, these grasslands still lack many characteristic old-growth grassland species and instead support more short-lived, early successional species than their old-growth counterparts. We know less about the timeline for belowground soil and structure development, but it likely corresponds with the timeline

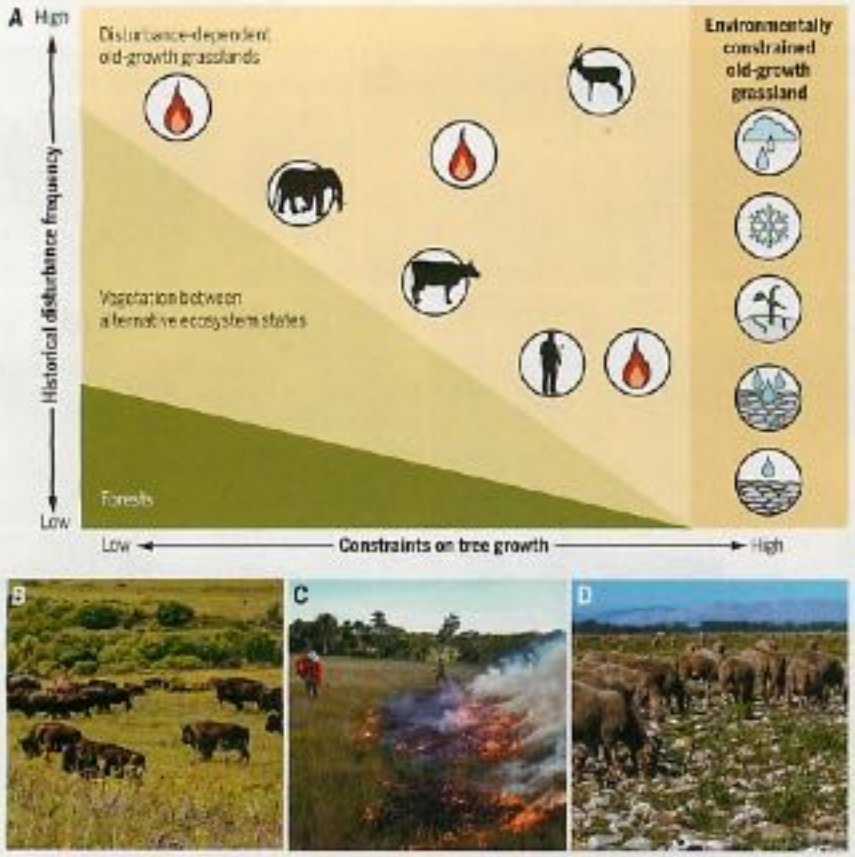

Fig. 3. Interactions among climate, soils, disturbance, and vegetation are key considerations for understanding old-growth grasslands as well as recovery trajectories in secondary grasslands. (**A**) On most soil types, the existence of disturbance-dependent grasslands (in light rose-color) is determined by interactions between soils and endogenous disturbances (fire, herbivory). Tree recruitment is limited by these disturbances. In environmentally constrained grasslands (in light brown), poor drainage (seasonally saturated or inundated soils), extremely low moisture-holding capacity (shallow, rocky soils), exceptionally low soil fertility, cold temperature, or low precipitation preclude dense tree cover, even in the absence of frequent disturbances. Disturbances and abiotic factors (circles, in no set order) that could result in exclusion of trees are placed as examples in each of the far left zones, respectively. In forests (dark green), dense tree cover constrains fire frequency and grazer abundance by limiting herbaceous plant productivity. The light green state space between disturbance-dependent old-growth grasslands and forests represents unstable vegetation (fire-excluded, tree-encroached grassland) in transition between alternative ecosystem states; old-growth grasslands and forests often co-occur in mosaics in such landscapes. (**B** to **D**) Examples of grasslands structured by different interactions. (**B**) Bison grazing in Konza prairie, where fire is needed to suppress woody encroachment. (**C**) Water saturation of the soil prevents tree establishment and fire maintains diversity in this wet grassland in Jalapão, Northern Brazil. (**D**) Sheep grazing in a Mediterranean grassland in Southern France, where pastoralism has coevolved with the system in a grassy state since the Holocene.

of these compositional dynamics (25). The increased appreciation of the temporal dimension of grassland assembly emphasizes the need of restoration to accelerate this trajectory and challenges the view that one initial period of active restoration will be sufficient to guide development. We highlight three advances driven by this increased appreciation below.

Focus interventions on disturbance-vegetation feedbacks

In cases where degradation has not had a catastrophic impact on belowground structure, it may be possible to reestablish broken feedbacks that then can guide recovery (26). Feedbacks among disturbance, vegetation, and belowground soil development have structured grasslands for millennia (4, 27). Disturbance regimes select for functional traits of the vegetation, which then provide feedback to affect the intensity, frequency, and impact of disturbances (28). For instance, fire regimes vary in flammability depending on plant properties, and herbivore pressure varies depending on the quantity and quality of forage and habitat suitability for predator avoidance (27). The response of vegetation to these disturbances varies based on plant traits such as resprout ability, clonal growth, and seed recruitment (26, 28). Feedbacks also extend to soils and soil organisms, as soils determine plant growth but are also products of the plants that grow on them (29).

As feedbacks in degraded grasslands differ in their nature and strength from those with more old-growth characteristics, reestablishing a disturbance regime in degraded grasslands may not result in expected effects of the disturbance or in the intended vegetation responses to the disturbance. Interventions simultaneously addressing disturbance and biota may be the best option to break the feedbacks that constrain recovery. For instance, there are examples of creative use of prescribed fire as a tool to re-create grazing habitat (30), and livestock can be managed in such a way as to initiate grazing habitat that supports large mammalian herbivores (31). Amendments such as biochar and mycorrhizal inoculum can shift the soil environment to be more suitable for native species, characteristics which can be maintained by slow growth and resource cycling of the vegetation (32, 33). As the system recovers, these interventions also need to shift depending how the recovering biota affects disturbance dynamics and vice versa.

Breaking the cycle of invasion: Vegetation change that constrains recovery

Restoration in areas where an altered disturbance regime has resulted in woody encroachment or exotic herbaceous species invasion demonstrate the importance of viewing restoration as a set of interventions that iteratively move the system to a new system state (10, 34).

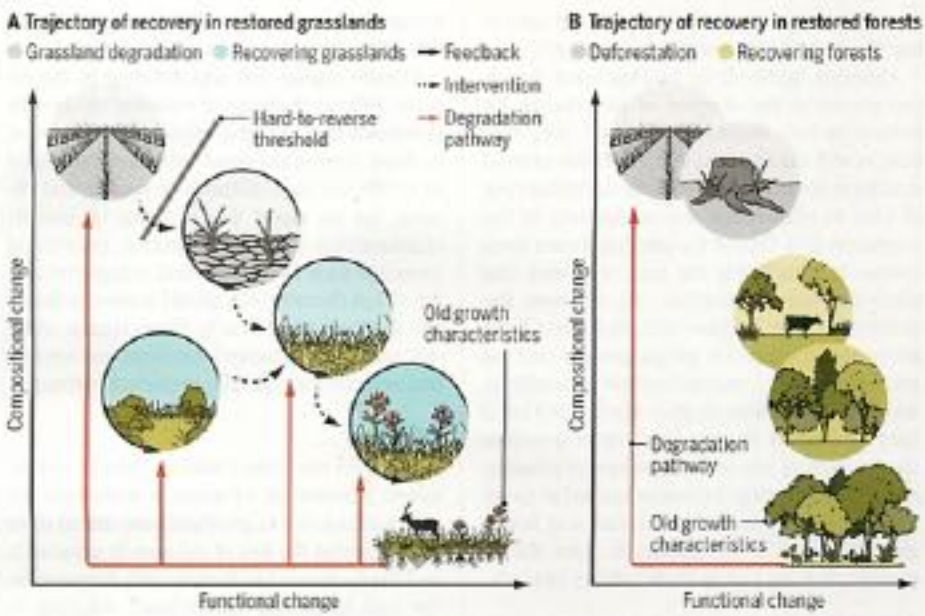

Fig. 4. Degradation pathways can result in differential loss of ecosystem function and diversity to old-growth grasslands, and the recovery of "old-growth" characteristics is dependent on the degree of functional change. Axes of functional and compositional change depict divergence from the reference characteristics (modified from (23)). (**A**) The trajectory of recovery in restored grasslands (blue spheres) toward old-growth characteristics (lower right) is dependent on the degradation pathways (red arrows, ranging right to left from altered disturbance regimes to land use conversion) as well as vegetation-soil-disturbance feedbacks (black arrows) at each stage of recovery. Substantial belowground disturbance (e.g., tilling) may cause the system to cross a hard-to-reverse threshold (gray line) and woody encroachment shifts feedbacks and can lead to alternative trajectories. Iterative restoration interventions (dashed black arrows) that consider these feedbacks can result in progression back toward old-growth characteristics. (**B**) Forests show similar dynamics, where recovery to old-growth characteristics after deforestation may be hard if not impossible. An early recovery stage after deforestation may be a grassy stage (which we term a derived grassland), yet the recovery trajectory is toward forest. Restoration interventions may accelerate recovery.

Woody species can strongly influence disturbance regimes, and land managers have resorted to cutting, herbicides, and even plowing to remove trees—with striking consequences for the remaining biodiversity. Extreme fires (firestorms) have been applied in heavily encroached areas using spinal ignitions or extreme weather days to try to reverse the woody cover and reinitiate ecologically relevant feedbacks (35). Once the grassy understory has been reduced to the point that it cannot carry a fire or support grazers, woody encroachment becomes more difficult to reverse (36), requiring the replanting of herbaceous vegetation alongside the initiation of disturbance regime for recovery feedbacks.

When invasive species are grasses, they can often maintain disturbance regimes that benefit short-lived ruderal life histories, preventing transitions to the belowground complexity and allocation that characterize old-growth grasslands (37). High accumulation of litter and standing dead biomass changes local fire behavior, and a dependence on seed recruitment often confers advantage for invasives under this disturbance regime (38). Dominance in the seed bank and difficulty reestablishing long-lived natives can make this feedback particularly difficult to address. One strategy is to enhance the ability for natives to recruit by seed via seed enhancement technology (e.g., seed coating or pelleting aimed at mitigating the conditions that limit establishment) (20), potentially addressing priority effects (i.e., the order in which plants are reintroduced) that influence species dominance in early stages of restoration (39).

Overlooked old-growth grassland species

One important restoration question is how to accelerate or facilitate species turnover toward old-growth species composition and associated belowground function. Worldwide, grasslands are often restored by sowing seeds (40). However, as many species have developed colonization and survival strategies that are based on belowground buds and clonal growth (23, 41) rather than on seeds, additional techniques may be needed to restore old-growth characteristics. Seeding fast-growing species can impede long-term restoration success by creating communities with low resilience to natural disturbance, such as fire, and excluding the longer-lived species from restoration (42). In fact, there may be many grasslands where seeded species maintain dominance long after restoration, spurring

reconsideration of whether actions are achieving the desired old-growth structure (*43*).

Although bud-bearing belowground organs can persist in the absence of disturbance for some time in a degraded grassland (*44*), how long is still unclear. Once these belowground structures are gone, we have little understanding of how to reintroduce this component of the vegetation (*24*). Topsoil transfer has shown some success in broadening the type of species that restoration can reintroduce (*45*), yet even this technique favors species with high seed bank allocation. Vegetative propagation—such as micropropagation, transplantation of seedlings, and individual tillers—is often needed (*24*) but is hard to conduct at scale, with open questions about protocols, spatial configuration of planting, and genetic sourcing. Techniques aimed at speeding the establishment of bud banks and belowground organs in a restoration have shown promise but are just in their infancy (*24*, *41*).

Global change as a challenge and opportunity

Global climate change frames the emerging perspective of long-term assembly toward old-growth characteristics in grassland restoration. Climate controls the distribution of grasslands in some regions, influences the feedbacks and threshold shifts that determines where grasslands persist, and, in virtually all regions, can have a strong influence on the interventions needed to restore feedbacks (*14*, *46*). Depending on the degree to which climate influences these processes, it may also affect the historical approach to the determination of grassland types and disturbance regimes (*12*). For instance, changes such as elevated atmospheric CO_2, which exacerbates invasion of woody species, would require novel disturbance regimes to aim for a grassy state.

Given the strong feedbacks between composition and disturbances in grassland recovery, shifts in climate may exert large influences on the assembly process. In some cases, it may be important to let climate effects shift restoration trajectories, as climate can guide species composition or characteristics to those most able to tolerate future conditions (*47*). Restoration efforts under a climate change scenario may thus target not only which species should be present at a given site, but also functional diversity, soil structure, and the belowground component. In this way, the system may be able to recover from an extreme event, as the presence of a viable bud bank and underground storage organs ensures the resilience of the system (*48*). However, letting climate effects shift restoration trajectories might also be undesirable if it endangers fundamental feedbacks in the trajectory of the system toward old-growth functional characteristics (*46*) by, for instance, selecting for species with greater aboveground allocation characteristics. As belowground complexity is a characteristic that develops over long time horizons, understanding how climate influences priority effects and feedbacks that affect recovery trajectories is critical.

Climate change will add difficulty to the already difficult challenge of restoring old-growth grasslands that resemble specific reference sites, as these ancient grassland references developed in a different time, disturbance regime, and climate. Yet we expect that restoring old-growth characteristics in these situations, prioritizing processes such as belowground complexity and functional diversity (*49*), should enable resilience and facilitate adaptation to future change while still maintaining character, functions, and services that embody these globally important systems.

Outlook

As we enter the United Nations Decade on Ecosystem Restoration, advances in restoration science and practice in grasslands are critical if we are to combat the loss of old-growth grasslands and the decline of biodiversity (*50*). However, in the rush to provide nature-based solutions to tackle climate change, tree planting in grasslands has become synonymous with restoration in many regions (*13*). At the same time, the high demand for arable land continues to spur conversion to agriculture. These are irreversible actions, ignoring the belowground soil-locked carbon storage in these old-growth grasslands as well as the hard road to restore their belowground complexity and their biodiversity once they are lost.

Although there are many challenges ahead, viewing grassland restoration as assembly toward old-growth characteristics with unique biota and belowground complexity will enable us to achieve ambitious restoration goals for Earth's grassy ecosystems. Given that grassland recovery involves strong feedbacks among vegetation, disturbance, and soils, as well as the lengthy time horizon for recovery, future progress depends on creative interventions that focus on iterative management, taking into account changes in grassland assembly over time. Techniques to reestablish species characteristic of old-growth grasslands, given their belowground structure and limited recruitment by seed, will require looking beyond or augmenting traditional seeding techniques. Metrics of belowground complexity and functional diversity will be critical guideposts to track trajectories in development and assess success. We urge conservation initiatives to safeguard against the conversion of old-growth grasslands for tree planting or tillage agriculture, to maintain our ancient biodiverse grasslands with appropriate disturbance regimes, and to emphasize the long-term restoration of grasslands in efforts to restore Earth's biodiversity.

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REVIEW

Molecular, cellular, and developmental foundations of grass diversity

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Humans have cultivated grasses for food, feed, beverages, and construction materials for millennia. Grasses also dominate the landscape in vast parts of the world, where they have adapted morphologically and physiologically, diversifying to form ~12,000 species. Sequences of hundreds of grass genomes show that they are essentially collinear; nonetheless, not all species have the same complement of genes. Here, we focus on the molecular, cellular, and developmental bases of grain yield and dispersal—traits that are essential for domestication. Distinct genes, networks, and pathways were selected in different crop species, reflecting underlying genomic diversity. With increasing genomic resources becoming available in nondomesticated species, we anticipate advances in coming years that illuminate the ecological and economic success of the grasses.

Most people reading this review will have either eaten, stepped on, or burned a grass within the past 24 hours. Humans have been cultivating grasses for at least 10,000 years and likely consumed them for millennia before that. Of the crops that feed the world, the big three—wheat, maize, and rice (Fig. 1)—provide 50% of calories consumed by humans as well as protein and micronutrients, are grown over the widest area, and have the highest economic value (*1*). In addition, so called "orphan crops," such as tef, sorghum, fonio, and various millets, most of which are native to Africa, grow well with less intense agricultural inputs and are poised to be cultivated more widely to serve a warmer, drier planet. Meat, eggs, and dairy products are the products of animals that consume forage, pasture, and prairie grasses.

Moreover, some of the most devastating agricultural weeds, such as Johnson grass in corn fields and barnyard millet in rice fields, are grasses (*2*). Grasses also underpin the beverage industry; the world wouldn't have beer without barley (Fig. 1) or rum without sugarcane, with the latter being used to produce not only sugar but also biofuel (*1*). Turf grasses beautify cultivated landscapes and provide the playing surface for golf courses, tennis courts, cricket pitches, and other sports fields. Grasses such as Miscanthus and switchgrass are being developed for lignocellulosic biomass, and perennial grasses, such as intermediate wheatgrass, may help store carbon below ground. Bamboos (and even giant reeds) are used for construction. Yet despite this diverse repertoire, only a small subset of the ~12,000 species of grasses are used by humans (*2*, *3*).

Like orchids, lilies, asparagus, and pineapples, the grasses (family Poaceae or Gramineae) have a single seedling leaf (cotyledon) and are placed in the large clade of monocotyledonous flowering plants (monocots). The grasses constitute ~20% of the ~60,000 species of monocots (*4*). Thus, all grasses are monocots, but most monocots are not grasses. Grasses that produce seed that is cultivated agronomically and eaten by humans and animals are often called cereals.

Morphological and physiological diversity

Grasses are ecologically dominant in vast areas of all the continents except for Antarctica (*2*, *5*). Even in areas with some tree cover, grasses form a broad understory. The grass family may have originated more than 80 million years ago, extending its continental reach during the late Miocene grassland expansion (8 million to 3 million years ago), although its current distribution also reflects extensive climatological change since then (*5*, *6*).

Broad physiological adaptations permit grasses to thrive in disparate environments. Most grasses are tropical, but one major group, subfamily Pooideae, has spread widely in cool and cold areas, even reaching Antarctica (*7*). Whereas some genetic components of their cold tolerance are widely shared stress responses, others represent the repurposing of loci involved in other physiological responses (*8*). Such loci include ones that regulate the induction of flowering after cold (vernalization), as in winter wheat (*9*). Among the tropical grasses, high-efficiency (C_4) photosynthesis has originated 22 to 24 times (*10*), with the physiological and anatomical bases of the pathway being subtly different each time. Our cultivated cereals are mainly annual, grown for their ability to complete their life cycle (seed to seed) in one growing season, but most species of grasses are perennial (*2*). The genetic mechanisms underlying the shift from perennial to annual are unknown but are likely diverse (*11*).

Genomic diversity

The genomes of grasses are largely collinear for all species in the family, that is, the genes are in roughly the same order (*12*). This broad similarity allows genes identified in one species to be discovered in a second species, permitting the grasses to function as "a single genetic system" (*12*). All grass genomes also share large regions of duplicated genes, which points to a polyploidization event in the common ancestor of the family [e.g., (*13*, *14*)]. Polyploidization events have continued to occur frequently throughout the evolution of the family, with some authors estimating that as many as 75 to 80% of the species are recent polyploids (*15*).

Beneath this broadly conserved genome architecture lurks extensive diversity, including variation in nucleotides (single-nucleotide polymorphisms), gene structure, and even the presence or absence of genes [e.g., (*16*, *17*)]. The nucleotide differences between two lines of

Fig. 1. Diversity of grass inflorescence morphology. (**A**) In wheat, the unbranched spike produces single spikelets (inset) with multiple florets. (**B**) In barley, the unbranched spike produces triplet spikelets (inset). In this two-row variety, only the central spikelet produces a floret. (**C**) Rice has many branches and produces single spikelets (inset) with a single floret. (**D**) Maize produces many branches with paired spikelets (inset) that each produce two florets.

PHOTOS: (A, B, D) ELIZABETH A. KELLOGG; (C) PAULA MCSTEEN

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Zea mays (maize) are greater than those between humans and chimpanzees (*18*). Genes central for plant structure in maize are missing in wheat and rice, and vice versa (*19*). In other words, not all grasses have the same complement of genes, and their morphology is altered accordingly.

The grain: A grass-specific structure

The grass fruit (grain or caryopsis) is the innovation that characterizes all grasses (*2*) (Fig. 2A). The grain develops from fusion of the single seed to the inner wall of the ovary, creating a single solid structure. The wheat "seeds" sold in the grocery store are in fact grains, with the bran made up of the ovary wall plus the seed coat. Within the grain is the young embryo (the germ, in wheat), which is a well-formed little plant with multiple leaf primordia and shoot and root apical meristems (the stem cells that give rise to all organs in the plant) (Fig. 2B). Development of the grass embryo progresses a long way before the fruit is shed from the plant, distinct from that in other closely related monocot families in which the embryo is a globular, scarcely differentiated mass of cells at fruit maturation (*2*).

The grain and the inflorescence that bears it have been the focus of both natural and human selection for grain size and number and dispersal. The starch-filled endosperm and oil-filled embryo of grains made wild grasses an obvious source of food for human ancestors. The early process of converting these wild species into ones that could be cultivated year after year is well known and is described in many biology textbooks. Traits in this familiar "domestication syndrome" may include (i) cultivated plants with grains that are larger than those of their wild ancestors and do not drop off the plant, (ii) lack of dormancy, (iii) loss of awns (wheat, sorghum, oat, rice), and (iv) increased grain number. We will focus on the developmental, cellular, and molecular bases of two of these traits: failure of seed drop (called "loss of shattering") and grain number.

Shattering: Useful in the wild, a liability in cultivation

An early step in grass domestication is selection for mutations that let the plant hold onto its seeds rather than drop them in the dirt. The annual cycle of reaping and planting automatically selected for grains that were held more firmly than those in wild undomesticated plants and, over time [possibly ~1000 years (*20*)], led to domesticated plants in which the flower stalks fail to break easily, so-called nonshattering varieties. Lack of shattering was selected independently in most known domestication events in cereals (*21*).

The close relationship and genomic similarities among the cereal crops suggested that perhaps loss of shattering in wheat, sorghum, rice, and others could have occurred by repeated modifications of the same underlying genes. However, a series of quantitative genetic locus studies (*22*) and subsequent studies that looked at the expression of genes involved in forming the break point itself (abscission zone) have found extensive differences among the crops (*23*). Genes that are mutated in domesticated wheat (*brittle rachis 1* and *2*) are unrelated to those in rice (*shattering4* and *5*), which in turn are distinct from those in sorghum and millet [e.g., *less shattering1*, which is reviewed in (*24*)]. The one exception may be a locus known as *shattering1* (*sh1*) in sorghum (*25*), which is also mutated in domesticated rice and foxtail millet (*22*, *26*). *sh1* is a transcription factor in the YABBY family (named for the distinctive DNA binding domain known as a yabby domain), but its precise molecular function remains unknown.

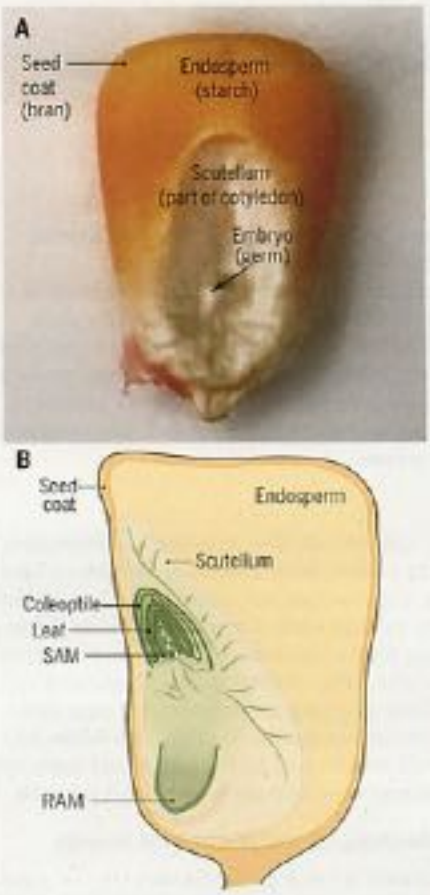

Fig. 2. Grains characterize all grasses. (**A**) Photograph of a maize grain indicating the starch-filled endosperm and the seed coat. The scutellum (part of the first leaf or cotyledon) and the embryo are visible on the adaxial side of the kernel. (**B**) Diagram of a longitudinal section through the well-developed maize embryo indicating the coleoptile and scutellum (which make up the first leaf or cotyledon), multiple leaf primordia, the shoot apical meristem (SAM), and the root apical meristem (RAM).

Spontaneous reversal of domestication, in which shattering has been reacquired independently, has created grasses that grow as weeds within the crop; such dedomestication has been documented in at least four lineages of rice, as well as in a few other grasses [reviewed in (*27*)]. The underlying domestication mutations are still present in the newly weedy rice, but the weedy populations have additional mutations that lead to shattering, each using different sets of genes (*28*).

Even among wild grasses, shattering appears to occur by different mechanisms, which may explain the distinct sets of mutations in the different domestication events. The break point forms in different positions in different lineages of grasses (*2*). Breakage occurs below the flower (often called a floret) in many species, such that the grain is shed along with floral organs and subtending bracts, but in other grasses (including the many species of millet), breakage occurs below the clusters of flowers (called spikelets) so that several flowers fall off the plant at once (Fig. 3). In still other species such as wheat and barley relatives, the inflorescence stalk breaks up. Cellular details and cell wall structures also differ among species, but the cell wall differences do not correlate with the location of the abscission zone or with evolutionary relationships (*29*).

Specific sets of genes characterize the abscission zones of rice, *Brachypodium*, and green millet, but the abscission-specific genes are almost completely nonoverlapping (*23*). Only two, a MYB transcription factor and a lysine decarboxylase, are specific to the abscission zone of all species (*23*). *sh1* is commonly upregulated in the abscission zone but is also expressed more widely, suggesting that its function in the abscission zone is part of a larger spikelet developmental network.

Despite years of investigation, the precise process of shattering in grasses remains unknown. Most of the genes that affect the process are transcription factors, often from well-known gene families that affect other aspects of plant development. One compelling hypothesis is that the process of shattering is not a single mechanism but rather a set of mechanisms that have evolved over time.

Grain yield: A diversity of mechanisms

Because a grass flower (floret) produces only one grain (at most), the number and arrangement of flowers directly affect the yield. The number of grains is thus affected by the number of flowers per spikelet, the number of spikelets per branch, and the number of branches per inflorescence, all of which vary among species (Fig. 4). Furthermore, many species have inflorescences that top vegetative

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branches, called tillers, further contributing to grain yield. Complicating the picture, grain weight and number of grains are generally inversely correlated, so simple selection for more grains leads to more smaller grains (*39*). Because of the complexity of how flowers are produced, increased grain number can be achieved by any number of different mechanisms.

Domestication and postdomestication breeding of cereals have led to an increase in the number of grains produced (increased yield) compared with that produced by the wild ancestor. For example, hybrid maize bears 16 to 22 rows of kernels around the circumference of the cob, substantially more than the wild ancestor teosinte, which bears only two rows. The number of rows is always an even number because maize produces its spikelets in pairs (Fig. 4), as do all other members of the tribe Andropogoneae, including sorghum, sugarcane, and Miscanthus (*2*). Paired spikelets have also arisen independently in the related tribes Paspaleae (e.g., seashore paspalum) and Paniceae (e.g., fonio, crab grass). But how do these grasses produce pairs in the first place? The vast majority of grasses, like rice, produce spikelets singly, although another cereal, barley, produces spikelets in triplets. Wheat produces spikelets singly, but mutations can cause the formation of paired or triple spikelets, indicating that wheat has the underlying genetic capacity to produce additional grain. Could understanding these mechanisms be used to increase grain number in cereals or in grasses or orphan crops to be domesticated in the future?

Multiple mechanisms have led to the variation in inflorescence morphology observed in grasses during evolution and domestication (Figs. 1 and 4). Determination of the molecular, cellular, and developmental bases of these phenotypes indicates that similar phenotypes in one species can be caused by different pathways or that orthologous genes can cause different phenotypes in different species. In the following sections, we discuss three mechanisms involved in the diversity of morphology in cereal grasses.

To branch or not to branch

Multiple genetic pathways control branching in grass inflorescences (*19*). Mutations in these pathways can lead to increased branching and increased grain number, so it is not surprising that these pathways have been selected in the evolution, domestication, and breeding of cultivated cereals. However, a variety of different pathways have been used in different cereals (*19*). We discuss just two of these pathways below.

In maize, expression of *ramosa2* (*ra2*), which encodes a transcription factor in the lateral organ boundary (LOB) domain family, acts upstream of *ramosa1* (*ra1*), which encodes a zinc-finger transcription factor and controls the abrupt switch from producing branches to producing spikelet pairs [reviewed in (*19*)]. The expression pattern of *ra1* in *Miscanthus* and sorghum, both of which also produce spikelets in pairs and are in the same clade as maize, also correlates with the branch-to-spikelet pair transition, albeit later, correlating with an increased number of branches (*31*). However, *ra1* is not found in rice, barley, wheat, or other members of their subfamilies that do not produce spikelets in pairs (*19*). Conversely, mutations in the ortholog of *ra2* in barley also increase branching and are associated with phenotypic differences between two-row and six-row barley (Fig. 4) (*9*). Therefore, the genetic network regulated by *ra2* differs between major groups of grasses even though the protein itself is conserved.

Recent progress has been made in understanding the genetic basis for the unbranched spike morphology in wheat and barley by the *compositum1* (*com1*) and *com2* loci [reviewed in (*32*)]. Whereas *com1* orthologs do not regulate branching in maize and rice (*33*), the function of *com2* appears to be somewhat conserved. *com2* mutations increase branching and spikelet number in barley and cause the production of paired or, rarely, triple spikelets in "miracle wheat," which is so called because of its increased grain yield (*32*, *34*). Mutations in the orthologous gene also increase branching in maize and rice, but the additional spikelets do not produce florets and are sterile, and hence do not increase yield (*35*). However, mutations in the promoter of the rice ortholog, which cause reduced rather than complete loss of function, increase spikelet number and yield and thus may be valuable for breeding (*36*). Evolutionary analysis of *com2* orthologs identified signatures of selection at particular amino acids in rice, wheat, and barley (*37*), although their functional importance remains to be determined.

Growth suppression

Another mechanism for altering branching would be to suppress the outgrowth of structures that have already been formed. For example, increased expression of several transcription factors, including *teosinte branched1* (*tb1*) and *grassy tillers* (*gt1*), has led to the suppression of tiller buds during domestication in maize, and these transcription factors are proposed to have conserved roles in regulating tiller number in wheat and rice [reviewed in (*35*)]. *tb1* and *gt1* have been used repeatedly in cereals for different purposes other than tiller number. For example, *gt1* was co-opted in sex determination in maize (*38*), and orthologs of *tb1* or *gt1* are used in the suppression of spikelets in two-row barley (*35*). Furthermore, in wheat, loss of function of *tb1* and interactions with flowering-time genes cause production of paired spikelets (*39*, *40*). Thus, changes in expression (or the targets) of transcription factors that cause growth suppression could be very powerful in causing phenotypic changes.

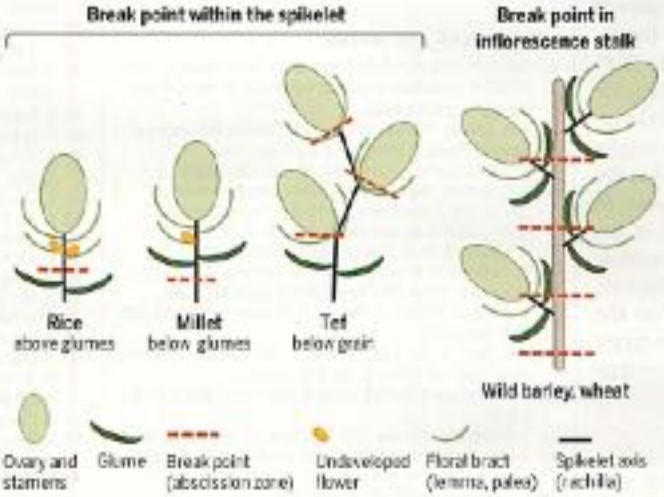

Fig. 3. Diagrams of spikelets (rice, millet, tef) and inflorescence (wheat, barley) showing different positions of break points (abscission zones). Modified leaves known as glumes (dark green arcs) mark the base of the spikelet and provide critical positional landmarks for comparisons. The break-point position above the glumes, as in rice, is common and ancestral in the grass family (*23*). The position below the glumes, as in millet, predominates in the subfamily Panicoideae. Few grasses break right below the grain, as in tef. The breakable inflorescence stalk is common not only in wild relatives of wheat and barley but also in maize.

Meristem size matters

One mechanism to increase grain number in maize and rice is to increase the size of the apical inflorescence meristem (*41*). A conserved signaling pathway involving proteins in the *CLAVATA* (*CLV*) and *WUSCHEL* (*WUS*) families regulates the plant growth hormone, cytokinin, which affects the size and number of stem cells in the meristem. Mutations that affect signaling in the *CLV-WUS* pathway can increase meristem size, row number, and yield in maize and green millet (*42*, *43*) but increase floral organ number in rice (*44*). Despite these differences, a screen for alleles with signatures of selection in both maize and rice identified the same locus, which increases yield in both species through an

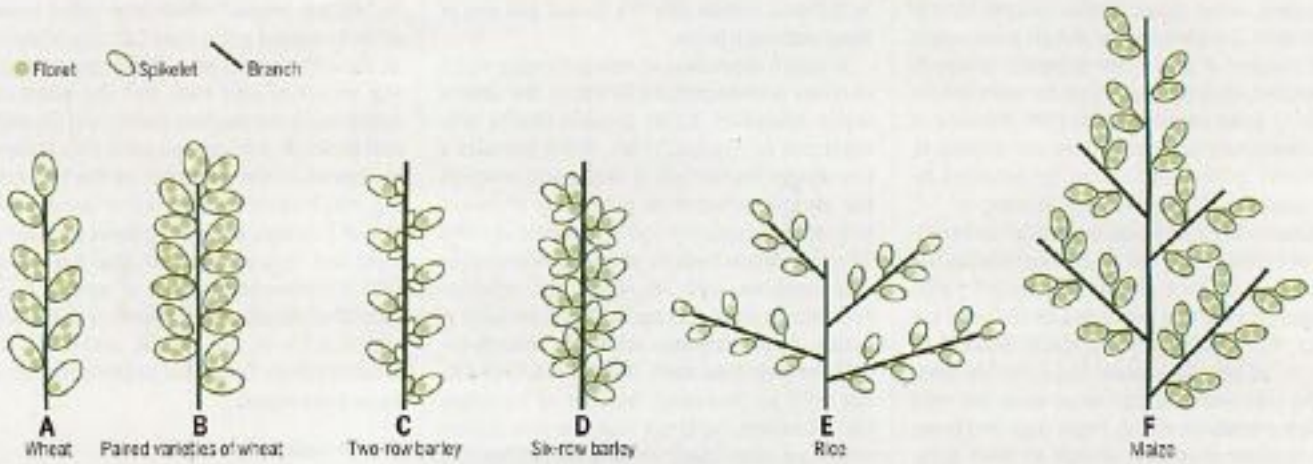

Fig. 4. Mutations that influence spikelet number in cereals provide insights into evolutionary mechanisms. **(A)** In wheat, the unbranched spike produces spikelets with a variable number of florets (average of three). **(B)** Mutations in wheat can cause the production of paired spikelets, similar to maize. **(C)** In two-row barley, only the central spikelet produces a floret. **(D)** In six-row barley, all three spikelets produce a floret and set seed. (E) Rice has many branches and produces single spikelets with a single floret. Mutations in rice that increase yield increase branch number and reiterate branches on the branches. **(F)** Maize produces many branches with paired spikelets, each of which produces two florets. Mutations in maize can cause the production of single spikelets, similar to rice and wheat, or can convert spikelet pairs to branches.

increase in cytokinin and cell division (*46*). Mutations that increase cytokinin levels or signaling also increase the number of branches and yield in rice (*46*), and cytokinin has been implicated in branching in barley (*47*). However, the *CLV-WUS* pathway has not yet been functionally characterized in wheat and barley, although it is an obvious target for crop improvement.

Meristems that produce multiple spikelets are larger than single-spikelet meristems. Such meristems include the spikelet-pair meristem in maize, the mutant paired-spikelet or triple-spikelet meristems in wheat, and the triple-spikelet meristem in barley; the latter extends over almost half the circumference of the inflorescence (*48*). In maize, defects in the *CLV-WUS* pathway or the plant growth hormone auxin can cause the production of single instead of paired spikelets (*49*, *50*). It seems likely that similar pathways are involved in the production of the triple-spikelet meristem in barley and in the independent origins of the paired spikelets in grasses. However, multiple ligands, receptors, and transcription factors, and even parallel pathways, converge on the *CLV-WUS* pathway in different meristem types, so the pathways that specify each meristem type in each crop will need to be identified.

Outlook

Grasses are an economic and ecological success story. We speculate that the large endosperm and well-developed embryo that are characteristic of grasses (Fig. 2) gave grains a head start in germination and seedling survival, in both ecological and agricultural settings. Grass genomic diversity provides the raw material for their morphological diversity. Genomic sequencing has provided insights into the genetic basis of domestication and post-domestication breeding of cereal genomes [reviewed in (*51*)], the development of wood in bamboo (*52*), and the multiple independent origins of cold tolerance, photoperiod insensitivity, and C_4 photosynthesis (*7*, *10*). The availability of functional genomics tools (*53*) will provide opportunities to move from genes to networks and to determine which parts of the pathway are conserved and which are species specific. These networks will enable modern-day agriculturists to determine how to domesticate orphan crops such as tef and fonio and to begin to understand how grasses have covered the world.

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REVIEW

Grassland soil carbon sequestration: Current understanding, challenges, and solutions

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Grasslands store approximately one third of the global terrestrial carbon stocks and can act as an important soil carbon sink. Recent studies show that plant diversity increases soil organic carbon (SOC) storage by elevating carbon inputs to belowground biomass and promoting microbial necromass contribution to SOC storage. Climate change affects grassland SOC storage by modifying the processes of plant carbon inputs and microbial catabolism and anabolism. Improved grazing management and biodiversity restoration can provide low-cost and/or high-carbon-gain options for natural climate solutions in global grasslands. The achievable SOC sequestration potential in global grasslands is 2.3 to 7.3 billion tons of carbon dioxide equivalents per year (CO_2e $year^{-1}$) for biodiversity restoration, 148 to 699 megatons of CO_2e $year^{-1}$ for improved grazing management, and 147 megatons of CO_2e $year^{-1}$ for sown legumes in pasturelands.

Grassland ecosystems cover an area of 52.5 million km^2, accounting for ~40.5% of the Earth's land surface excluding Greenland and Antarctica (*1*). Grasslands provide habitats for biodiversity, contribute to food production, and deliver many cultural services (*1*). They also store ~34% of the terrestrial carbon stock (*1*), with ~90% of their carbon stored belowground as root biomass and soil organic carbon (SOC), thus playing a vital role in soil carbon sequestration (*1, 2*). However, grasslands are highly vulnerable to human disturbance (e.g., overgrazing and land-use conversion to agriculture) and climate change (*1–3*). Worldwide, grasslands have undergone severe decreases in biodiversity and ecosystem functions, leading to reductions in SOC storage (*2, 4, 5*). Here, we review the recent advances in our understanding of SOC dynamics, current challenges, and possible solutions to enhance SOC sequestration in global grassland ecosystems. We address three questions: (i) How do key biotic and abiotic factors regulate grassland SOC formation, turnover, and stability?; (ii) how do climate warming, alterations in precipitation, and fire affect SOC storage?; and (iii) how does grazing management affect SOC and how can improved practices result in SOC sequestration?

Mechanisms and drivers of SOC sequestration

In grassland ecosystems, ~60% of net primary productivity is allocated belowground (*6*). Belowground carbon inputs are more often incorporated into SOC than aboveground inputs because of their chemical composition (e.g., aliphatic compounds and root exudates) and their presence in the soil (Fig. 1) (*6*). On average, root carbon inputs have a SOC stabilization efficiency that is five times greater than aboveground carbon inputs (*6*).

Organic carbon in soil is distributed between particulate organic matter (POM) and mineral-associated organic matter (MAOM) fractions, with only a minor portion (1 to 2%) present as dissolved organic matter. POM and MAOM differ in their formation, physical and chemical properties, and mean residence times in soil (*7, 8*). POM is formed from the fragmentation of plant and microbial residues, and therefore is composed of lightweight fragments made of large polymers (Fig. 1). MAOM, by contrast, is formed from single small molecules that are leached from plant residues or exuded from plant roots, which associate to minerals directly (ex vivo) or after microbial assimilation (in vivo) as microbial necromass (*7, 8*). MAOM on average has a lower carbon:nitrogen ratio because of its proportionally higher microbial origin, its longer mean residence time in soils (from decades to centuries) compared with POM (<10 years to decades), and its strong chemical bonding to minerals and physical protection in fine aggregates (*7, 8*). Therefore, MAOM contributes to longer-term carbon sequestration in soil. Root exudates such as dissolved sugars, amino acids, and organic acids are the key pathway to MAOM formation largely through microbial in vivo transformations (Fig. 1) (*8, 9*). Plant aboveground, root, and rhizodeposition inputs exhibit different

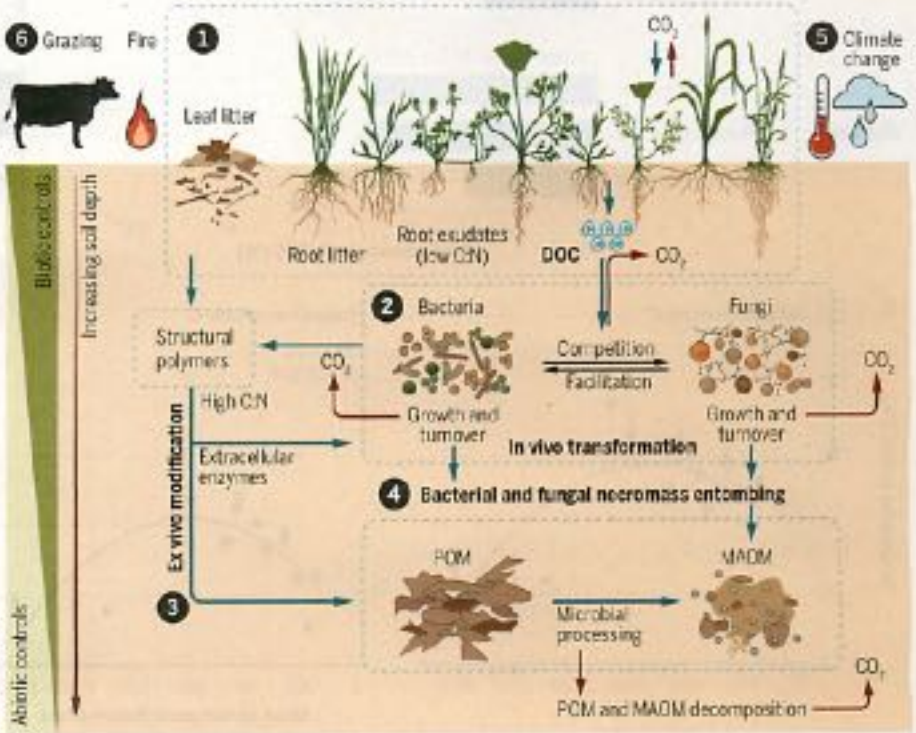

Fig. 1. Conceptual framework for key factors and mechanisms controlling SOC sequestration in grassland ecosystems. (**1**) Plant diversity controls on productivity, biomass allocation, and SOC inputs through litter and root exudates (*6, 13, 14*). (**2**) Key pathway of MAOM formation through microbial in vivo transformation (*8, 17*). (**3**) Pathway of POM formation through microbial ex vivo modification (*8, 17*). (**4**) Microbial necromass carbon (C) accumulation in MAOM (*9, 11*). (**5**) Climate change impacts on SOC sequestration through plant and microbial pathways (*26, 28*). (**6**) Grazing and fire impacts on SOC storage through pathways of plant and animal waste C inputs, compaction, and bioturbation (e.g., trampling and wallowing), microbial in vivo transformation, and microbial ex vivo modification (*33, 36, 38, 46*). C:N, carbon:nitrogen ratio; DOC, dissolved organic carbon.

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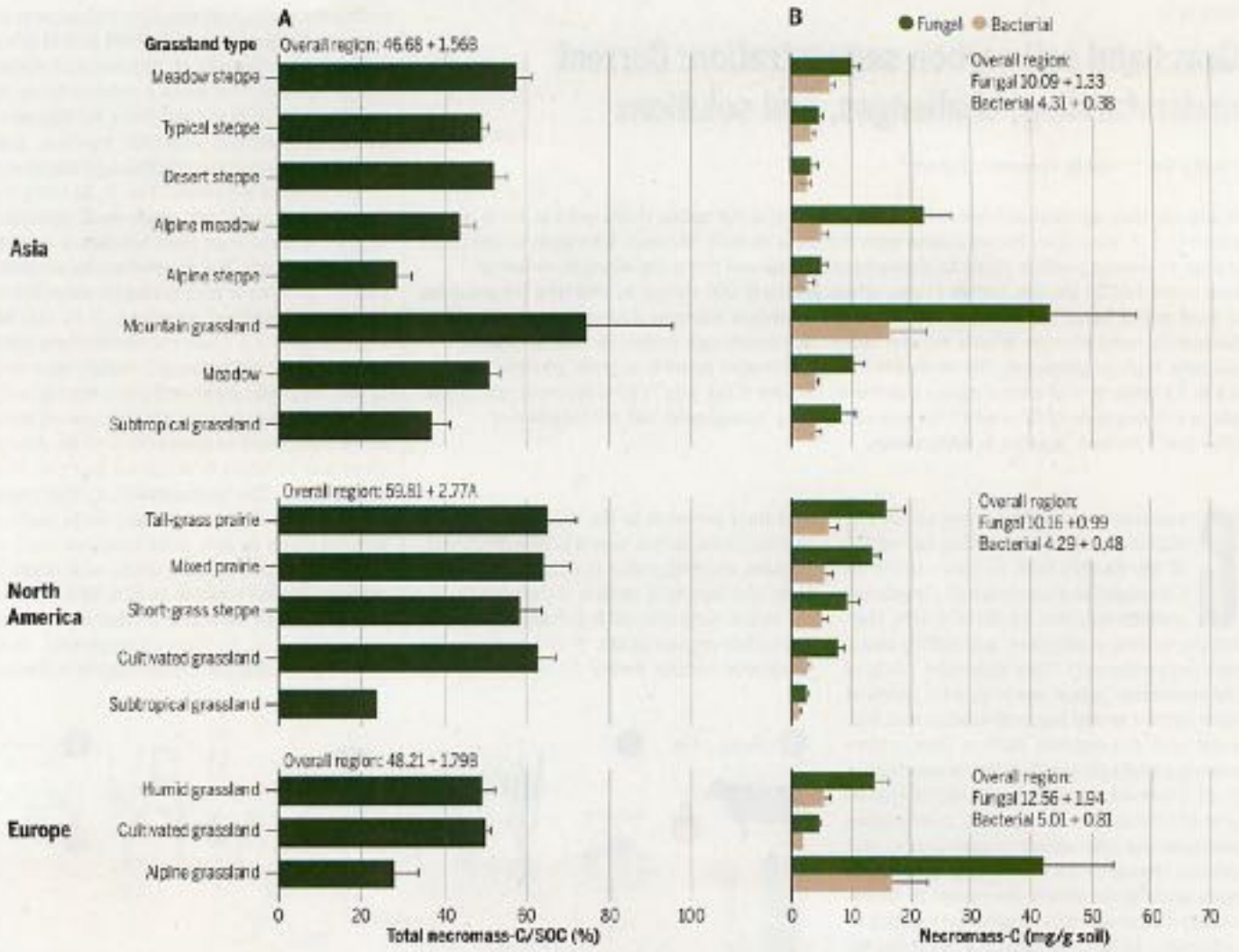

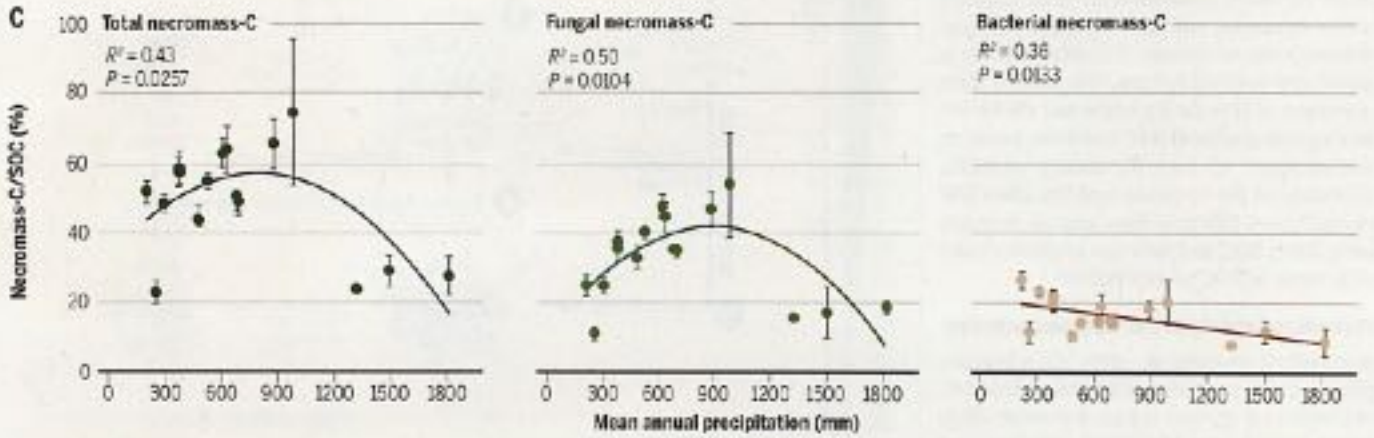

Fig. 2. Patterns and climatic drivers of microbial necromass contribution to SOC. (**A**) Microbial necromass C contribution to SOC. (**B**) Fungal and bacterial necromass C concentrations. (**C**) Relationships of total microbial, fungal, and bacterial necromass C contributions to SOC with mean annual precipitation in the topsoil of grassland systems in Asia, North America, and Europe. Data are from Liang et al. (*17*) and Wang et al. (*18*). Only the topsoil microbial necromass C and corresponding SOC data (n = 223) were used for global and regional synthesis. All data were classified into different grassland types within regions on the basis of sampling site information from the original study. Asia (eight grassland types, n = 122), North America (five grassland types, n = 47), and Europe (three grassland types, n = 54). Within each grassland type, mean and standard error for each variable were calculated across different sampling sites. General linear model analyses were performed to explore whether the total microbial necromass C contribution to SOC and fungal and bacterial necromass C concentrations differ among different regions. Values with different letters are significantly different at the $P < 0.05$ level. Simple linear regression was used to analyze the relationship of mean annual precipitation with fungal, bacterial, and total microbial necromass C contributions to SOC across all grassland types on the global scale.

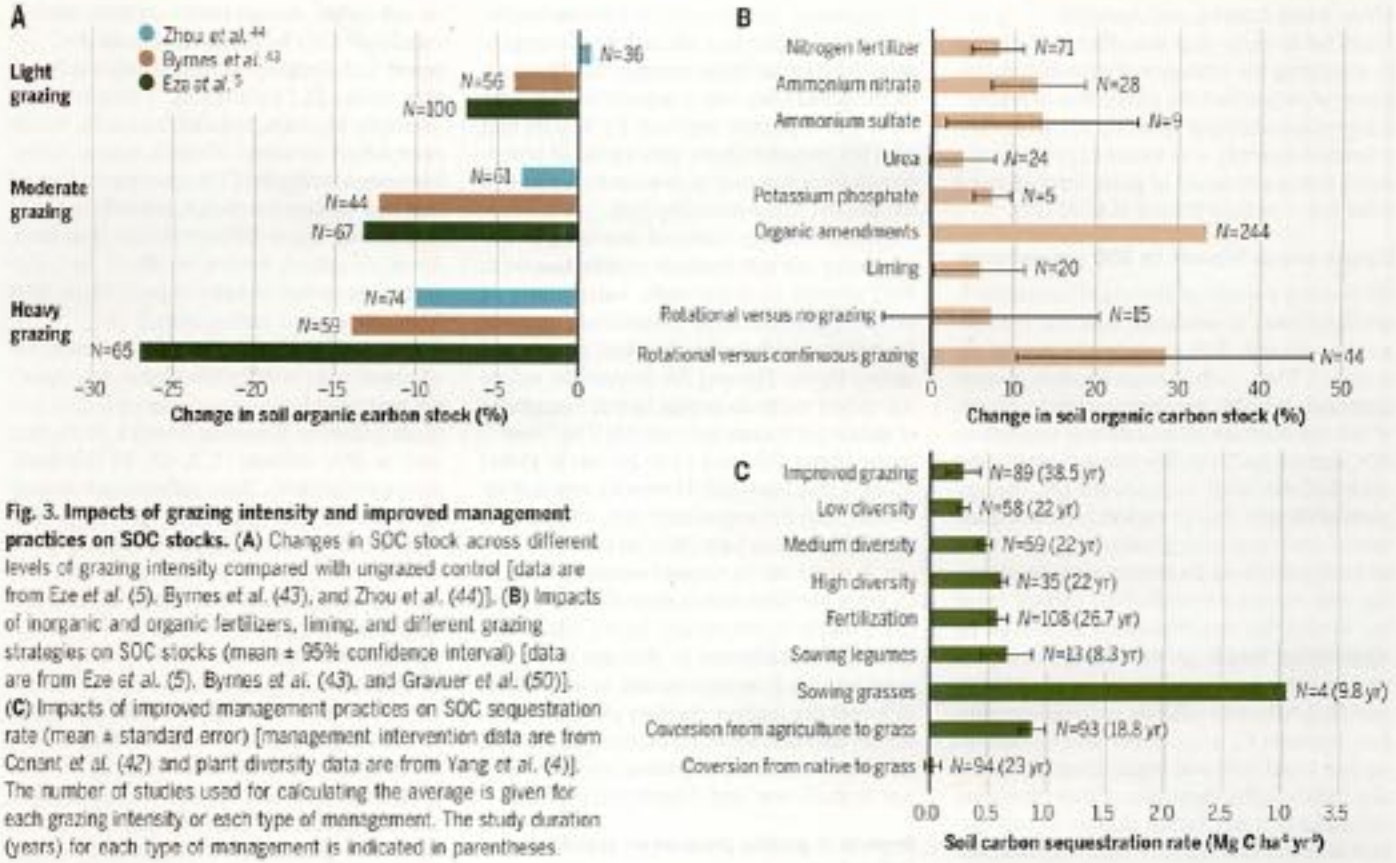

Fig. 3. Impacts of grazing intensity and improved management practices on SOC stocks. (**A**) Changes in SOC stock across different levels of grazing intensity compared with ungrazed control [data are from Eze *et al.* (*5*), Byrnes *et al.* (*43*), and Zhou *et al.* (*44*)]. (**B**) Impacts of inorganic and organic fertilizers, liming, and different grazing strategies on SOC stocks (mean ± 95% confidence interval) [data are from Eze *et al.* (*5*), Byrnes *et al.* (*43*), and Gravuer *et al.* (*50*)]. (**C**) Impacts of improved management practices on SOC sequestration rate (mean ± standard error) [management intervention data are from Conant *et al.* (*42*) and plant diversity data are from Yang *et al.* (*4*)]. The number of studies used for calculating the average is given for each grazing intensity or each type of management. The study duration (years) for each type of management is indicated in parentheses.

POM and MAOM formation efficiencies. Approximately 46% of root exudates, 9% of root tissues, and 7% of aboveground carbon residues are transformed into MAOM, whereas 19% of root litter is transformed into POM across crops, grasses, and trees growing in the field and under controlled laboratory conditions (*10*). Thus, plants with greater carbon allocation to roots contribute more to soil carbon sequestration, particularly the formation of MAOM. However, it remains largely unclear how the contributions of roots (root exudates and root litter) and aboveground inputs to SOC accumulation (POM and MAOM) change with grassland types, soil properties, and climate conditions.

In grassland topsoils, 50 to 75% of SOC is found in MAOM. The average carbon:nitrogen varies from ~10 to ~12 for MAOM and from ~16 to ~18 for POM (*3*); therefore, the accrual of SOC in MAOM requires substantially greater nitrogen than the equivalent accrual in POM (*11*). The formation of POM is primarily driven by climate (temperature and precipitation). By contrast, the accumulation of MAOM is controlled by soil properties such as silt and clay content, cation-exchange capacity, and microbial nitrogen availability, which means that it may saturate (*8*, *12*). In European grasslands, topsoil carbon storage in MAOM saturates at ~50 g C kg^{-1} soil, beyond which the additional increase in SOC storage completely depends upon accrual in POM (*11*). Currently, most European grasslands (80%) are below saturation, indicating a large capacity for SOC sequestration in their topsoils (*11*).

Plant diversity is a key driver of SOC formation and storage (*4*). High plant diversity enhances SOC storage by elevating belowground carbon (i.e., root biomass and root exudates) inputs (*13*, *14*) and promoting microbial growth, turnover, and entombment of necromass (*15*). Maintaining consistently high levels of biodiversity and root carbon inputs is essential for enhancing SOC storage and persistence in grasslands (Fig. 1).

Fungi and bacteria have a strong influence on SOC accumulation, stabilization, and turnover in grasslands (Fig. 1), as in other terrestrial ecosystems (*6*, *16*). Microbial necromass plays an important role in SOC accumulation and stabilization (*9*, *17*). In the topsoil of global grasslands, the contribution of the microbial necromass to total SOC ranges from 23 to 74%, with an average of 50% (Fig. 2A), which is greater than its contribution in agricultural and temperate forest soils (*17*, *18*). The contribution of necromass to SOC changes with soil depth (*18*) and is typically dominated by fungal necromass, with the fungi-to-bacteria necromass carbon ratio ranging from 1.2 to 4.1 across global grasslands (Fig. 2B). This is likely because fungi produce more chemically recalcitrant structural compounds and have greater carbon use efficiency than bacteria (*6*, *16*). Moreover, mycorrhizal fungi, which live in association with plant roots and derive their carbon directly from the plant, can regulate the carbon sequestration capacity in soil. Carbon sequestration capacity per unit nitrogen in soil is 1.7 times greater in ecosystems dominated by ectomycorrhizal fungi–associated plants (e.g., savannas, shrublands, and forests) than in systems dominated by arbuscular mycorrhizal fungi–associated plants (e.g., nonwoody grasslands) because ectomycorrhizal fungi can produce enzymes to degrade organic nitrogen from plant litter (*19*). However, MAOM is relatively higher in ecosystems that are dominated by arbuscular mycorrhizal fungi (*13*), such as grasslands.

Climate regulates the metabolic activity of microbes and thus controls large-scale patterns of microbial necromass and SOC storage (*18*, *20*). At the global scale, cold, moist soils promote the accumulation of microbial necromass carbon. The maximum microbial necromass carbon occurs at a mean annual precipitation of 900 to 1000 mm with a mean annual temperature <0°C (Fig. 2C), indicating high priorities for preserving the current stocks in these systems. Few studies have measured the contribution of microbial necromass carbon to SOC in grassland soils, and data are lacking from

Africa, South America, and Australia (*17, 18, 20*). Microbial diversity may also affect SOC storage by regulating the efficiency of microbial assimilation of carbon and the production of organo-mineral associations in soils (*21*). Recently, microbial diversity was found to promote the stabilization efficiency of grass litter–derived POM but to reduce that of MAOM (*22*).

Climate change impacts on SOC sequestration

Sixty-seven percent of the world's grasslands are distributed in semiarid, arid, and cold climates, with only 23% occurring in humid climates (*1*). Thus, carbon sequestration in most grasslands is highly sensitive to climate change, which can exert strong and diverse impacts on SOC accrual and stability through plant- and microbial-mediated mechanisms (*8*). The impacts of climate change on soil carbon sequestration often vary with grassland type, climate, and soil conditions. In semiarid steppe, warming may enhance root-derived carbon input but inhibit the decomposition of MAOM by suppressing fungal growth and soil respiration, resulting in an increase in the MAOM pool (*23*). In humid tallgrass prairies, warming may increase C_4 grass cover and C_4-derived carbon input into soil organic matter, but it also increases the decay rate of these fractions, resulting in a negligible change in soil carbon sequestration (*24*). In alpine grasslands, warming-induced permafrost degradation reduces active-layer SOC storage by decreasing the stability of microbial networks and accelerating SOC (and specifically POM) decay (*25*). A recent meta-analysis demonstrated that long-term (≥5 years) warming increases the ratios of ligninase to cellulase activity and enhances microbial utilization of recalcitrant carbon, leading to a 14% reduction in the topsoil recalcitrant carbon pool (*26*). However, warming may increase the accumulation of root-derived carbon in the subsoil MAOM pool (*27*). POM is much more climate sensitive than MAOM (*3, 11*). The percent change in POM (−12.2%) with climate warming is on average three times greater than that in MAOM (−3.8%) in global grasslands (*28*). This suggests that grasslands with a high proportion of MAOM will contribute less to soil carbon-climate feedbacks.

Future projected precipitation anomalies and long-lasting droughts (*29, 30*) will likely influence soil carbon sequestration of grassland ecosystems by altering plant community composition, productivity and carbon allocation, and microbial processes. In the semiarid steppe, increased precipitation promotes soil aggregation by stimulating fungal growth and increasing soil-exchangeable magnesium (*23*). Precipitation anomalies (increases and decreases) can substantially alter root-to-shoot ratios and vertical root distribution in grasslands (*31*), thus regulating soil microbial growth and SOC storage. Reduced precipitation strongly suppresses oxidase activity, whereas higher precipitation stimulates the activity of nitrogen-acquisition extracellular enzymes (*32*). However, on the global scale, only a negative tendency for POM and a positive tendency for MAOM and total SOC concentrations with increased precipitation were observed in grasslands because of the limited data availability (*28*).

Climate change–induced increases in fire frequency can substantially modify long-term SOC storage in grasslands, particularly in savanna grasslands, by intensifying nutrient limitation, which suppresses plant growth and carbon inputs. Elevated fire frequencies reduce soil carbon stocks on average by 0.21 megagrams of carbon per hectare per year ($Mg\ C\ ha^{-1}\ year^{-1}$) in the upper soil layer (0 to 20 cm) in global savanna grasslands (*33*). However, a recent study showed that fire suppression (i.e., >60 years of fire exclusion) has little effect on total SOC storage (0 to 60 cm) in tropical savannas because C_4 grass–derived carbon dominates the SOC, particularly in deeper soil layers, where soil carbon is less affected by changes in fire frequencies (*34*). It remains unclear to what extent different fire regimes regulate plant diversity, above- and belowground biomass allocation, microbial-mediated processes, and SOC storage in shallower and deeper soil profiles.

Impacts of grazing pressure on grassland soil carbon

Natural grasslands are grazed by wild ungulates, which can enhance SOC storage because they graze for short periods of time and move across the landscape. This results in maintained plant cover, diversity and productivity, promotion of species with deep roots, microbial processing with the formation of both POM and MAOM, and soil-mixing processing by soil fauna (*35, 36*). Increases in ecosystem metabolism and plant labile carbon inputs (e.g., root exudates) are expected to increase both the ex vivo and in vivo formation of MAOM (*9, 10, 37*). Conversely, increased root inputs and allocation to depth result in higher POM in the subsoil (*6, 38*). In addition, large herbivores create habitats for many bioturbators (e.g., fossorial mammals and soil macrofauna) to loosen up soil and expose larger aggregates of soil organic matter to organo-mineral interaction by vertical soil mixing (*36*). However, both the direction and magnitude of effects of large wild herbivores on soil carbon storage can vary strongly with soil nutrient availability, across grasslands, and under different levels of herbivore density. For example, a recent short-term study suggested that nutrient availability strongly moderates the impact of herbivore grazing on soil carbon sequestration in herbaceous grasslands (*39*). Large herbivore grazing increases the upper-layer soil carbon storage under elevated nutrient (fertilization) conditions but has no effect on soil carbon storage under ambient nutrient conditions (*39*). Sandhage-Hofmann *et al.* (*40*) report that elevated elephant densities enhance SOC stocks [4.7 tons (t) ha^{-1}] despite losses of woody biomass in moist, semiarid, wood-encroached savannas of south-central Africa. However, a synthesis of 174 experiments showed that large herbivore exclusion generally increases SOC storage across different biomes (grassland, forest, shrubland, tundra, woodland, etc.), suggesting an overall negative impact of large wild herbivores on soil carbon storage (*41*).

Livestock grazing is the most common use of grasslands worldwide. Some grasslands are managed to improve forage quantity and quality, thereby increasing livestock production and/or SOC storage (*1, 2, 42*). In livestock-dominated systems, these pathways are strongly controlled by grazing intensity and rest periods. Continuous livestock grazing reduces plant cover, diversity, and productivity, and thus root inputs and plant- and microbial-mediated SOC formation, while stimulating losses through microbial turnover and erosion caused by increased compaction and reduced cover (*1, 2, 43*). Eze *et al.* (*5*) demonstrated that livestock grazing on average decreases SOC stock by 15% across five continents, with the greatest reduction (−22.4%) in SOC stock in the tropics and the least reduction (−4.5%) in temperate grasslands. At the global scale, light grazing (e.g., seasonal and rotational grazing) shows the least negative effects or even promotes soil carbon storage, whereas moderate and heavy (continuous) grazing consistently reduces soil carbon stocks (Fig. 3A) (*5, 43, 44*). For a given category of grazing intensity, the discrepancy in magnitude of changes in SOC stocks between these studies may partly arise from the lack of quantitative measures of grazing intensity and the difference in data sources (*5, 43, 44*). Nevertheless, the magnitude and directions of grazing impacts on soil carbon sequestration are context dependent and vary with climate and soil conditions, vegetation properties, livestock type, herbivore diversity, grazing strategies (e.g., continuous versus rotational grazing), and grazing intensity and duration (*5, 38, 43–45*). The negative impact of increasing grazing intensity on SOC is lessened with greater water availability (*5, 44*) but is more severe with warmer temperatures and longer grazing duration in temperate grasslands (*44*). With moderate and heavy grazing, SOC increases in grasslands dominated by C_4 species and decreases in grasslands dominated by C_3 species (*45*). Sheep grazing generally has a greater negative impact on SOC than cattle grazing, and the reduction in SOC with grazing is substantially greater in topsoil than that in subsoil (*44*). A mixed cattle and megaherbivore system was shown to be a sustainable management strat-

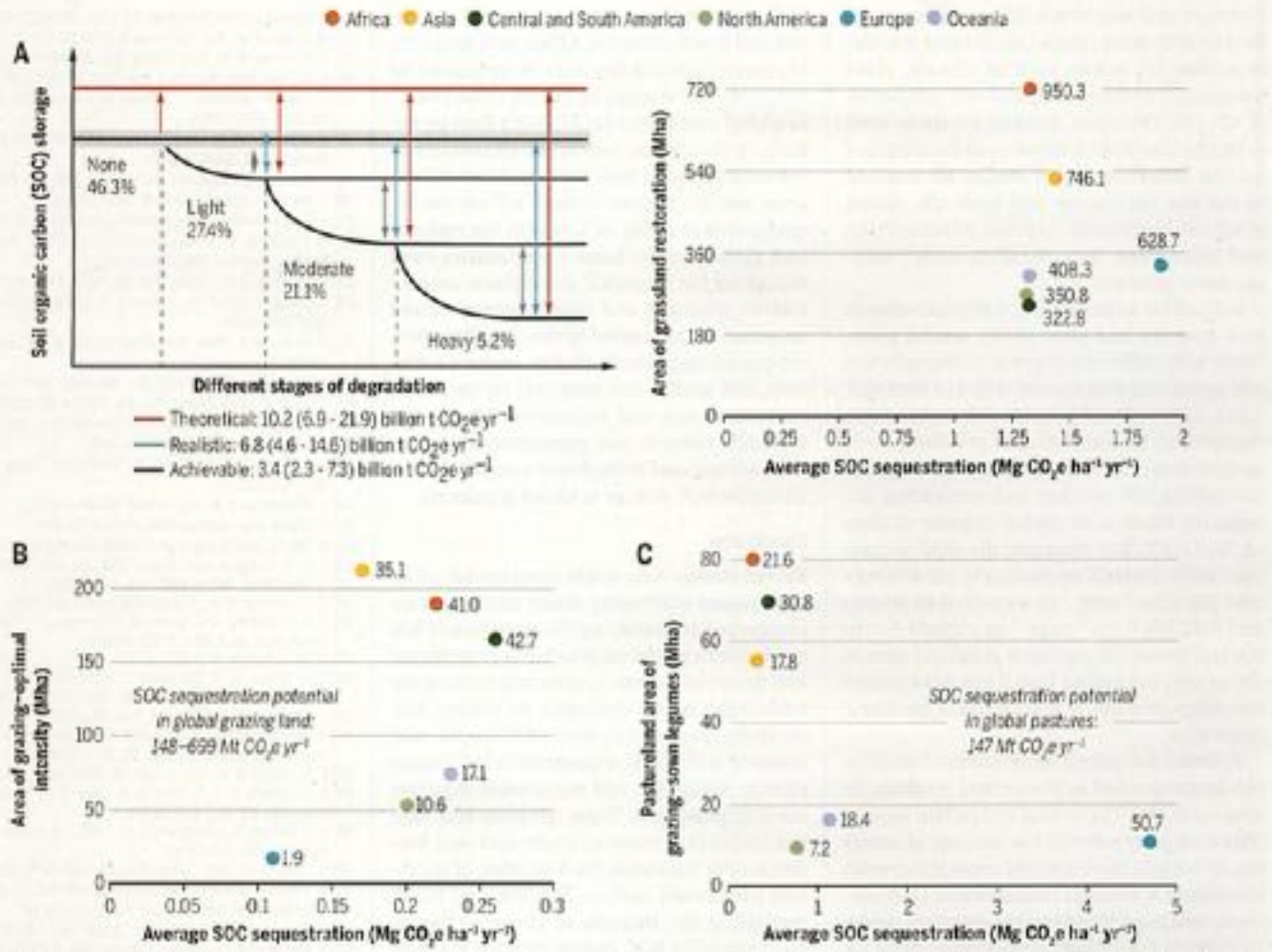

Fig. 4. Soil C sequestration potential of grassland ecosystems at the regional and global scales. SOC sequestration potentials are arranged according to average SOC sequestration rates and area of each management strategy for denoting their relative contributions. (**A**) Capacity and attainability of SOC sequestration by restoring degraded grasslands [data are from White *et al.* (*1*), De Deyn *et al.* (*52*), Deng *et al.* (*54*), and Fargione *et al.* (*53*)]. At the global scale, SOC sequestration potential is presented as theoretical, realistic, and achievable, respectively, based on Chapman (*55*). Means and the 95% confidence intervals (parentheses) are given (left panel). At the regional scale, only achievable SOC sequestration potential are estimated because of the large uncertainties for estimating the theoretical and realistic SOC sequestration potentials in each region. For each region, the mean achievable SOC sequestration potential (Mt CO_2e $year^{-1}$) is given (right panel). (**B** and **C**) Global SOC sequestration potential (Mt CO_2e $year^{-1}$) through optimizing grazing intensity in grazing lands and sowing legumes in pasturelands [data are from Griscom *et al.* (*51*)]. Only maximum climate mitigation potential with safeguards for reference year 2030 is shown.

herbivore diversity (*46*). Moreover, rotational grazing consistently shows higher SOC stocks compared with continuous grazing (or free grazing) (*43*), with gains observed specifically in the mineral associated fraction (*47*).

Managing for soil carbon storage in grasslands

Empirical and experimental studies have indicated that improving grassland management can increase SOC storage, thus mitigating carbon losses caused by climate change, long-term overgrazing, and grassland degradation (*2*, *42*, *48*). Management improvements may result in soil carbon accrual through several interrelated mechanisms (Fig. 1). Conversion from croplands to grasslands removes disturbance from tillage and increases root carbon inputs to soil (*6*, *42*). Restoring the biodiversity of degraded grasslands may increase plant production and promote microbial turnover and necromass entombment (*4*, *13*, *15*). Grazing improvement can increase higher-quality root carbon (lower carbon:nitrogen ratios) inputs (*38*) and/or nitrogen retention, thus promoting the formation and persistence of MAOM in soils (*47*). Sowing legumes increases soil carbon and nitrogen inputs by elevating root biomass, root exudates, and fine root turnover (*42*, *49*). Applications of inorganic and organic fertilizers may stimulate primary productivity and high-quality plant carbon inputs to soil, resulting in more efficient microbial carbon use (*5*, *28*, *50*).

A number of management interventions have been adopted to restore grasslands (Fig. 3, B and C). On the global scale, the improved grassland managements increase SOC stocks on average by 0.47 Mg C ha^{-1} $year^{-1}$ (*42*). This suggests that the world's grazing lands, which occupy an area of ~34 million km^2, have substantial potential to increase SOC storage (Fig. 4). Among all improved management practices, conversion from cultivation to grasslands, increasing plant diversity, sowing legumes and grasses, and fertilization are associated with the highest soil carbon sequestration rates (Fig. 3C) (*4*, *42*). Under moderate grazing intensity, the average SOC stock increase (28.4%) is substantially greater with rotational grazing than that with continuous grazing (Fig. 3B). In the southeast United States, grassland soils managed with adaptive multi-paddock grazing that used a high-density–short-duration rotational grazing had more carbon (72.49 Mg C ha^{-1}) and nitrogen (9.26 Mg N ha^{-1}) stocks compared with continuous grazing (64.02 Mg C ha^{-1} and 8.52 Mg N ha^{-1}) in the 0 to 100 cm soil layer (*47*). However, the

direction and magnitude of management effects on soil carbon stocks are context specific, depending on factors such as climate, plant community composition, and soil properties (*5*, *43*, *50*). Therefore, grazing practices need to be implemented with an understanding of context. Moreover, further studies are required to examine the synergy and trade-offs among grassland biodiversity, primary productivity, and soil carbon sequestration under management interventions.

Soil carbon sequestration potential varies in both quantity and attainability among grasslands with different degrees of degradation and across different regions (Fig. 4). Given that ~50% of the global grassland area has been degraded (*1*, *2*), restoration of grassland cover and biodiversity is an effective strategy for promoting SOC storage and mitigating the negative impacts of global climate change (*4*, *15*, *51*–*53*). For example, the SOC accrual rate with grazing exclusion is on average 0.68 Mg C ha^{-1} $year^{-1}$ in topsoil (0 to 30 cm) and 0.62 Mg C ha^{-1} $year^{-1}$ in subsoil (30 to 100 cm) across 145 degraded grassland sites in China (*54*), indicating that it has not reached saturation over the 27-year period of grassland restoration.

Potential soil carbon sequestration capacities can be categorized as theoretical, realistic, or achievable (*55*). Theoretical soil carbon sequestration capacity refers to the estimate of restoring all soils to their natural capacity or even enhancing it through management interventions, realistic soil carbon sequestration capacity refers to the optimistic value accounting for social and economic constraints, and achievable capacity is the value of a pragmatic scenario based on the current trends (*55*). At the global scale, the mean theoretical, realistic, and achievable capacities of SOC sequestration with grassland restoration are estimated to be 10.2, 6.8, and 3.4 billion t CO_2 equivalents per year (CO_2e $year^{-1}$), respectively (Fig. 4A). At the regional scale, Africa, Asia, and Europe are projected to have the largest achievable capacity of soil carbon sequestration with grassland restoration, with Oceania and North and South America exhibiting the least SOC sequestration potential (Fig. 4A). These global patterns of SOC sequestration potential are primarily caused by the differences in average soil carbon sequestration rate and the area of degraded grassland in different regions. The greater SOC sequestration potential with grassland restoration in Africa and Asia is due to the larger areas of degraded grasslands in these continents, whereas European grasslands have a higher average soil carbon sequestration rate (Fig. 4A). In addition, optimizing grazing intensity (e.g., rotational grazing) is projected to increase soil carbon sequestration potential by 148 to 699 megatons (Mt) CO_2e $year^{-1}$ in global grazing lands (Fig. 4B), with the greatest SOC sequestration potential occurring in Central and South America, Africa, and Asia (*51*). Moreover, sowing legumes is projected to enhance SOC storage by 147 Mt CO_2e $year^{-1}$ in global pasturelands (*51*), with Europe exhibiting the greatest soil carbon sequestration potential caused by both the largest pastureland areas and the highest average soil carbon sequestration rate (Fig. 4C). At both the regional and global scales, large uncertainties exist regarding the projected soil carbon sequestration potential and rate of accrual. These uncertainties are caused by the complex interactions among climate change, human activities, and spatial and temporal variations in ecosystem and soil responses (*51*, *53*, *56*). Scientific research and management innovations are required in the future to maximize the attainable SOC storage in global grasslands.

Conclusion

Recent studies have made considerable progress toward addressing major challenges associated with identifying the capacity and key mechanisms of various grasslands to sequester and preserve carbon in soils and developing knowledge-based strategies to restore biodiversity, preserve current SOC stocks, and promote additional sequestration for climate change mitigation and sustainable management in grasslands. These advances highlight the important roles of plant and soil biodiversity in regulating the formation of microbial necromass carbon, MAOM, and POM, mediating the impacts of climate change, and promoting SOC storage through management improvements and restoration in global grasslands. They also demonstrate that the impacts of climate change, grazing, fire, grassland restoration, and mitigation solutions on soil carbon sequestration are moderated by multiple context-dependent factors. Future research is needed to address the uncertainty and context dependency of the proposed mitigation solutions and their carbon sequestration potentials and to consider their possible synergies and trade-offs for biodiversity conservation, climate mitigation, and food production.

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REVIEW

The planetary role of seagrass conservation

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Seagrasses are remarkable plants that have adapted to live in a marine environment. They form extensive meadows found globally that bioengineer their local environments and preserve the coastal seascape. With the increasing realization of the planetary emergency that we face, there is growing interest in using seagrasses as a nature-based solution for greenhouse gas mitigation. However, seagrass sensitivity to stressors is acute, and in many places, the risk of loss and degradation persists. If the ecological state of seagrasses remains compromised, then their ability to contribute to nature-based solutions for the climate emergency and biodiversity crisis remains in doubt. We examine the major ecological role that seagrasses play and how rethinking their conservation is critical to understanding their part in fighting our planetary emergency.

Though commonly called grasses, seagrasses are a unique group of submarine flowering plants that belong to the monocotyledon order Alismatales, comprising four families and 72 species. Although they occupy a broad range of niches and are derived from multiple evolutionary lineages (*1*), they all share a connection to marine environments and consistently exhibit features that separate them from all other angiosperms. Seagrasses have adapted to live underwater, where light is limited, where salt and nutrients can be problematic, and where soils can become highly toxic (*2*).

Seagrass diverged from other alismatid monocots ~105 million years ago, and work by Olsen *et al.* (*3*) supports hypotheses that modern seagrass biodiversity can be linked to the materialization of multiple habitats after the Cretaceous-Paleogene extinction event. In the past decade, the seagrass science community has grown (*4*) and revealed the uniqueness of these plants and the importance of the ecosystems that they create (Fig. 1). Seagrasses bioengineer their environment by slowing water flow, trapping particles, and improving the environment within a positive feedback mechanism to facilitate the creation of habitat (*5*). Just like terrestrial plants, their reproduction can be supported by a diverse range of pollinators, such as eumacean crustaceans (*6*), and seed dispersers, such as fish (*7*). Their reproduction is not always sexual—genetic evidence has revealed that vegetative growth has led to the establishment of one single clonal organism spanning >180 km of coastline (*8*). Nitrogen-fixing bacteria living within their roots allow them to colonize nitrogen-poor environments (*9*), and associations with clams (and their bacterial symbionts) have aided their ability to inhabit otherwise toxic sulphide-rich marine soils (*10*). There is also growing evidence of the presence of fungi associated with the roots and rhizomes of seagrasses, indicating that they may play essential roles similar to those of fungal associates of terrestrial plants (*11*).

Aside from their ecological uniqueness, seagrasses are of increasing interest in a socio-political context owing to their potential to help combat the current climate and biodiversity crises that our planet faces. Seagrass meadows also support human well-being by virtue of their role in supporting fisheries, coastal protection, and water filtration (*12*), and action for their conservation supports the fulfillment of the 17 Sustainable Development Goals (SDGs) proposed by the United Nations in 2015. Seagrasses also support many species of conservation concern, such as the dugong, green turtle, and manatee (*13*), and provide interacting ecological functioning throughout the coastal seascape (*14*).

"Compared with...terrestrial grasses and even seaweeds, the body of research within seagrass is magnitudes smaller..."

To harness the power of seagrass as a nature-based solution to the climate emergency and the biodiversity crisis, seagrass systems must be in a resilient functioning state. Seagrass meadows remain globally threatened by diverse factors, including poor water quality, damage from boats and related activities, aquaculture, and coastal development (*15*). Even in areas where seagrass is protected, extreme climate drivers place seagrass at risk. For example, after a marine heatwave in 2010 to 2011, up to 699 km^2 of seagrass meadow in the Shark Bay Marine Park in Western Australia were lost or damaged, potentially releasing up to 9 Tg of CO_2 back into the atmosphere during the 3 years before regrowth occurred (*16*). Seagrass sensitivity to stressors is acute and may even extend to the effects of anthropogenic noise (*17*). In many places, the risk of seagrass loss and degradation persists (*15*), and its functional state is commonly compromised; unless this can be reversed, the potential for seagrass to contribute to the complex jigsaw of nature-based solutions remains in doubt. In this Review, we reflect on the status of seagrass ecosystems, the major ecological role that they play in the coastal environment, and how rethinking their conservation is critical to allowing them to play a role in reversing climate change.

Global decline, net-zero loss, and achieving net gain

The role that seagrass can have in reversing or mitigating climate change requires consideration of their global biogeochemical contribution. For this, we first need a better understanding of whether seagrasses are currently in a state of net loss, stasis, or net gain globally, along with the parameters that drive their greenhouse gas balance (Fig. 1). The global coverage of seagrass is currently estimated to be 160,387 to 266,562 km^2 (*18*). This range reveals that we have very limited understanding of the actual extent of seagrass populations. We also do not fully understand the extent of the ecological goods and services that seagrass provides, including to biodiversity and coastal protection. Studies have sought to place estimates on seagrass loss at 1 to 7% per year (*19, 20*) and create global carbon storage estimates of up to 19.9 Pg (*21, 22*). However, if we do not know how much we have or have had, we cannot hypothesize very well on what has been lost or its associated ecological relevance.

The reported trajectory of seagrass coverage (*20, 23*) indicates that it may be recovering in some areas; however, this analysis is limited because it only focuses on locations where seagrass is mapped, monitored, and likely affected by some level of conservation action, and it may represent only a fraction of potential and unknown seagrass area. Analyses are also limited by favoring data published in academic journals and excluding available data in the gray literature. A coordinated global effort is required to create meaningful global estimates of seagrass coverage and change that are validated with open data sharing between governments, academics, nongovernmental organizations, and commercial enterprises (*18*). In the UK, a technology-focused consortium is forming to fill the gaps in our knowledge to help drive understanding of the ecological role of seagrasses (*24*), and recommendations for a methodological pathway to improve the global seagrass map have recently been proposed (*18, 25*).

Seagrass as a nature-based solution

The growing interest in nature-based solutions is necessitating deeper understanding of the ecological role that seagrass meadows play in the context of climate change. Seagrass meadows store and sequester carbon within their sediments over long periods of time at highly efficient rates; however, this role varies over space and time along with factors such as hydrodynamics and species composition influencing

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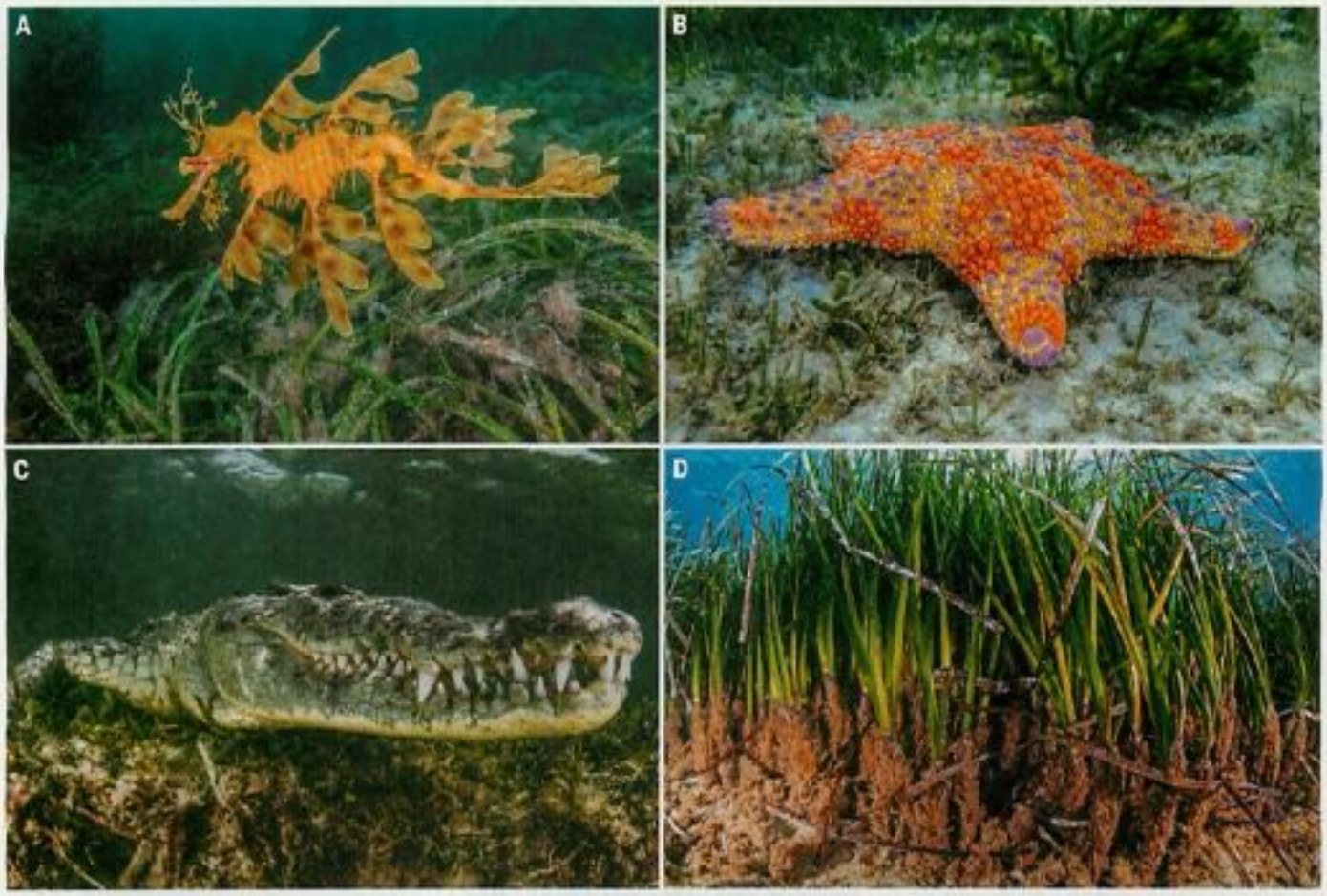

Fig. 1. Seagrass and biodiversity. (**A** to **C**) Seagrass meadows contain biodiverse and enigmatic species assemblages, including the leafy sea dragon (A), sea stars (B), and predators such as crocodiles (C). (**D**) The biodiversity and productivity of seagrass meadows also lead to them storing and sequestering substantial amounts of carbon in their sediments. Seagrass meadows provide habitat in support of biodiversity [(A) to (C)] in coastal waters globally. When healthy and in a balanced state, seagrass can be a great source of many other ecosystem services, such as water filtration, carbon storage (D), and coastal defense. Anthropogenic factors, such as coastal development and poor water quality leading to eutrophication of coastal waters, are some of the principal drivers of seagrass decline.

IMAGE CREDIT: DIMITRIS POURSANIDIS, BENJAMIN JONES, AMANDA COTTON, JAYNE JENKINS, VIA THE OCEAN AGENCY AND RICHARD UNSWORTH

this function. Additionally, despite their more obvious role in the storage of organic carbon, seagrasses, like most vegetation, also produce the greenhouse gases methane (CH_4) and nitrous oxide (N_2O). The balance of these emissions relative to the storage of carbon is of principal importance in the context of their role in influencing climate. Limited understanding exists with respect to whole-seagrass ecosystem greenhouse gas balance (Fig. 2). Available data indicate that seagrasses have broadly lower greenhouse gas emissions of CH_4 and N_2O than comparative coastal and wetland habitats and that low salinity and anthropogenic stressors are major processes driving production (*26*). Similarly, comparison with habitats such as peatlands and mangroves shows seagrasses to be relatively low in CH_4 and N_2O (*27*). However, after seagrass meadow degradation and loss, there exists a potential for high emissions of CH_4 from underlying sediment (*28*). Eutrophication of seagrasses may also drive elevated N_2O emissions. Although scientific understanding in this field is increasing rapidly, our lack of understanding of the drivers of greenhouse gas emissions by plants, least of all by seagrasses (*21*, *27*), contributes to the uncertainties that surround the marketing of blue carbon (*29*).

Although its capacity for carbon storage is of high current interest, human appreciation for the ecological role of seagrasses has changed (*30*). An historic view of seagrasses from the Northern Hemisphere shows their importance in food production and as a raw material. For example, house roofs in Denmark were thatched with dried seagrass (some of which can still be seen), and seagrass detritus was used to fertilize crops (*30*). In the late 1800s, when Indian cotton crops failed, documented discussion by British cotton traders turned to the use of seagrass as an alternative fiber. In North America, companies existed that traded in seagrass as an insulation material, which was subsequently used in the US Capitol building. The Seri people of the Gulf of California collected seagrass seed to create a gruel (*31*). In the 21st century, in many parts of the world, seagrass meadows are a source of food from the gastropod and bivalve mollusks and sea cucumbers that they shelter (*32*). The importance of seagrass habitats as a source of seafood production is both direct and indirect at local and basin-wide scales, with 20% of the world's biggest finfish fisheries having some known association with seagrass (*33*).

Seagrasses also play a fundamental role in the filtration of coastal waters, trapping particles (including microplastics), cycling nutrients, and absorbing nitrogen from the water column (*34*). This filtration role also extends to the removal of bacteria and viruses (*35*–*37*), thus contributing to improved sanitation (*38*) and human health and well-being (*22*). In the Baltic Sea, seagrass meadows have been recorded to contain 63% fewer potentially harmful *Vibrio vulnificus* and *Vibrio cholerae* bacteria compared with nonvegetated areas (*37*).

Additionally, the role of seagrass in protecting coastlines from erosion is substantial and may grow in value with sea level rise and as storms become more frequent (*11*). The locally relevant role of seagrasses in ameliorating low pH from ocean acidification may also increase the value

of these marine plants over time (*39*, *40*). Although the ecological roles that seagrasses play around the world shift with space and time, the constant across most of the world's seagrasses is that they remain at ecological risk and many are in a perilous state.

What is a pristine, healthy, or balanced seagrass ecosystem?

The extent and function of seagrass meadows are largely manifestations of current and previous human activity. We have limited capacity to appreciate the value of seagrass owing to the scale of alteration and unknown baselines for these systems (*41*, *42*). Evidence from ecological feedbacks indicates that seagrass meadows are driven by top-down and bottom-up processes (*43*, *44*). Although there is increasing appreciation for how seagrass might be influenced by excess nutrients and various pollutants in our coastal waters, we have limited appreciation for what extreme overexploitation of near-shore environments has done to seagrass meadows. We simply do not know what a so-called pristine meadow looks like, which creates a limited appreciation for the true ecological role of these poorly understood systems. A contributory factor to the poor understanding is the low relative research output on seagrasses [see (*45*)]. However, it is apparent that there has been a profound loss of predators from these systems, whereas numbers of consumers, secondary consumers, and grazers have also been affected (*46*)—in some cases, loss of predators has led to overgrazing (*47*, *48*).

In localities where associated biodiversity is high, functional redundancy may serve to protect seagrass meadows (*49*), but with decreasing diversity away from the tropics, such redundancy may be reduced. There is also a growing appreciation for seagrass as a foraging resource for seabirds; this is because they support abundant prey items, such as crustaceans, polychaetes, and fish (*50*). Given the parallel global decline of avifauna with global seagrass, we can only speculate as to what the functional role of loss of seagrass might have once been (*51*).

In recent decades, biodiversity and ecosystem functioning has evolved into a dynamic area of contemporary ecology with a rich body of research. Compared with research in terrestrial grasses and even seaweeds, the body of research within seagrass is magnitudes smaller and is fueled by a smaller community of scientists. We must understand the biodiversity associated with seagrass meadows to be able to develop management programs that secure their ecological functioning under further climate change. Global and regional studies are beginning to transform our knowledge (*44*, *52*, *53*), but tools such as sequencing environmental DNA need to be more widely applied. Reconstructions using molecular and historical evidence are needed to understand the true ecological potential of these ecosystems, to locate sites for rehabilitation and replanting, and to provide ambition to marine conservation.

Seagrass meadows and the SDGs

Improved protection and restoration of seagrasses require better recognition of the role that they play in supporting people and our planet; the state of seagrasses is symptomatic of the deteriorating state of the overall natural environment (*54*). The United Nations SDGs are a means of framing a response to this emergency by connecting the daily actions and needs of people, institutions, and communities to the sustainability of the planet and transforming these connections into measurable actions for positive environmental, social, and ecological outcomes. Articulating the ecological role of seagrass in terms of ecosystem services and natural capital promotes a scientific vision of what behavioral change might mean for seagrass, whereas the SDGs provide a framework for how change can be perceived by all people. We suggest that, of the 17 SDGs, action for seagrass conservation and restoration can make a meaningful contribution to 16 of these global goals (Fig. 3). We propose that the ecological role and value of seagrass can also be described in these terms to improve and catalyze action to halt and reverse seagrass loss.

Seagrass meadows form globally relevant habitats that support fisheries and associated economic goods; it is in this ecological role that seagrasses play a prominent role in SDGs. Thus, well-managed, sustainably exploited seagrass meadows that are in a state of ecological balance (*32*, *33*, *55*) will contribute to reducing poverty (*56*), reducing hunger (*32*), responsible consumption and production (*57*), and decent work and economic growth (*58*) (Fig. 3). Sustainably managed seagrass fisheries in many parts of the world also contribute toward gender equality and reducing other inequalities. For example, the role of women is underappreciated in intertidal and near-shore small-scale subsistence fisheries (*59*), of which seagrass meadows are a major component. Inclusion of women in these fisheries is well known to improve community adaptative capacity and resilience (*60*), leading to improved environmental outcomes (*59*).

A major ecological role of healthy seagrass systems is to make the wider environment more conducive for animal life (including humans) in both marine and coastal environments. Seagrass habitats enhance oxygenation in marine sediments; trap particles in the water column, improving water clarity; cycle and store nutrients; and reduce the bacterial and viral load in coastal waters. This creates a three-dimensional environment that harbors biodiversity, baffles wave energy to protect coastlines from erosion, and further enhances the whole coastal seascape for biodiversity (e.g., through the protection of adjacent habitats, such as coral reefs and mangroves).

The bioengineering effect that seagrasses have on their own environment also contributes to

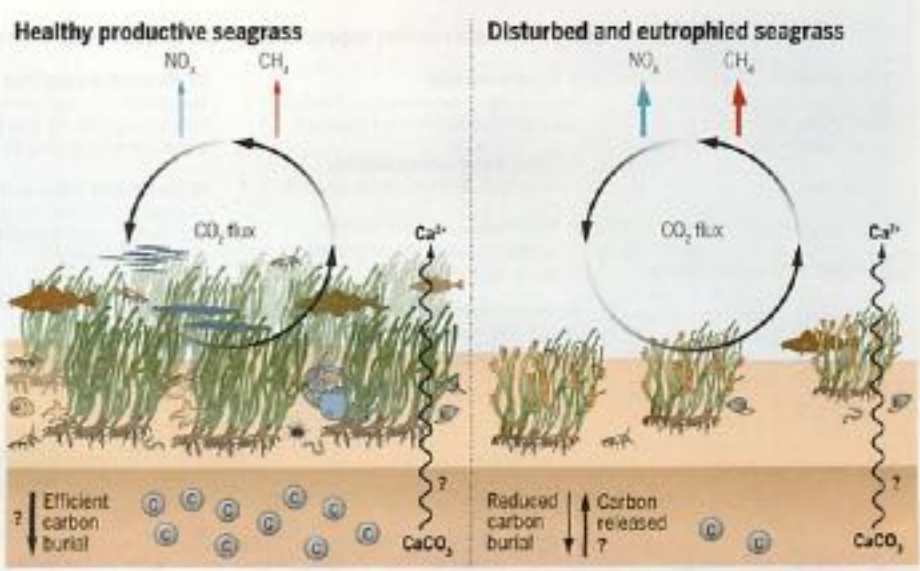

Fig. 2. The greenhouse gas balance of seagrass. There are many competing processes that result in seagrass meadows becoming net sources or sinks of greenhouse gases in our oceans. The left panel illustrates a healthy meadow where net photosynthetic productivity and dense seagrass is leading to rapid trapping and storage of carbon into the sediments. Although we lack a full understanding about greenhouse gas balance in seagrasses and the implications of disturbance, the right panel illustrates how meadow degradation and eutrophication can lead to the remobilization and loss of stored carbon and the potential increased production of CH_4 and N_2O. We also know little about the consequences of calcification by associated fauna within productive seagrass meadows on the overall carbon balance.

SDGs related to clean water and sanitation, good health, and well-being (12). Additionally, there is increasing appreciation of the value of seagrass for storing and sequestering carbon and the potential value of conserving seagrass meadows for climate mitigation (67). We understand that seagrasses enhance life below water, but less-well appreciated is that seagrass systems also enhance life on land by providing resources to shoreline habitats and populations, especially birds (62). The biodiversity present within seagrass meadows, the ecological processes and functions within them, and their relatively easy access also provide educational opportunities for human communities (63).

Without strong partnerships between communities, governments, nongovernmental organizations, and the private sector, seagrass conservation and restoration will not work effectively. The final SDG is about this bigger ambition. In the UK, the conservation charity Project Seagrass is bringing together private sector companies (e.g., CGI and Ocean Infinity), universities (e.g., Swansea and Heriot-Watt), institutes (e.g., NOC), and the government (e.g., the Hydrographic Agency) to map the UK's seagrass meadows. Similar initiatives are happening globally in places such as the Seychelles, Australia, and Indonesia.

Many aspects of the SDGs focus on the human planet, where the role that seagrasses play is changing with respect to a changing climate. With an expanding need to harness the energy of our oceans through wind, waves, and tide, there is increasing potential for new infrastructure to come into conflict with seagrass ecosystems. At the same time, this could lead to improved outcomes for seagrass, especially at a time when there is increasing global recognition of the need to develop strong criteria and indicators for pathways toward nature-positive outcomes. One such mechanism is that adopted in Australia, where marine biodiversity offsetting is accepted as a component of development consent to achieve an ambition of no net loss of biodiversity. A failed push toward tidal lagoon power in the UK provided impetus for seagrass restoration, and there is a growing focus on using seagrass restoration as a means of enhancing fish habitat as an offset to the effect of offshore wind power installations on marine biodiversity. The decline and reduced use of major historic urban coastal infrastructure, such as disused docklands, fisheries ponds, and mill ponds, are typical of many areas of the temperate Northern Hemisphere. The large empty docklands of South Wales provide an exemplary opportunity for seagrass restoration, and in southern Spain, entrepreneurial restaurateurs are bringing disused salt ponds back to life with seagrass for the growth of food products (64).

Charting a pathway to the net recovery of seagrass

Solutions for seagrass conservation and restoration have never been more urgent given the ongoing risks they face (15) and their potential role in helping mitigate climate change and the biodiversity crisis (21). Given the real and immediate threat of runaway climate change that places the future of humanity at risk, we need to rapidly move toward a conservation and restoration model that focuses on achieving global net recovery of seagrass (Fig. 4). Although financial mechanisms are emerging that begin to place monetary value onto seagrass carbon stores and carbon sequestration potential that will enable greater conservation and restorative action, concern exists about the potential for perverse and unintended consequences of such mechanisms (including international ownership of local resources), particularly around their role in supporting livelihoods (56).

It has been argued that avoiding a climate catastrophe requires at least three global transformations that are unprecedented in both magnitude and speed (54). One of these is a transformation of our relationship with nature to one that conserves, restores, and enhances its benefits for people and the planet (54). The SDGs could provide a valuable lens for securing the wider ecological role of seagrass meadows beyond carbon sequestration.

Seagrass habitats are global; estimates of loss are widespread and varied, but there is general agreement that the loss is vast. However, this does mean that there is huge potential for nature-based solutions focused on seagrass restoration. A restored seagrass meadow may take many years and be high cost in terms of

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Fig. 3. Seagrass and sustainable development. Conservation and restoration of seagrass meadows and their ecological role can be communicated through the lens of the SDGs, of which seagrasses contribute to 16 of the 17 goals. A major part of this contribution is through the roles that they have as bioengineers and in supporting fisheries.

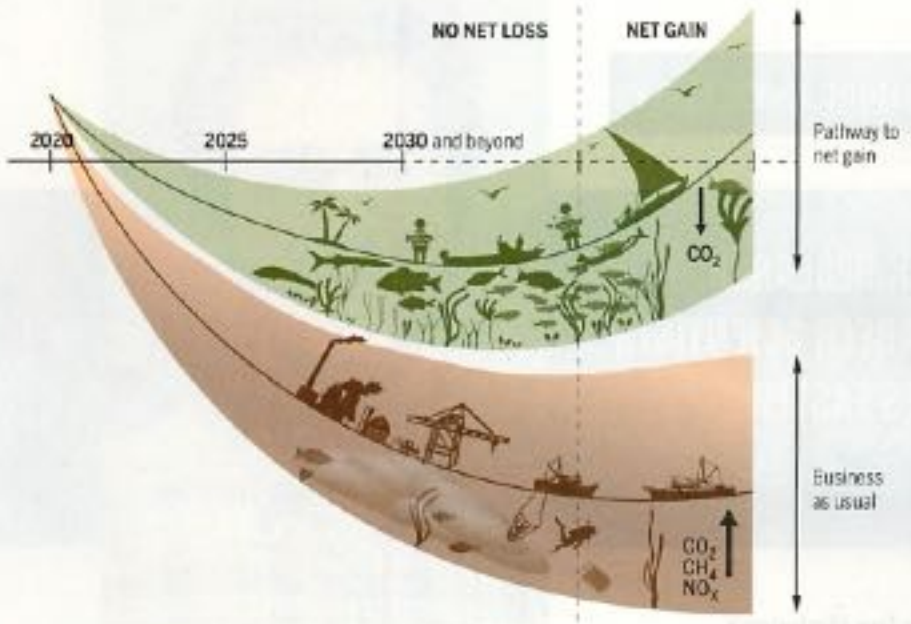

Fig. 4. A trajectory of seagrass recovery. Business as usual: Although seagrass meadows provide extensive ecosystem services and offer a major global opportunity as nature-based solutions, without intervention, they remain on a trajectory of global decline throughout the next century. Pathway to net gain: If major conservation action is taken to halt and reverse seagrass loss and degradation, then seagrasses can provide major contributions to fulfilling the aims of 16 of the 17 SDGs and for providing a major nature-based solution to climate change. Net gain of biodiversity requires avoidance of damage (e.g., legal instruments to halt bottom trawling) or minimization of effects that cannot be avoided, restoration to enhance or recreate habitats after damage (e.g., advanced mooring systems to allow recovery from boat damage), compensation, and recovery to enhance or recreate habitats known to have been historically lost or degraded (e.g., by active replanting). Image uses silhouettes created using symbols from the IAN Library, UMCES, University of Maryland.

labor and infrastructure to become ecologically functional (*65*, *66*). The opportunity provided by seagrass restoration should not detract from the urgent need to protect what we already have. As seagrass meadows become degraded, they not only begin to become net emitters of carbon, but they also release large amounts of nitrogen and sediments into the coastal ecosystem (*34*), together with any potential contaminants trapped within (e.g., heavy metals or plastics) (*67*). Achieving no net loss (and ultimately global net gain) of seagrasses requires scientific vision and political will (Fig. 3). This will not be easy, but we know that cumulative and connected conservation of seagrass over large scales can have major economic and environmental benefits (*66*). In general, plant conservation lags behind the conservation of animals (*68*), but seagrass could provide a model for how to overcome this so-called plant blindness, especially in the context of nature-based solutions (*69*).

Seagrasses have previously been described as the "ugly duckling" of marine conservation (*70*), but their star has risen with increasing interest in their potential to contribute to nature-based solutions to climate change and sustainable development. However, there are substantial ecological, social, and regulatory barriers and bottlenecks to seagrass restoration and conservation because of the scale of the interventions required. We must work inclusively at a local scale but in a globally connected network. Advances in marine robotics, molecular ecology, remote sensing, and artificial intelligence offer new opportunities to solve conservation problems in difficult environments at unprecedented global scales.

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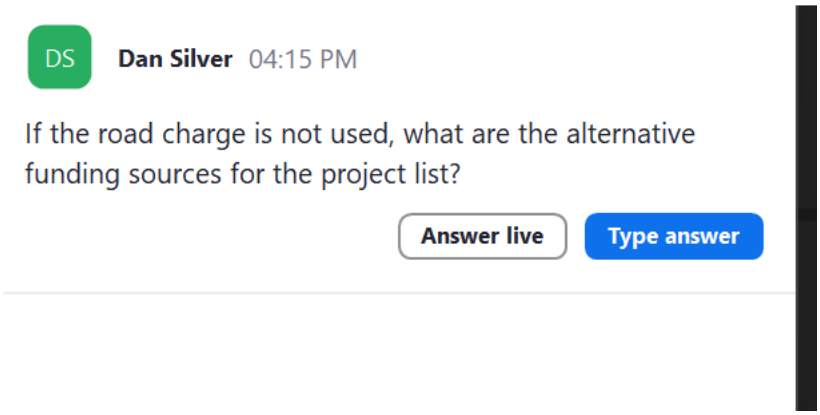
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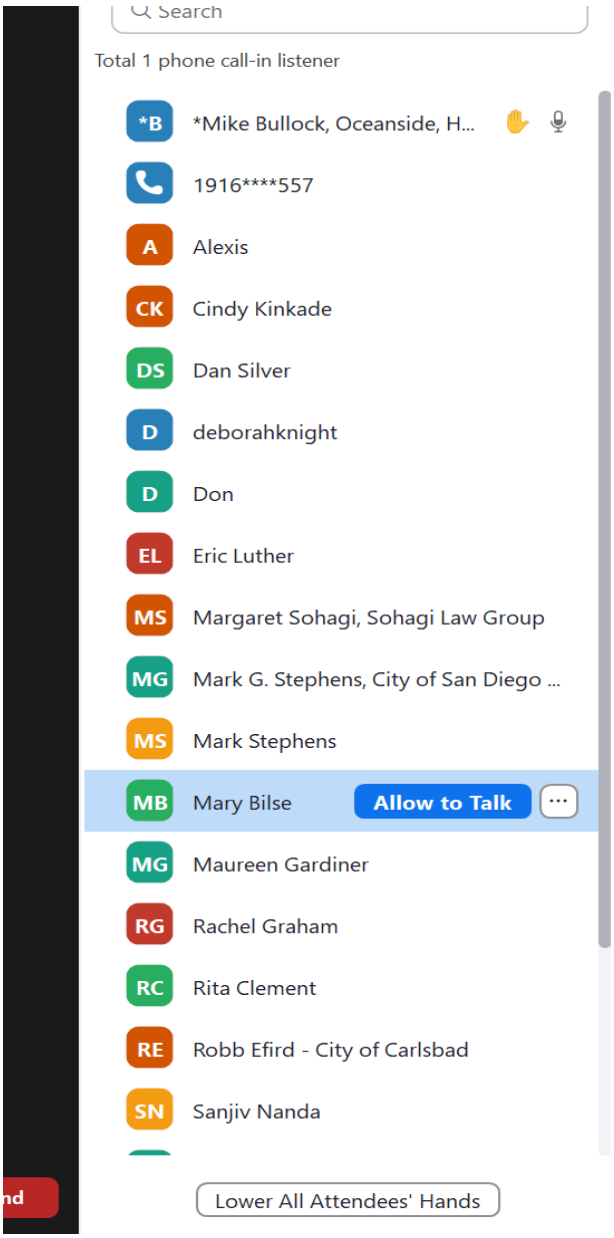
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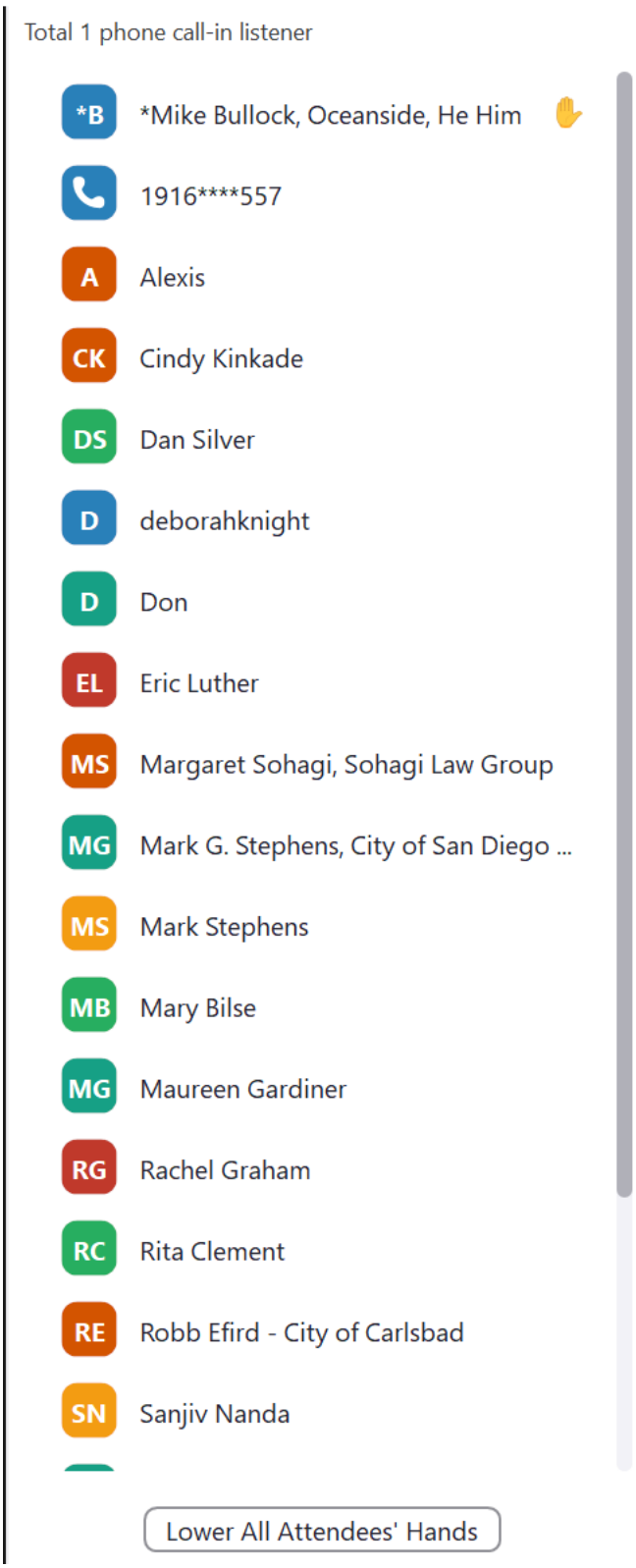
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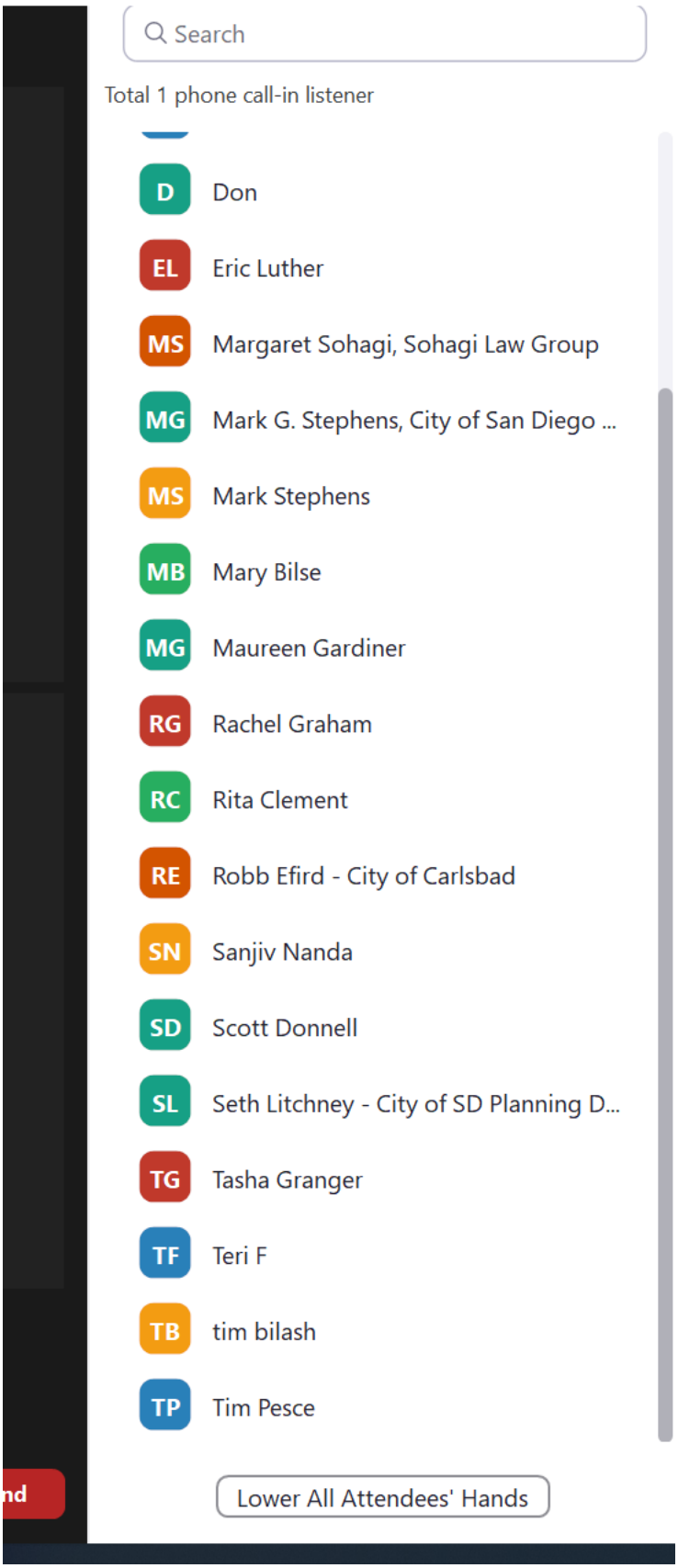
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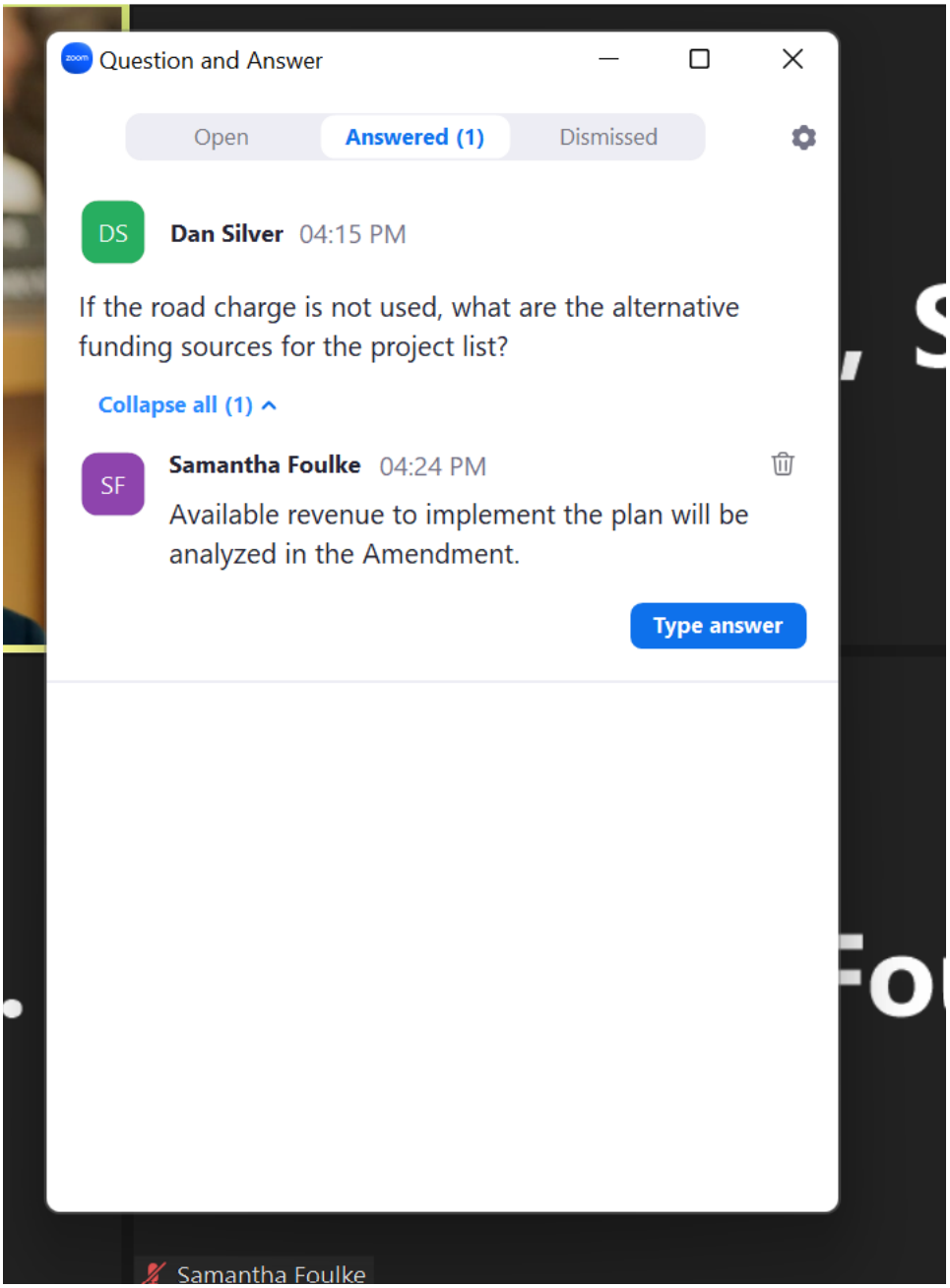
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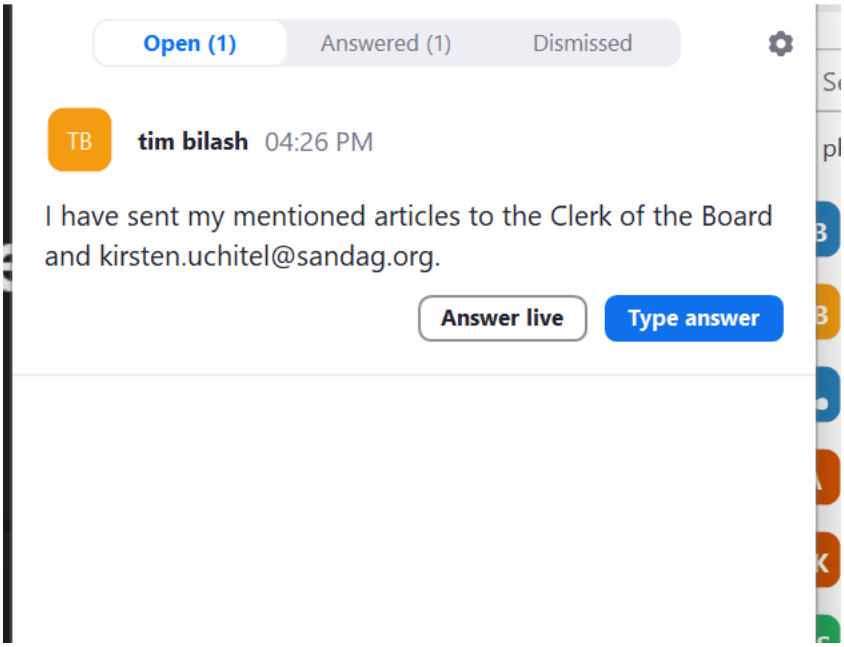
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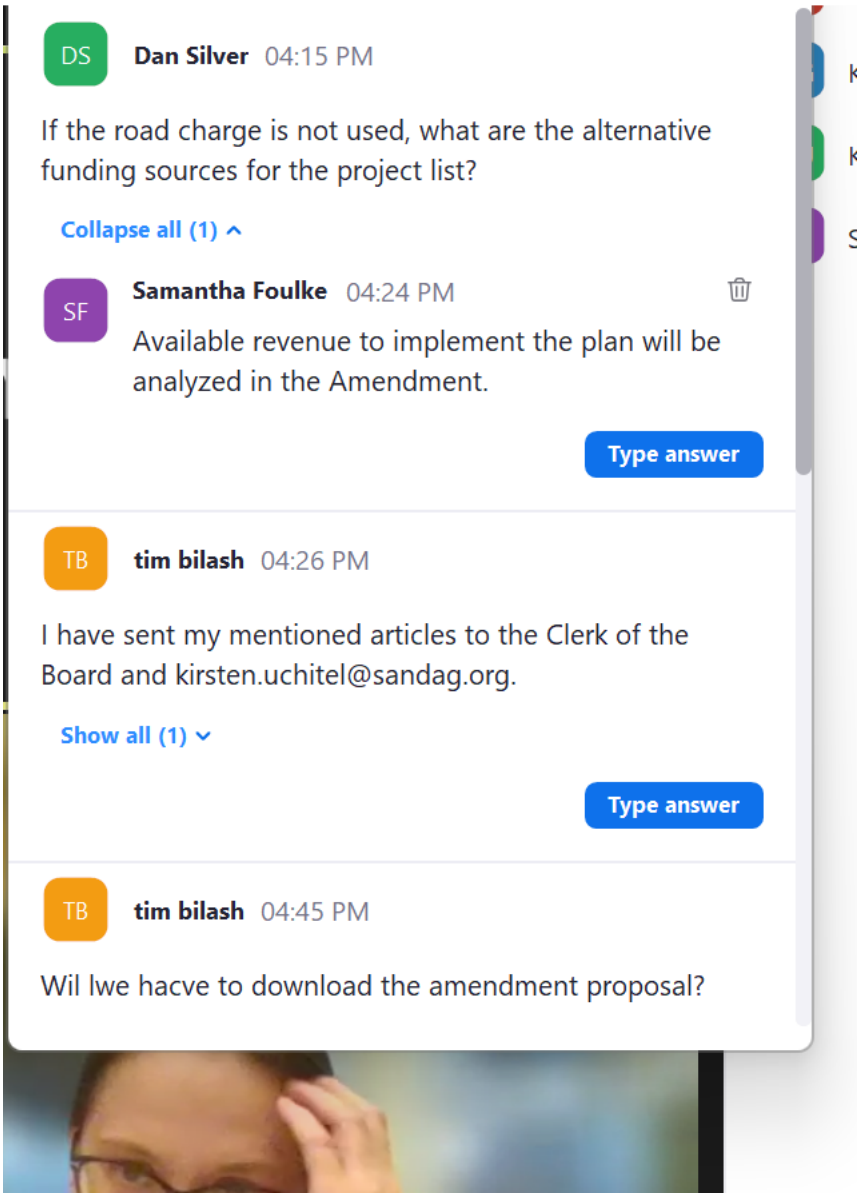
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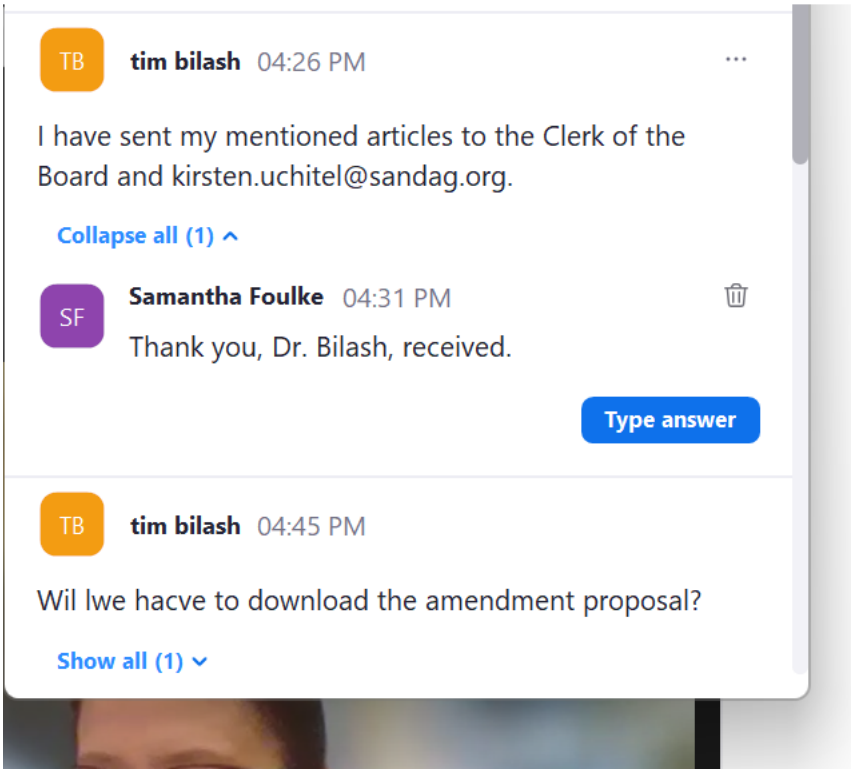
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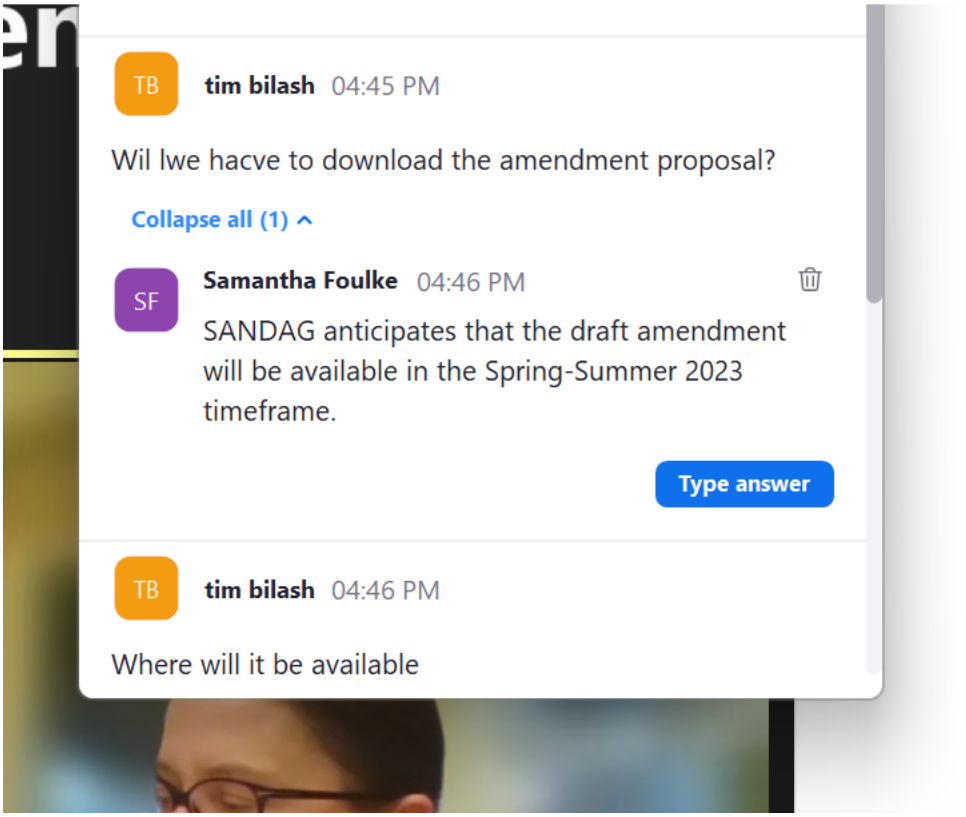
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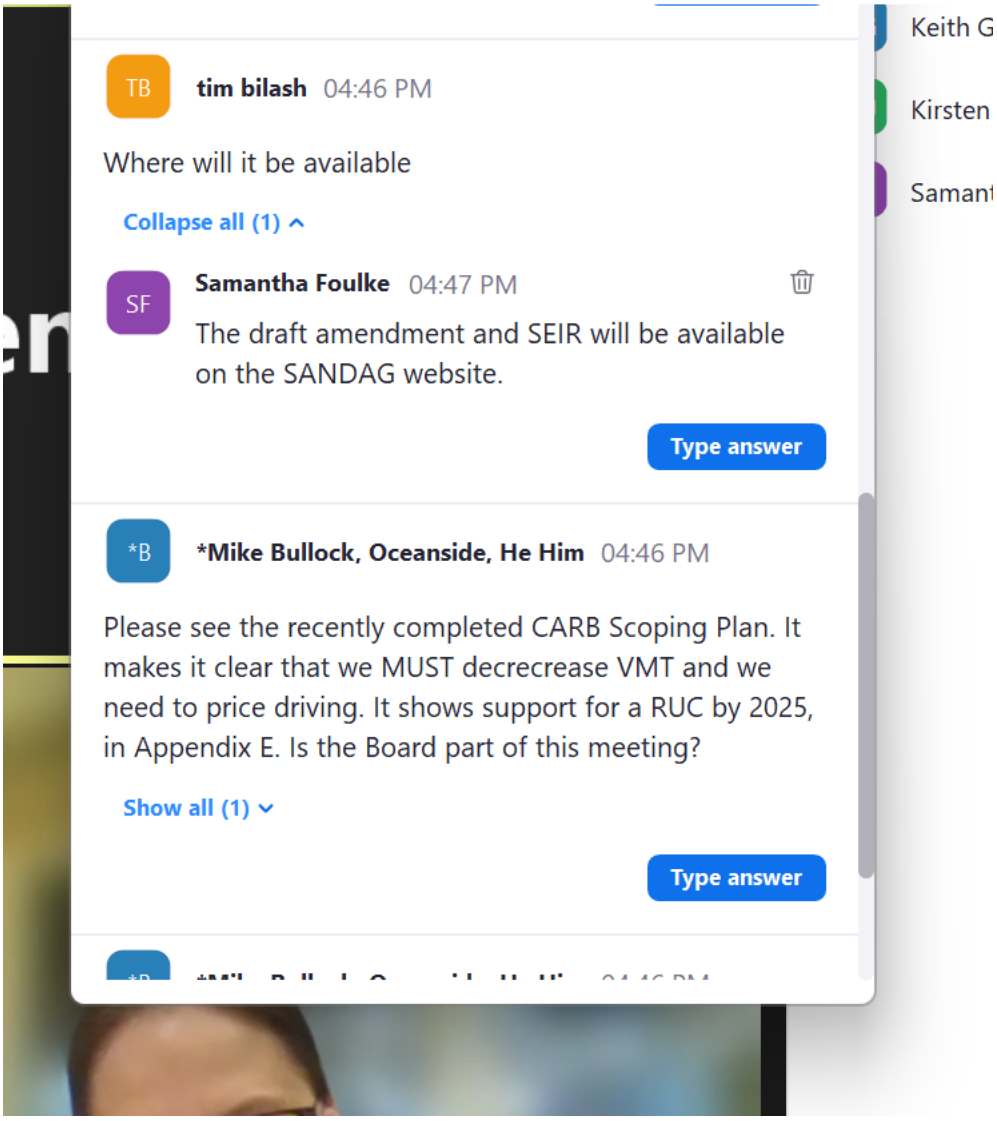
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Samantha Foulke 04:47 PM
The draft amendment and SEIR will be available on the SANDAG website.
Type answer
*B
*Mike Bullock, Oceanside, He Him 04:46 PM
Please see the recently completed CARB Scoping Plan. It makes it clear that we MUST decrecrease VMT and we need to price driving. It shows support for a RUC by 2025, in Appendix E. Is the Board part of this meeting?
Show all (1)
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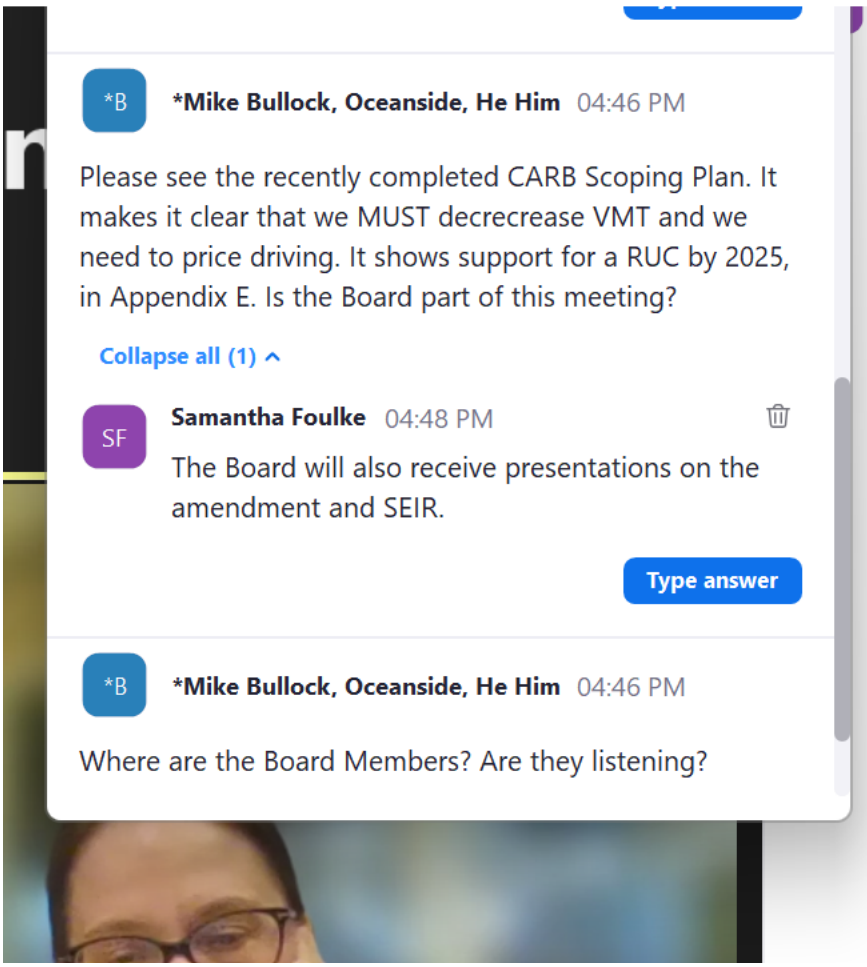
*B
*Mike Bullock, Oceanside, He Him 04:46 PM
Please see the recently completed CARB Scoping Plan. It makes it clear that we MUST decrecrease VMT and we need to price driving. It shows support for a RUC by 2025, in Appendix E. Is the Board part of this meeting?
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Samantha Foulke 04:48 PM
The Board will also receive presentations on the amendment and SEIR.
Type answer
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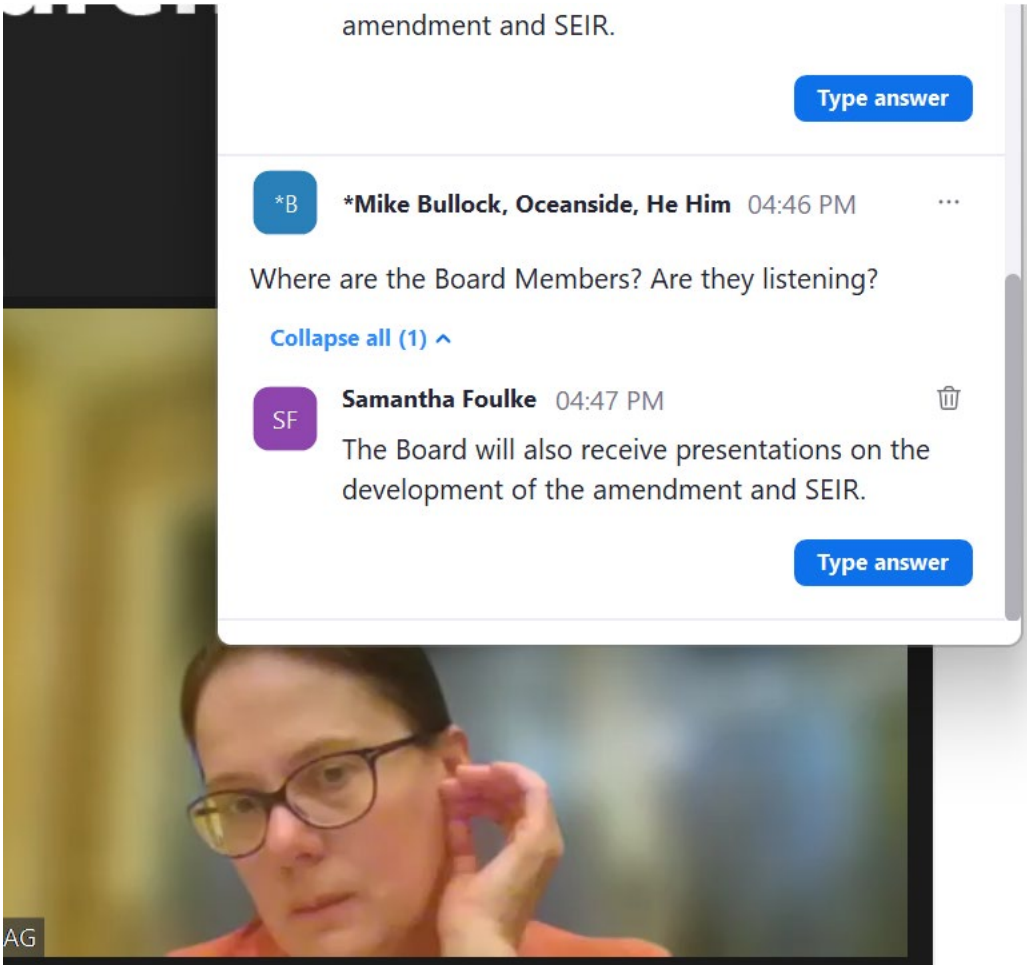
*Mike Bullock, Oceanside, He Him 04:46 PM
Where are the Board Members? Are they listening?


amendment and SEIR.
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*Mike Bullock, Oceanside, He Him 04:46 PM
Where are the Board Members? Are they listening?
Collapse all (1)
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Samantha Foulke 04:47 PM
The Board will also receive presentations on the development of the amendment and SEIR.
Type answer
AG

APPENDIX B~~D~~

AIR QUALITY TECHNICAL REPORT FOR ~~SAN DIEGO FORWARD:~~AMENDMENT TO THE 2021 REGIONAL PLAN ~~PROGRAM~~ SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

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~~August 2021~~July 2023

ICF. 202~~1~~3. *Air Quality Technical Report for ~~San Diego Forward:~~Amendment to ~~The~~ the 2021 Regional Plan ~~Program~~ Supplemental Environmental Impact Report.~~.~~ ~~August~~July. San Diego, CA. Prepared for SANDAG, San Diego, CA.

Contents

Tables and Figures

Figure **Page**

Acronyms and Abbreviations

2015 Regional Plan	San Diego Forward: The 2015 Regional Plan
2019 Federal RTP	2019 Federal Regional Transportation Plan
approved Plan	The 2021 Regional Plan
AADT	average annual daily traffic
AAQS	ambient air quality standards
ABM	activity-based model
ASFs	age sensitivity factors
ASL	above sea level
Caltrans	California Department of Transportation's
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CPF	cancer potency factor
CVA	Chula Vista
DPM	diesel particulate matter
DTN	San Diego-Beardsley Street
DVN	Otay Mesa-Donovan
DVs	PM design values
ED	exposure duration
EIR	environmental impact report
EPA	United States Environmental Protection Agency
ESC	Escondido
ETW	Equivalent Test Weight
FAH	fraction of time at home
FEM	Federal Equivalent Method
FHWA	Federal Highway Administration
FR	Federal Register
FSD	Floyd Smith Drive
GLC	ground-level concentrations
GVWR	gross vehicle weight rating
HARP	Hotspots Analysis and Reporting Program
HI	Hazard Indices
HQ	hazard quotient
HRA	Health Risk Assessment
KVR	Kearny Villa Road
MSATs	mobile source air toxics
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment

NHTSA	National Highway Transportation Safety Administration
NKX	Miramar Marine Corps Air Station
OEHHA	Office of Environmental Health Hazard Assessment
PAH	polycyclic aromatic hydrocarbons
PEF	potency equivalency factors
PEIR	programmatic environmental impact report
PEN	Camp Pendleton
PES	Perkins Elementary School
PM10	particulate matter up to 10 microns
PM2.5	particulate matter up to 2.5 microns in size
POM	polycyclic organic matter
proposed ~~Plan~~Amendment	~~San Diego Forward:~~Amendment to t~~T~~he 2021 Regional Plan
PSD	Prevention of Significant Deterioration
REL	Reference Exposure Level
RH	Release Height
RSEI	Risk-Screening Environmental Indicators
SAFE	Safer Affordable Fuel-Efficient
SANDAG	San Diego Association of Governments'
SCAQMD	South Coast Air Quality Management District
SDAPCD	San Diego Air Pollution Control District
SEIR	supplemental environmental impact report
SILs	significant impact levels
TACs	toxic air contaminants
TOG	Total Organic Gases
TRI	Toxics Release Inventory
URF	Unit Risk Factor
VH	Vehicle Height
VMT	vehicle miles traveled
VOC	volatile organic compounds
ZEV	zero-emission vehicle
ZMU	zero-emission multiple units

1 INTRODUCTION

~~*San Diego Forward: The 2021 Regional Plan*~~ (~~proposed~~ approved Plan) serves as San Diego Association of Governments' (SANDAG) update to *San Diego Forward: The 2015 Regional Plan* (2015 Regional Plan), adopted in October 2015, and the 2019 Federal Regional Transportation Plan (2019 Federal RTP), adopted in October 2019. The ~~proposed~~ approved Plan includes land use and transportation improvements to increase mobility and transportation connectivity, reduce single-occupancy passenger car travel, and support increased population growth.

ICF worked with SANDAG to develop a comprehensive technical study to evaluate the potential impacts of air pollution on the region to support the ~~proposed~~ approved Plan's program environmental impact report (approved Plan PEIR). Following the adoption of the approved Plan on December 10, 2021, the SANDAG Board of Directors directed staff to prepare a focused amendment to the approved Plan that deletes the regional road usage charge. ICF then later implemented the same air quality methodology for a supplemental EIR (SEIR) for the proposed Amendment that included the model corrections described in Chapter 2, *Project Description*, of the SEIR. This technical report documents the approach, technical methods, and results of the air quality technical work implemented in the SEIR.

All changes associated with the updated analysis for the proposed Amendment are provided in strikeout/underline format. Also, please note that in this technical report, the term "proposed Amendment" means the approved Plan as amended.

2 TECHNICAL METHODOLOGY

This section provides an overview of the general approach used in this analysis. It is followed by a more detailed discussion of the analysis approach for the emissions (Chapter 3), air quality (Chapter 4), and health risk assessment (Chapter 5) modeling.

2.1 OVERVIEW OF APPROACH

The analysis performed in this report includes the following general steps:

1. Quantify emissions for all sources of criteria pollutants and toxic air contaminants (TACs) associated with the proposed ~~Plan~~ Amendment.

2. Conduct dispersion modeling for base and ~~regional plan~~Amendment years to estimate ambient PM10 and PM2.5 concentrations resulting from the operational emissions under the proposed ~~Plan~~Amendment.

3. Perform dispersion modeling for base and ~~regional plan~~Amendment years to estimate TAC concentrations at sensitive receptors.

4. Quantify human health risk based on exposure to the modeled TAC concentrations.

The methodologies used in these assessments are described below. This technical report focuses on the methodologies, data sources, analysis methods, and results pertaining to the Localized Particulate Matter (PM) Impact Analysis (Impact AQ-4) and Health Risk Assessment (HRA) (Impact AQ-5) in support of the findings in the SEIR.

2.1.1 GENERAL PARAMETERS: MODELED YEARS AND CASES

A baseline year and three future years were modeled for the proposed ~~Plan~~Amendment: the baseline year is 2016, and the future years are 2025, 2035, and 2050.

All four cases are similar but differ in that the pollutant source and, potentially, the receptor location could change over time with implementation of the ~~Plan~~ proposed Amendment (e.g., if a roadway is widened or new residential land uses are developed within assessment domains).

2.2 POLLUTANTS

Air pollutants negatively impact air quality and subsequently human and environmental health. The SEIR analysis included emissions projections for all criteria air pollutants, with additional analysis of concentrations and risks associated with two categories of air pollutants: PM and TACs, as these are the pollutants most likely to cause significant air quality impacts under the proposed ~~Plan~~Amendment. Both are described below.

2.2.1 PARTICULATE MATTER

This analysis addresses concentrations of the criteria pollutants PM10 and PM2.5 that would result from the proposed ~~Plan~~Amendment. Particulate matter is a complex mixture of materials that can include metals, soot, soil, dust, and other organic and inorganic particles. Particulate matter can be divided into many size fractions, measured in microns (a micron is one-millionth of a meter). The California Air Resources Board (CARB) and the United States Environmental Protection Agency (EPA) have developed air quality standards for two size classes of particles: particles up to 10 microns in size (PM10) and particles up to 2.5 microns in size (PM2.5). PM2.5 particles are a subset of PM10 (CARB 2021a).

2.2.2 TOXIC AIR CONTAMINANTS

This analysis also addresses health risk changes from concentrations of the non-criteria TACs associated with ~~Plan~~ the proposed Amendment implementation. A TAC is an air pollutant for which an air quality standard has not been set but which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health (Section 39655 of the California Health and Safety Code). CARB has formally identified over 200 substances and groups of substances as TACs (CARB 2021b).

Internal combustion engines, including diesel and gasoline fueled, emit TACs. Engine exhaust includes a complex mixture of air pollutants, including both gaseous and solid materials. The solid material in diesel exhaust is known as diesel particulate matter (DPM). More than 90% of DPM is less than one micron in size. Thus, DPM is a subset of both PM10 and PM2.5 (CARB 2021a). Other TACs are also emitted from fuel combustion. In total, the Federal Highway Administration (FHWA) has identified nine priority TACs from mobile sources, called mobile source air toxics (MSATs):[1]

- 1,3-butadiene
- acetaldehyde

[1] FHWA's MSAT guidance is available at: https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat/.

- acrolein
- benzene
- DPM
- ethylbenzene
- formaldehyde
- naphthalene
- polycyclic organic matter (POM) / polycyclic aromatic hydrocarbons (PAH)[2]

CARB notes that the top three TACs for potential cancer risk are DPM; 1,3-butadiene; and benzene. These TACs are primarily generated by fossil fuel–powered motor vehicles (CARB 2002). CARB considers the risk from whole diesel exhaust to be represented by DPM concentrations.

This analysis includes all nine priority MSATs identified by FHWA for the sake of completeness and full disclosure, as these nine priority MSATs include CARB's top three emitters. Along with mobile on-road and rail sources, stationary sources that may influence incremental risks due to changes in land use under the ~~proposed~~ approved Plan are included in the HRA, as described below. The proposed Amendment would not result in any changes to stationary sources. Risks from TAC emissions from those sources are included, based on available information, even if they are not in the list of priority MSATs.

3 EMISSION SOURCES

As a first step in performing this assessment, ICF developed an emissions inventory of the pollutants used in the air quality and health risk analyses, including link-based emissions for on-road mobile sources and source-based emissions for passenger and freight rail and other major stationary sources. The emissions inventory was compiled using a combination of best available and industry-accepted protocols and tools developed by CARB, EPA, and other agencies.

The analysis focused on sources of emissions that will be affected by the two components of the proposed ~~Plan~~Amendment: (1) regional growth and land use changes that could modify the location of sensitive receptors in the region (regional growth and land use are not modified in the proposed Amendment), and (2) changes in the location and activity along the transportation network that could modify the quantity of emissions along passenger and freight corridors, as well as the changes in the emissions rate of the fleet over time. Particulate matter and TAC emissions are included from the following sources:

- On-road vehicle exhaust, which includes PM10, PM2.5, and MSATs.
- On-road fugitive brake wear, tire wear, and re-entrained PM10 and PM2.5 road dust emissions.
- Passenger rail and freight rail exhaust as indicated by SANDAG, which includes PM10, PM2.5, and MSATs (mainly DPM).
- Stationary sources and additional sources identified for cumulative risk.

[2] See Section 3.1 below for information on treatment and reporting of these compounds.

3.1 ON-ROAD SOURCES

This section discusses both exhaust and fugitive emissions from on-road mobile sources. The emissions inventory for mobile on-road sources on the regional highway and roadway networks considered parameters in SANDAG's activity-based model (ABM), such as vehicle speeds, vehicle types, and time of day. The mobile source PM and TAC emissions inventory generally followed the following steps:

1. Determine baseline PM10, PM2.5, organic gas, and DPM speed-resolved emission factors from CARB's latest Emission Factor model (EMFAC2017[3]) representing the fleet described by the ABM and EMFAC2017 for the San Diego region and corresponding to the vehicle types considered in SANDAG's ABM.
2. Determine emission factors for the priority MSATs[4] from literature values, applied to PM and organic exhaust emissions, and brake and tire wear emissions, as appropriate.[5,6,7]
3. Determine road dust PM10 and PM2.5 emission factors using CARB methods.
4. Extract activity data from the ABM outputs to determine vehicle activity on specific roadway segments.
5. Link the activity and emissions factors and develop a database of emissions by link, time of day, and bus, light- and heavy-duty vehicles for major links, and spatially aggregated emissions for the less trafficked "minor links."

For both PM and TACs, ICF first built a complete, link-based emissions inventory database for the entire San Diego region for the modeled scenario in each analyzed year. SANDAG provided data for vehicular traffic on all roadway links in the ABM model in the same five daily periods simulated by the model and for the three vehicle types modeled.[8] The output of this database is emissions by link, resolved by vehicle type and hour. Only direct PM emissions were considered. Secondary PM was not included.[9]

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[3] Consistent with the analysis in the approved Plan PEIR, EMFAC2017 was used for all road-link emissions modeling ~~per SANDAG direction on February 2,~~ 2021 in the SEIR.

[4] Both gasoline and diesel were speciated into MSATs in the modeling. Cancer and chronic risk from diesel exhaust was captured by DPM, so only gasoline was speciated for the risk endpoints to avoid double counting diesel risk diesel. However, for acute non-cancer risk, the speciated components of all fuels are added together.

[5] Organic gases were specified according to their emissions of total organic gases (TOG), tracked separately by fuel type and bus, light-, and heavy-duty vehicle categories. The parameters were set by the speciation profiles selected.

[6] There are various sources for developing speciation, which include CT-EMFAC, MOVES, SPECIATE, or other sources, such as those used by CARB. Each has advantages and disadvantages. ICF used MOVES2014b in the approved Plan PEIR as it was the most comprehensive and consistent available source at the time of analysis.

[7] Due to uncertainty and relative risk, ICF did not speciate fugitive sources, such as brake wear, tire wear, or road dust to include in health risk. See footnote 11.

[8] Only a single average day type was available and used. Higher resolution is not likely to dramatically alter the long-term concentrations for HRA or annual PM concentrations, although it could affect the 24-hour average PM and acute risk results. Also, vehicle types from EMFAC and the activity-based model (ABM) were harmonized and emissions aggregated to the three modeled vehicle types—bus, light, and heavy duty.

[9] Secondary PM is particulate matter formed in the atmosphere through chemical reactions, especially nitrogen and sulfur oxides (NO_X and SO_X, respectively), including emissions from mobile sources. CARB has estimated secondary PM to be nearly half of total PM in the San Diego Air Basin. See: https://www.sdapcd.org/content/dam/sdapcd/documents/grants/planning/PM-Measures.pdf~~https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Air%20Quality%20Planning/PM-~~

Speciation[10] of MSATs for non-diesel vehicles was based on standard, accepted models and approaches (identified above).[6] Only exhaust emissions were speciated.[5, 11] Of the nine MSATs identified in Section 2.2.2, *Toxic Air Contaminants,* one applies only to diesel vehicles: DPM, which is defined as whole exhaust particulate matter from diesel vehicles. All cancer risk from diesel exhaust was included in the California Office of Environmental Health Hazard Assessment's (OEHHA) assigned Unit Risk Factor (URF) for DPM (OEHHA 2019a); no further speciation of diesel exhaust was included for cancer risk. Likewise, chronic risk from diesel exposure was captured in OEHHA's Reference Exposure Level (REL)[12] for diesel particulate exhaust, which was used (OEHHA 2019a). Speciation of gaseous components of diesel exhaust (which are minor) could contribute to the overall acute non-cancer characterization and was included. The remaining eight species apply only to non-diesel engines, which are primarily gasoline. Of these, six have speciation factors available through the California Department of Transportation's (Caltrans) CT-EMFAC model. Another MSAT, POM, has both particulate and gaseous components and, while recently included in CT-EMFAC, its speciation does not show variations after 2021. Caltrans has posted guidance on determining POM and naphthalene emissions based on U.S. Department of Transportation's Federal Highway Administration policies,[13] but it relies on older EPA speciation data. To use a consistent source and rely on current data for speciation factors for all MSATs and the different vehicle and fuel types, ICF determined and applied speciation factors from EPA's MOVES2014b mobile source emission model, current at the time of analysis, for all on-road mobile sources (EPA 2015a, 2016). Although not California-specific, ICF concluded this represents the most current and consistent set of available data for speciation of MSAT emissions.

Multiple species that are components of POM and polycyclic aromatic hydrocarbons (PAH) are included. For emissions calculations, ICF summarized PAH emissions as benzo[a]pyrene equivalents through toxicity weighting. This calculation was done by multiplying the emissions of PAHs that ICF had previously speciated out using MOVES with the benzo[a]pyrene-normalized potency equivalency factors (PEF) according to OEHHA guidance.[14] If a particular PAH was not listed in the OEHHA guidance document then OEHHA has not determined its cancer potency, and for the purposes of this assessment ICF did not include that PAH's emissions in the HRA. These PAH emissions, weighted by their individual PEF's, were summed to create the

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~~Measures.pdf~~. However, the approach here was not for complete regional photochemical assessment, but an analysis of nearby, direct impacts, similar to a hotspot assessment and following Caltrans guidance for project-level assessments (http://www.dot.ca.gov/env/air/aq-analysis.html). Per EPA guidance, "PM hot-spot analyses include only directly emitted $PM_{2.5}$ or PM_{10} emissions. $PM_{2.5}$ and PM_{10} precursors are not considered in PM hot-spot analyses, since precursors take time at the regional level to form into secondary PM." EPA-420-B-15-084, November 2015. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NMXM.pdf.

[10] Speciation provides a breakdown of the chemical composition of PM and organic gas (VOC) emissions into its various components, such as MSATs.

[11] Brake and tire wear can be significant contributors to overall PM, but cancer risk is typically driven by diesel exhaust PM concentrations. Furthermore, speciation profiles of brake and tire wear are uncertain (e.g., see U.S. Environmental Protection Agency. 2014. *Brake and Tire Wear Emissions from On-road Vehicles in MOVES2014*. EPA-420-R-14-013. December. Available: https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=525701).

[12] An REL is the concentration level at or below which no adverse non-cancer health effects are anticipated for the specified exposure duration. RELs are based on the most sensitive, relevant, and adverse health effect reported in the medical and toxicological literature, and RELs are meant to err on the side of public health protection.

[13] http:// www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/2016msat.pdf.

[14] *OEHHA Technical Support Document for Cancer Potency Factors, Appendix A*. Available: https:/ /oehha.ca.gov/media/downloads/crnr/appendixa.pdf.

benzo[a]pyrene equivalent. Table 1 outlines components of PAH according to EPA's substance registry as well as those used specifically in the toxicity weighting calculations, and their corresponding PEF.[15]

Table 1. Polycyclic Aromatic Hydrocarbon Species and Corresponding Potential Equivalency Factors

Species of Polycyclic Aromatic Hydrocarbon	Potency Equivalency Factor
Acenaphthene	Not available
Acenaphthylene	Not available
Anthracene	Not available
Benzo[a]anthracene	0.1
Benzo[a]pyrene	1.0
Benzo[b]fluoranthene	0.1
Benzo[g,h,i]perylene	Not available
Benzo[k]fluoranthene	0.1
Chrysene	0.01
Dibenzo[a,h]anthracene	1.05
Fluoranthene	Not available
Fluorene	Not available
Indeno[1,2,3-c,d]pyrene	0.1
Phenanthrene	Not available
Pyrene	Not available

3.1.1 SAFER AFFORDABLE FUEL-EFFICIENT (SAFE) VEHICLES RULE

The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule was issued in two parts jointly by the National Highway Traffic Safety Administration and EPA. Part 2 (SAFE-2), enacted March 2020, reduced progress in fuel economy and carbon dioxide standards for model years 2021–2026 passenger cars and light trucks. SAFE-2 set the CAFE standards to increase in stringency by 1.5 percent per year above model year 2020 levels for model years 2021–2026. These standards are lower than the previous CAFE standards, which required a 5 percent per year increase in stringency over the same period. Part 1 (SAFE-1), enacted in September 2019, withdrew California's waiver of preemption under Section 209 of the Clean Air Act, which in part eliminated California's ability to enact its zero-emission vehicle (ZEV) mandate. CARB ~~has~~ concluded that the loss of the ZEV sales requirement ~~will~~ would increase gasoline vehicle emissions~~, and thus will~~ which would have led~~lead~~ to an underestimate in emissions starting in 2021 when predicted with the EMFAC2017 model.

The SAFE rules have now been repealed or replaced. ~~CARB has released off-model adjustment factors that may be applied to gasoline vehicle emissions from calendar year 2021 to correct for the impacts of the SAFE rule.In April 2021, in response to President Biden's Executive Order 13990, the EPA began the process of repealing SAFE-1, with plans to begin the repeal of SAFE-2 in summer 2021.~~ On December 21, 2021, the National Highway Transportation Safety Administration (NHTSA) published its CAFE Preemption rule,[16] which finalizes its repeal of the SAFE-1 Rule, thus reopening the pathway for state and local fuel economy laws. On April 1, 2022, NHTSA

[15] EPA substance registry, PAH entry: https://sor.epa.gov/sor_internet/registry/substreg/substance/details.do?displayPopup=&id=6012.

[16] https://www.nhtsa.gov/sites/nhtsa.gov/files/2021-12/CAFE-Preemption-Final-Rule-Web-Version-tag.pdf

announced new, landmark CAFE standards for passenger cars and light trucks in model year 2024–2026[17] that are significantly more stringent than had been set by the 2020 SAFE-2 rule and somewhat more stringent than the prior standards adopted in 2012. Then on April 12, 2023, EPA proposed its multi-pollutant emissions standards for model years 2027–2032 light- and medium-duty vehicles.[18] The proposed standards would result in a 56 percent reduction below the existing model year 2026 standards by model year 2032 for light duty vehicles and 44 percent below current standards for medium duty vehicles.

The SAFE rule ~~does~~ would not affect the 2016 baseline emissions included in this report or the approved Plan PEIR~~analysis~~. The approved Plan PEIR noted that while ~~tThe~~the rule would increase emissions for horizon years ~~under the Plan:~~ 2025, 2035, and 2050~~. However~~, the status of the rule ~~i~~was highly uncertain ~~given the current presidential Executive Order calling for its repeal. Even if the rule were maintained,~~ and the impact on emissions, air quality, and health risk was ~~is very~~ small. ~~CARB correction factors for 2050—the year with the largest magnitude—are 1.0318 for PM Exhaust and 1.0257 and 1.0117 for Evaporative and Exhaust Total Organic Gas (TOG) emissions, respectively, for gasoline vehicles. When applied to the total San Diego regional fleet in 2050, these factors are reduced to increases of 1.2% and 0.7% in PM and TOG exhaust. The proposed Plan anticipates approximately 82% reduction in exhaust PM between 2016-2050 (Section 7.1). When including emissions of brake wear, tire wear, and road dust, the SAFE factors for exhaust PM have a negligible impact on PM emissions and thus on air quality. Similarly, the factors have negligible impact for health risk as they do not apply to diesel exhaust and would lead to only a very small increase in gasoline TACs.~~ Thus, the SAFE Rule ~~correction factors were~~ was not applied in the approved Plan PEIR air quality analysis and is also not applied here. Furthermore, consistent with conditions of the approved Plan PEIR, newly adopted and proposed standards since the approved Plan PEIR described in the previous paragraph are not included here for the proposed Amendment for consistency. For these reasons, the results may be considered conservative. ~~to emissions projections in this analysis due to uncertainty in SAFE Rule implementation and its insignificant impact on results.~~

3.1.2 MAJOR LINKS

Major links are those links in the ABM with significant amounts of traffic that justified modeling as individual sources. The distinction between major and minor links was based on vehicle activity (average annual daily traffic [AADT]) thresholds. Per SANDAG direction, ICF used a threshold of 100,000 vehicles per day (both directions), consistent with CARB guidance for urban roads (CARB 2005).[19] A threshold of 50,000 vehicles per day was used for one-way links. Links considered zone connectors were not included in major links.

The shape of major links was determined from the geospatial data provided by SANDAG and consistent with that in the ABM. To simplify modeling without notable impacts on risk results, ICF reprocessed the geospatial data so that the vertices of each polyline were 60 feet apart or more; for a curvy link, this can have the effect of straightening the roadway in nominal 60-foot increments while also creating sources the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) can accept. ICF assigned each major link to the modeling subdomain(s) it intersected (see Section 4.2, *Assessment Domain*).

[17] https://www.nhtsa.gov/sites/nhtsa.gov/files/2022-04/Final-Rule-Preamble_CAFE-MY-2024-2026.pdf

[18] https://www.govinfo.gov/content/pkg/FR-2023-05-05/pdf/2023-07974.pdf

[19] This document recommends thresholds of 100,000 vehicles per day for urban and 50,000 for rural roads. Given the focus on developed areas, ICF used the urban threshold throughout the assessment domain.

Major links intersecting multiple modeling subdomains were assigned to each of those modeling subdomains, and in such cases, ICF modeled the whole major link for each modeling subdomain (even the parts of the link lying beyond a modeling subdomain's boundary). In these cases, though some emissions technically occurred outside a given modeling subdomain, those "outside" sections of links were relatively short, and their emissions were released relatively close to the modeling subdomain boundary line.[20] Major links were converted to polygons by buffering each link 6 feet on each side of the link for every lane (Uchitel pers. comm.). This creates a 12-foot width for each lane of traffic.

Exhaust emissions on major links were calculated according to the general equation:

$$E = EF \times AD$$

where *EF* is the pollutant-, vehicle type-, and speed-specific emission factor, in grams per vehicle mile, while *AD* is activity data, in terms of vehicle miles traveled. Emissions were calculated for all hours of the day. SANDAG provided available information regarding on-road activity for determining these emissions, to include ABM outputs describing traffic and speeds on each link in the modeled road network. All hours within one ABM time period were assigned that period's traffic values (e.g., if the a.m.-peak in the ABM represents 6–9 a.m., those 3 hours will all be assigned that period's traffic uniformly). The 3–4 p.m. hour was split between two ABM time periods; ICF recalculated emissions for the 3–4 p.m. hour as the time-weighted average of the emissions of those two periods.

Emissions were aggregated into three vehicle types: light-duty vehicles, heavy-duty vehicles, and buses, based on those reported in the ABM. Fuel mix for each was based on EMFAC2017 defaults for the region. ICF considered light-duty vehicles to be vehicles below 8,500 pounds gross vehicle weight rating (GVWR), consistent with EMFAC. The EMFAC vehicle class breakdown by GVWR is shown in Table 2.

Table 2. Vehicle Type, Descriptions, and EMFAC Category

Vehicle Type	Description	EMFAC Vehicle Category
Light-Duty Vehicles	Passenger Cars	LDA
	Light-Duty Trucks (GVWR <6,000 pounds and ETW ≤3,750 pounds)	LDT1
	Light-Duty Trucks (GVWR <6,000 pounds and ETW 3,751–5,750 pounds)	LDT2
	Motorcycles	MCY
	Motor Homes	MH
Heavy-Duty Vehicles	Medium-Duty Trucks (GVWR 6,000–8,500 pounds)	MDV
	Light-Heavy-Duty Trucks (GVWR 8,501–10,000 pounds)	LHD1
	Light-Heavy-Duty Trucks (GVWR 10,001–14,000 pounds)	LHD2
	Medium-Heavy Duty Diesel (GVWR 14,001–33,000 pounds)	MHDT
	Heavy-Heavy Duty Diesel (GVWR >33,000 pounds)	HHDT
Buses	School Buses, Urban Buses, Motor Coach, Other Buses, and All Other Buses	SBUS, UBUS, OBUS

[20] No double counting of these impacts occurs in concentrations as each modeling subdomain is modeled separately.

Source: CARB 2015a.
Notes: GVWR is the maximum operating weight of a vehicle, including cargo and passengers. Equivalent Test Weight (ETW) is equal to GVWR plus one-half of the difference between the GVWR and the curb weight (i.e., weight at purchase without cargo or passengers) of the vehicle.

ICF considered trucks heavy-duty vehicles, and, consistent with EMFAC classifications, considered motor homes to be light-duty. Buses were modelled as a separate category from heavy-duty vehicles to more accurately represent EMFAC emission factors for buses. SBUS and OBUS categories were not provided in the ABM. SBUS and OBUS vehicle miles traveled (VMT) were spread throughout all links, with the contribution of SBUS/OBUS VMT to each link proportional to the VMT of the link VMT compared to the total VMT of the ABM. SBUS was only added to morning and late afternoon minor links, to reflect school pick-ups and drop-offs within neighborhoods and residential areas. OBUS was only added to morning, midday, and late afternoon major links, in order to reflect routes of bus operators, such as Greyhound.[21]

3.1.3 MINOR LINKS

Minor links[22] were classified as those links in the ABM below the 100,000 AADT (for two-way segments, or 50,000 AADT for one-way links) count threshold used to determine major links. Emissions on minor links were calculated as they were for major links, based on emission factors and activity data. The same vehicle and time designations employed for major links were used for minor links. However, unlike major links, minor links were aggregated at the U.S. census tract level. Mapping of links to census tracts was based on the link's centroid. ICF aggregated the emissions from individual minor links to an area, defined as the census tract boundary. Because the boundaries of the modeling subdomains (discussed in Section 4.2 below) did not align with the tracts, to limit inter-domain influences ICF clipped at the modeling subdomain boundaries any tract intersecting more than one modeling subdomain, creating partial tracts within each of the intersecting modeling subdomains. Each partial tract carried with it the emissions of the minor links within it. As with major links, to simplify modeling without notable effects on risk results, ICF reprocessed the tract geospatial data so that the vertices of each polygon were 300 feet apart or more. For curvy areas of a tract boundary, this can have the effect of straightening the tract boundary in nominal 300-foot increments but was able to be modeled within AERMOD.

3.1.4 OUTPUT

The output of this emissions modeling was a database of emissions for the designated pollutants by link (for major links) or by census tract (for minor links). This emissions database reported emissions by vehicle type (light and heavy) and hour.[23] This represented the emissions strength and temporal profile of the sources in the dispersion model.

Comparisons were drawn between the emissions modeling performed, SANDAG's conformity results, and default EMFAC inventory outputs. SANDAG's conformity results used the same data as the time-, speed- and link-resolved activity data used in the emissions modelling, except for EMFAC categories SBUS and OBUS. SBUS and OBUS were allocated according to the method described in Section 3.1.2, *Major Links,* in the emissions

[21] Sample Greyhound schedules are available at: http://extranet.greyhound.com/revsup/schedules2/pageset.html.
[22] Minor links may have a small impact only. Areas with minor links were chosen based on SANDAG's needs, provided data, and feedback on the approach.
[23] Note that the ABM presents traffic volumes by five daily time periods. The database translated these into hourly outputs for use in the AERMOD.

model, while the conformity results added EMFAC emissions data for SBUS and OBUS directly to their emissions results, without spatial or temporal allocation. The conformity results also represented natural gas buses with gasoline emission factors. ICF compared the inventory to that from SANDAG's conformity results to verify that the time-, speed, and link-resolved emissions estimation methods were comparable to those used elsewhere. Percent difference of total emissions was used as a comparison tool between these methods, with percent difference calculated as the difference between the emissions model and the conformity results, normalized to the conformity results. ~~A d~~Difference between +/- ~~of~~ 10% ~~less than 5%~~ was seen between most pollutants, except for TOG, which saw differences of -20% (conformity greater than modeled) in 2035 and 2050. This difference in TOG is attributed to the difference in estimating bus emissions. The bus fleet in San Diego is composed of buses that use natural gas, diesel, and gasoline as fuel. ~~Though buses make up less than 1% of the total VMT, emissions from n~~Natural gas buses are ~~responsible for over 20% of the total emitted~~ large emitters of TOG within San Diego County. For this reason, small deviations in the calculation of bus emissions can result in major differences in estimations of TOG, which is why the method to allocate bus emissions in Section 3.1.2 was used.

3.2 PASSENGER AND FREIGHT RAIL

The analysis also included emissions from rail sources identified by SANDAG. SANDAG provided ICF with the activity and geospatial polygons for future rail lines, while for existing (2016) rail lines SANDAG provided rail lines by type of rail. Existing rail lines were selected to remove any that were used only for light rail. The remaining existing rail lines were simplified by removing points less than 60 feet apart. The simplified rail lines were buffered by 25 feet to create 50-foot-wide rail corridors to match the size of the future rail corridors. The existing rail polygons were combined with the future planned rail polygons for each year to get the full extent of rail for each of the planned future years. Rail sources were assigned to the modeling subdomain in which they are located, except some rail geospatial segments were relatively long, so ICF clipped the rail segments at modeling subdomain boundaries, creating a defined portion in each modeling subdomain.

Emissions were estimated based on the projected rail activity for the various analysis years and relevant emissions factors from CARB and EPA. MSAT and PAH emission factors were calculated based on EPA emission factors.[24] Gaseous MSATs were calculated as a component of volatile organic compounds (VOC), while gaseous and particulate PAHs were calculated as components of VOC and PM2.5, respectively. For passenger rail, the analysis considered locomotive fleet turnover and rail activity for each analysis year, as provided by SANDAG staff. Freight rail emissions were taken directly from CARB's freight emissions model in EMFAC.[25] Countywide rail emissions were calculated by rail line for each year, and each line was assigned the same spatial emission rate. The 3–4 p.m. hour was split between two ABM time periods; ICF recalculated emissions for the 3–4 p.m. hour as the time-weighted average of the emissions of those two periods.

Passenger (commuter) rail emissions were estimated based on estimated fuel consumption, which were derived from daily train and daily train mile activity, provided by SANDAG, and assumed fuel economy for each rail line, based on rail line reporting to the U.S. Department of Transportation. Table 3 summarizes the

[24] MSAT and PAH emission factors available in tables 11 and 12: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100PUQI.pdf.

[25] The historic *2016 Line haul Locomotive Model & Update* and the *2017 Passenger Rail Emissions Model* were used here unchanged from the approved Plan PEIR analysis. The previous link (https://www.arb.ca.gov/msei/ordiesel.htm) is no longer ~~are~~ available~~at: https://www.arb.ca.gov/msei/ordiesel.htm~~.

estimated passenger line fuel consumption by line and by year under the approved Plan. All results are unmitigated and do not account for zero emission efforts in the approved Plan years.

Table 3. Passenger Rail Fuel Use, Gallons per Day

Rail Line	Year			
	2016	2025	2035	2050
398 (COASTER)	2,624	5,027	7,399	7,131
399 (SPRINTER)	869	869	1,738	2,818
Amtrak/Pacific Surfliner	3,173	4,231	4,760	4,760
Metrolink	886	886	1,107	1,107
581A	0	0	0	8,702
581B	0	0	0	7,901
582	0	0	10,410	17,723
583	0	0	0	11,638
Total	7,553	11,013	25,414	61,780

3.3 STATIONARY AND OTHER SOURCES

In the HRA, ICF also considered chronic and cancer risks from stationary sources. Like the approved ~~The proposed~~ Plan, the proposed Amendment would not directly affect the emissions strength or profile of these sources, and no data is readily available to project future emissions from stationary sources; thus, the analysis assumed future pollutant concentrations from these sources remains static in time. As a consequence of this assumption, the only influence the approved ~~proposed~~ Plan was assumed to have on incremental concentrations from stationary sources is when sensitive receptors are new or relocated as a result of the ~~proposed~~ approved Plan. (See Section 4.5 for discussion of receptor types and locations.) The proposed Amendment would not change the approved Plan's sensitive receptors or their locations.

ICF attempted to obtain current risk and/or facility information from the San Diego Air Pollution Control District (SDAPCD). However, ICF was informed[26] that limited data exists and that which does is often extremely dated. SDAPCD did not provide any data for use. Instead, current concentrations from stationary sources were determined from EPA's Risk-Screening Environmental Indicators (RSEI) model.[27] RSEI is a screening-level model that assesses the potential risk from industrial emissions, as captured in EPA's Toxics Release Inventory (TRI). The most current data currently available is for year 2016. An intermediate product of the RSEI model is estimated annual average pollutant concentrations by emitting facility on an 810-meter by 810-meter grid across the entire country modeled with AERMOD.[28] ICF extracted and processed this data for the modeling subdomains. ICF then modeled existing cancer and chronic risk from these concentrations with California-specific risk values using CARB's Hotspots Analysis and Reporting Program (HARP). As this approach does not predict short-term concentrations, no acute risks were attributed to stationary sources. ICF assigned

[26] Meeting with Archi dela Cruz, APCD September 5, 2018.

[27] https://www.epa.gov/rsei. Specific guidance and custom outputs for California were provided by Cynthia Gould, EPA contractor at Abt Associates per personal communication October 8, 2018.

[28] Complete information on the calculation approach in RSEI is available in *EPA's Risk-Screening Environmental Indicators (RSEI) Methodology, RSEI Version 2.3.6*, January 2018.

concentrations on this 810-meter grid to any sensitive receptors where incremental changes are likely due to the proposed ~~Plan~~Amendment. Given the lack of available information, ICF relied on RSEI long-term average concentration data only from major stationary sources and did not conduct any emission or dispersion modeling for stationary sources specific to this analysis. Note that while these stationary sources do influence the cumulative risk impact analysis, they are already captured in existing background concentrations for PM and are thus only included in the incremental risk calculation to support risks from new sensitive-receptor locations. ICF was also unable to identify similar sources of concentration data from sources operating south of the U.S.-Mexican border. Thus, these sources were not included in this analysis. ICF also did not model emissions from other source categories, including general area sources or from industrial and goods movement facilities not affected by the proposed ~~Plan~~Amendment, such as Port of San Diego activities, the airport, landfills, or other major stationary sources that were outside the proposed ~~Plan~~ Amendment and unavailable through SDAPCD or RSEI.

4 DISPERSION MODELING

ICF conducted dispersion modeling with the emissions discussed in Chapter 3, *Emission Sources,* to estimate localized PM10, PM2.5, and TAC concentrations under baseline (2016) conditions and three future-year (2025, 2035, and 2050) conditions with implementation of the proposed Amendment~~Plan~~.

4.1 MODELING PLATFORM

ICF conducted dispersion modeling using AERMOD (EPA 2019)—EPA's preferred model for near-field pollutant dispersion calculations for distances up to 50 kilometers from emission sources. AERMOD is widely used for assessments of dispersion of emissions from stationary and mobile sources. It is a steady-state plume dispersion model that utilizes hourly meteorological data, local land-cover conditions, and elevation data, along with spatiotemporal characterizations of emissions, to estimate air pollutant concentrations at locations that the user specifies. It also has built-in processing features that assist in evaluating concentrations of PM against the forms of the 24-hour National Ambient Air Quality Standards (NAAQS). The model is updated periodically to repair bugs and add enhancements based on revised understandings of the parameters impacting pollutant dispersion. ICF used the most current version available when model setup began (version 19191).

4.2 ASSESSMENT DOMAIN

ICF developed an assessment domain covering the more populated areas (western portion) of the county. Due to the size limitations of the AERMOD model, ICF divided this overall assessment domain into six modeling subdomains. Each of these was modeled as an individual case (Figure 1) with associated meteorological data and background data on air pollutants. Because some of these have background that exceed the appliable standard, some modeling subdomains are modeled compared to a significant impact level based on the applicable PM design values (DVs) for each. These are broadly consistent with work done in the previous EIR (SANDAG 2015) and based on available data from meteorological stations and air quality monitors. ICF designed these modeling subdomains to reflect the different population centers, land uses, terrain features, meteorological conditions, and ambient PM air quality across the populated areas of San Diego County, while also keeping the modeling as efficient as possible and limiting modeling subdomain size so that most receptors were not farther than 50 kilometers from emission sources (per *Federal Register* [FR] EPA guidance for AERMOD [82 FR 5182 Jan. 17, 2017]). ICF has also assigned each modeling subdomain a name for reference purposes.

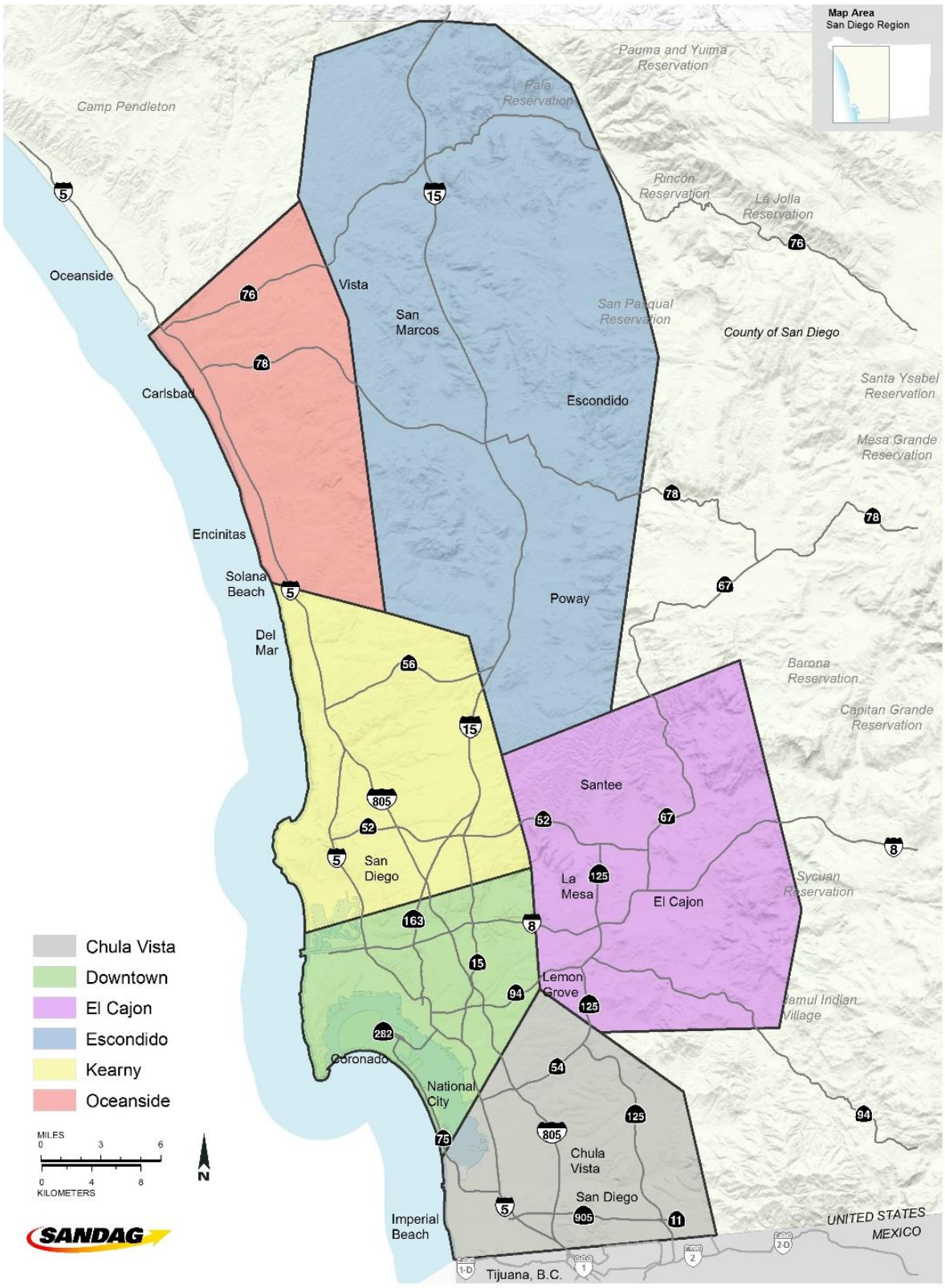


Figure 1. Subdomains for Dispersion Modeling

In the following subsections, ICF provides brief discussions of the characteristics of each modeling subdomain and the meteorological and PM stations selected for each. Section 4.3, *Meteorology,* provides further discussion of the meteorological stations and their data used for each modeling subdomain. Section 4.7, *Background Concentrations Data,* provides further discussion of the PM monitors and their respective DVs assigned for each modeling subdomain.

4.2.1 OCEANSIDE

The Oceanside modeling subdomain consists of the coastal region between the cities of Encinitas and Oceanside. The northern border runs along Camp Pendleton but does not include it (consistent with the analysis in the EIR for the 2015 Reginal Plan [SANDAG 2015]). Most areas are within about 14 kilometers of the coast, with some substantial terrain features peaking near 200 meters above sea level (ASL).

ICF used SDAPCD's Camp Pendleton (PEN) station for meteorology and SDAPCD's Kearny Villa Road (KVR) monitor for PM DVs. Although not within this modeling subdomain, the KVR monitor is the closest one that has adequately complete data to calculate 2016 DVs for the NAAQS and CAAQS.

4.2.2 ESCONDIDO

This inland modeling subdomain along the Interstate 15 corridor generally has rough terrain with most elevations at 100–400 meters ASL. The northern edge of this modeling subdomain incorporates the Fallbrook area and abuts the county border, while the southern edge is near Poway and is intended to align with the ridge that lies between the cities of Escondido and El Cajon. The north-south extent of this modeling subdomain, at about 60 kilometers, is longer than the 50 kilometers recommended AERMOD distance between a source and a receptor. That AERMOD limitation is related to the effectiveness and accuracy of the model's steady-state Gaussian dispersion calculations at long distances of plume travel within a model timestep of 1 hour. However, unlike tall smokestacks where the impact on air quality can be on the scale of tens of kilometers, the direct impact of near-ground roadway emissions is on the scale of hundreds of meters, such that the impact of their emissions will be negligible several kilometers away, let alone 50 or 60 kilometers away. This will minimize the impact of any possible model errors on the contribution, say, of major-link emissions near Poway to the air quality in Fallbrook (as a hypothetical example).

ICF used SDAPCD's Escondido (ESC) station for meteorological data and SDAPCD's KVR monitor for PM DVs for this modeling subdomain. Though the KVR monitor is not located within this modeling subdomain, the ESC PM monitor was shut down in 2015, preventing the calculation of 2016 DVs for all NAAQS and CAAQS.

4.2.3 KEARNY

This modeling subdomain features coastal cities extending from Pacific Beach in the south to Solana Beach in the north, and inland communities such as Mira Mesa and Kearny Mesa surrounding Marine Corps Air Station Miramar. This modeling subdomain has coastal and inland rugged terrain, with some elevations in the eastern portion at greater than 200 meters ASL.

ICF used SDAPCD's KVR station for meteorology and SDAPCD's KVR monitor for PM DVs in this modeling subdomain.

4.2.4 EL CAJON

This inland modeling subdomain is centered around the city of El Cajon. The terrain in this area is generally 100–300 meters ASL and features an inland valley surrounded by mountainous features.

ICF used SDAPCD's Lexington Elementary School (LES) station in El Cajon for meteorological data and SDAPCD's KVR monitor for most of the ambient air quality standards (AAQS) for this modeling subdomain. For the 24-hour PM10 CAAQS, the highest observed value in the year is compared with the standard level. During 2016, SDAPCD's Floyd Smith Drive (FSD) monitor was moved to its current LES location (SDAPCD 2017). Considering the FSD and LES datasets together, the 2016 record of PM10 data is 95% complete, and the highest 24-hour PM10 value from that superset (actually from the LES location) is larger than at the KVR monitor. To be health-protective, ICF utilized the LES station for the 24-hour PM10 CAAQS. All other AAQS require at least 3 full years of data; accordingly, ICF used the KVR site to determine the remainder of DVs for the El Cajon modeling subdomain.

4.2.5 DOWNTOWN

This urban modeling subdomain encompasses downtown San Diego, the Port of San Diego, Point Loma, Mission Valley, and Mid-City, with an eastern edge just east of San Diego State University and a southern edge following a diagonal from the Silver Strand to west of Lemon Grove. Most terrain elevations are less than 150 meters ASL. This is a primarily coastal area that extends 20 kilometers inland.

For this modeling subdomain, ICF used SDAPCD's Perkins Elementary School (PES) station in downtown for meteorological data and the San Diego-Beardsley Street (DTN) SDAPCD monitor for most PM DVs. Although DTN was permanently closed on November 24, 2016, the data still meet completeness requirements for calculating 2016 DVs for most of the AAQS.[29] ICF used DVs from the Chula Vista (CVA) SDAPCD monitor (which is not within this modeling subdomain) for the AAQS, which require a more complete dataset than what is available from DTN—that is, the 2016 $PM_{2.5}$ 24-hour and annual NAAQS.

4.2.6 CHULA VISTA

This modeling subdomain covers the southernmost extent of San Diego County, south of the Downtown modeling subdomain and north of the International Border and extends from Imperial Beach along the coast to the Otay Mesa area, including the Port of Entry. This area is coastal and extends inland approximately 20 kilometers, with terrain in the eastern portion of this modeling subdomain around 160–200 meters ASL.

ICF used CVA for meteorology and PM DVs in this modeling subdomain. While the Otay Mesa-Donovan (DVN) monitor had higher DVs, ICF did not utilize it because it is non-FEM (Federal Equivalent Method), and ICF is aware of some technical issues with the monitor that caused reporting problems.

4.3 METEOROLOGY

AERMOD requires meteorological data as input for the model. These typically are processed using AERMET, a pre-processor to AERMOD. AERMET requires observed surface meteorological data, upper-air meteorological data, and surface parameter data. SDAPCD provided three consecutive years of AERMET-processed, AERMOD-

[29] Beardsley Street station closed in November 2016 (https://ww3.arb.ca.gov/qaweb/site.php?s_arb_code=80142). Sherman Elementary station opened in its place in 2019. There are no PM data for this area during this time gap.

ready meteorological files from SDAPCD-operated stations near to or within each modeling subdomain, supplemented as needed with data from other stations, as indicated in Figure 2 and Table 4. These data utilized the latest AERMET version at the time (v19191), 1-minute-averaged wind data where available (via EPA's AERMINUTE preprocessor), and the sigma-theta AERMET option coupled with onsite measurements of turbulence. Calm winds occurred 3% or less of the time at each station, and missing hours of meteorological data occurred less than 2% of the time. Upper-air data were from the Miramar Marine Corps Air Station (NKX).

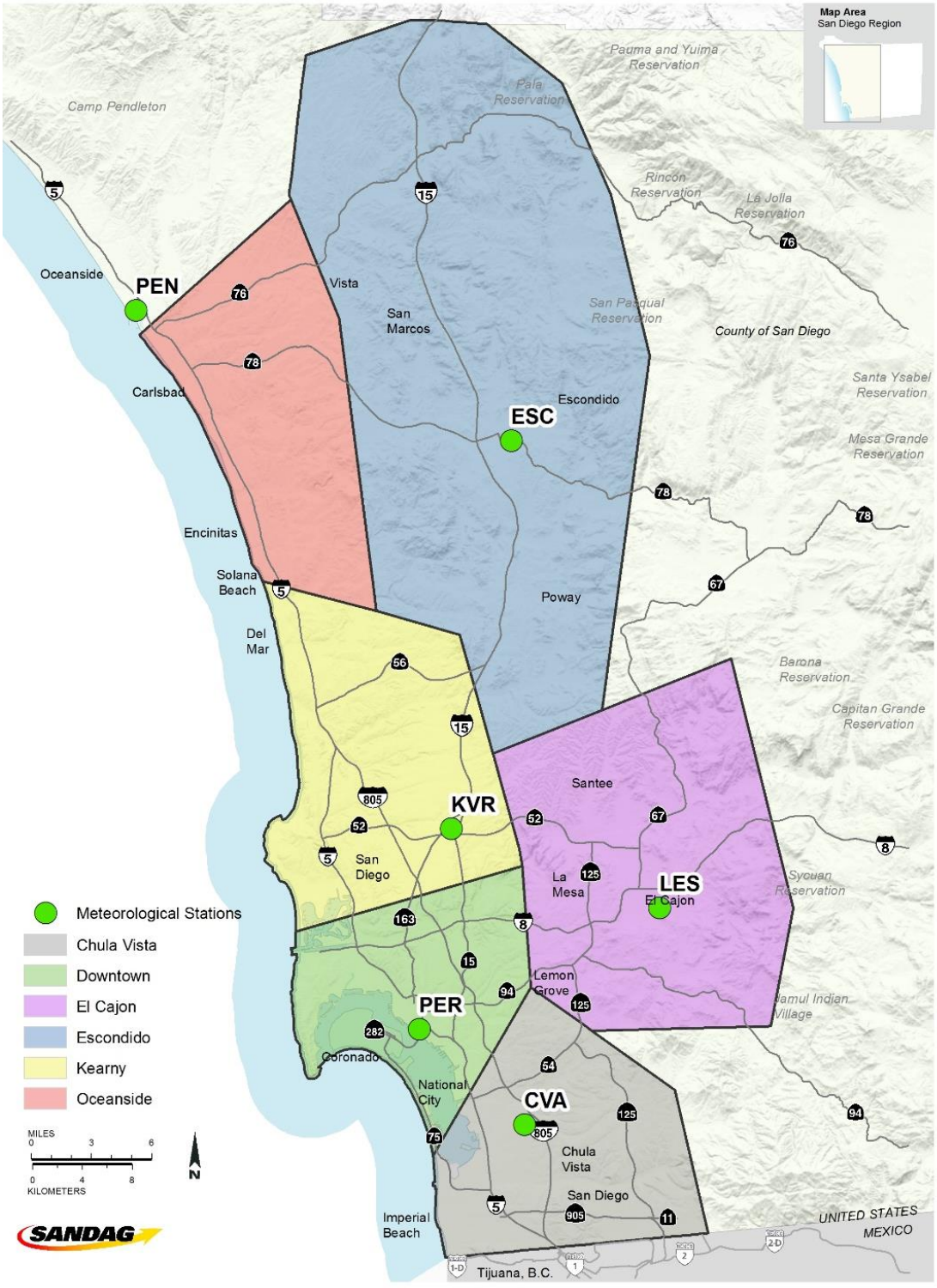


Figure 2. Sources of Meteorological Data

Note that the labels in the map indicate the station abbreviation for the onsite station (see Table 4). All onsite stations are managed by SDAPCD.

Table 4. Metadata on Each Meteorological Station

Modeling Subdomain (Abbreviation)	Station Metadata					
	Name	Latitude	Longitude	Elevation. (meters)[1]	ASOS 1-Minute Winds/Cloud-Cover Substitutions/ Temperature Substitutions[2]	Period
Oceanside (OCE)	On site: SDAPCD's Camp Pendleton (CMP) Supplemental Surface: CARB's McClellan-Palomar Airport (CRQ)	33.217	-117.396	16	Yes/ Yes/ Yes	2010–2012
Escondido (ESC)	On site: SDAPCD's Escondido (ESC) Supplemental Surface: Ramona Airport (RNM)	33.128	-117.075	200	Yes/ Yes/ Yes	2010–2012
Kearny (KVR)	On site: SDAPCD's Kearny Villa Rd. (KVR) Supplemental Surface: Marine Corps Air Station (NKX)	32.836	-117.129	134	No/ No/ Yes	2014–2016
El Cajon (LES)	On site: SDAPCD's Lexington Elementary School (LES) Supplemental Surface: Marine Corps Air Station (NKX)	32.791	-116.942	144	No/ Yes/ Yes	2010–2012
Downtown (DTN)	On site: SDAPCD's Perkins Elementary School (PES) Supplemental Surface: San Diego Int'l Airport (KSAN)	32.701	-117.150	8	Yes/ Yes/ Yes	2010–2012
Chula Vista (CVA)	On site: SDAPCD's Chula Vista (CVA) Supplemental Surface: San Diego Int'l Airport (KSAN)	32.631	-117.059	55	Yes/ Yes/ Yes	2010–2012

[1] Elevations were supplied by SDAPCD directly.

[2] "ASOS 1-Minute Winds" refers to whether the meteorological processing utilized 1-minute data on winds (applies only to ASOS stations). "Cloud-cover Substitutions" and "Temperature Substitutions" refers to whether the meteorological processing utilized interpolation to fill in small gaps of missing cloud-cover or temperature data.

ASOS = Automated Surface Observing System .

4.4 SOURCE REPRESENTATION

As discussed earlier (Sections 3.1, *On-Road Sources,* and 3.2, *Passenger and Freight Rail*), ICF modeled emission sources as polygons, from data supplied by SANDAG which ICF simplified to reduce the number of vertices without substantially impacting concentration gradients (which also improves model runtime). The spatial representations of the major links and the rail were mostly contiguous segments, while ICF modeled minor-link emissions aggregated to partial tract polygons (the portions of a tract within a given modeling subdomain). Because major-link segments were relatively short, ICF allowed them to cross beyond the boundaries of the modeling subdomain and be modeled as part of both modeling subdomains; rail segments were longer and ICF clipped them at modeling subdomain boundaries.

For efficiency in modeling, ICF aggregated emissions from on-road brake wear, tire wear, road dust, and exhaust into total PM10 and total PM2.5 emissions. ICF also aggregated TAC emissions based on toxicity weighting to benzene, utilizing OEHHA reference values—see the toxicity reference values and corresponding toxicity-equivalency factors in Table 5 that ICF used to aggregate TAC emissions to benzene-equivalents. ICF used actual emissions for each road and rail source (in units of grams per square meter per second), with temporal profiles based on those in the ABM, utilizing the AERMOD HROFDAY profile to represent the hourly variation in emissions throughout the day.[30]

Table 5. Inhalation Toxicity Reference Levels Used to Aggregate Emissions of Toxic Air Contaminants Based on Toxicity Weighting to Benzene

Chemical	Acute REL ($\mu g/m^3$)	Chronic REL ($\mu g/m^3$)	CSF $(mg/kg\text{-}d)^{-1}$	Acute Non-Cancer TEF	Chronic Non-Cancer TEF	Cancer TEF
1,3-Butadiene	660	2	0.6	2.44E+01	6.67E-01	1.67E-01
Acetaldehyde	470	140	0.01	1.74E+01	4.67E+01	10
Acrolein	2.5	0.35		9.26E-02	1.17E-01	
Benzene	27	3	0.1	1	1	1
DPM		5	1.1		1.67E+00	9.09E-02
Ethylbenzene		2000	0.0087		6.67E+02	1.15E+01
Formaldehyde	55	9	0.021	2.04E+00	3	4.76E+00
Naphthalene		9	0.12		3	8.33E-01
POM as Benzo[a]pyrene			3.9			2.56E-02

Sources: RELs: OEHHA 2019b, CSFs: OEHHA, 2019a.

DPM = diesel particulate matter; POM = polycyclic organic matter; REL = non-cancer reference exposure level; CSF = cancer slope factor; TEF = toxicity-equivalency factor (ICF multiplied emissions by these TEFs to toxicity-weight them to benzene); µg = microgram; m^3 = cubic meter; mg = milligram; kg = kilogram; d = day.

The absence of an REL or CSF means that OEHHA has not promulgated a value, and therefore ICF did not include that chemical in that risk metric (e.g., ICF did not include ethylbenzene emissions in assessments of acute risk). ICF used DPM only from diesel engines and the other TACs only from non-diesel engines. As noted earlier in Section 3.1 *On-Road Sources*, emissions of POM were already aggregated and toxicity-weighted to benzo[a]pyrene.

[30] Consistent with the ABM annualized vehicle-travel information, ICF did not include weekday/weekend variation in release profiles in the dispersion modeling.

ICF modeled two of each major- and minor-link polygon—one polygon for activity from light-duty vehicles and another for activity from heavy-duty vehicles. When SANDAG characterized north- and south-bound links from the same roadway as separate segments, ICF kept them separate in the modeling. ICF set the source release heights and the parameter for the initial vertical plume as indicated in Table 6, based on default vehicle heights and formulas provided by EPA (EPA 2015b, 2019).

Table 6. Characterizations of Source and Plume Height for On-Road Sources

Source Type	Vehicle Height (VH; meters)	Release Height (meters) = (VH × 1.7)/2	Initial Vertical Plume Parameter (SigmaZ; meters) = (VH*1.7)/2.15
On-road light duty (including exhaust, brake, dust)	1.53	1.3005	1.2098
On-road heavy-duty (including exhaust, brake, dust)	4	3.4	3.1628

Sources: VH = EPA 2015b. RH = EPA 2015b, EPA 2019, SigmaZ = EPA 2019.

ICF modeled two of each rail polygon—one polygon for daytime activity and another for nighttime activity. ICF defined daytime as 6 a.m. through 5:59 p.m. ICF set the source release heights and the parameter for the initial vertical plume as indicated in Table 7 (ENVIRON International, Corporation 2008: Table 4-1). ENVIRON used these height and vertical-plume values for arriving-departing line haul, while they used much higher values for switcher activities.

Table 7. Characterizations of Source and Plume Height for Rail Sources

Source Type	Release Height (meters)		Initial Vertical Plume Parameter (SigmaZ; meters)	
	Daytime	Nighttime	Daytime	Nighttime
Switcher (rail yard)[1]	37.76	37.3	8.78	8.67
All Other Rail[2]	4.76	11.25	1.11	2.62

[1] Activity Subcategory D (Switching) (ENVIRON International, Corporation, 2008: Table 4-1).

[2] Activity Subcategory E (Arriving-Departing Line Haul) (ENVIRON International, Corporation, 2008: Table 4-1).

ICF did not directly model dispersion of stationary-source emissions. ICF based concentrations on EPA's RSEI modeling (see Section 3.3, *Stationary and Other Sources*).

4.5 RECEPTORS

Receptors are specific locations where air pollutant concentrations are simulated in the dispersion model. Our analysis had two types of receptors: those used for the HRA and those used for PM evaluation. Those for the HRA evaluation are referred to here and in the body of the SEIR as *sensitive receptors*; they represent sensitive land uses such as residences, schools, and parks. The second type, *ambient receptors,* are used to determine the ambient air quality impacts of the proposed ~~Plan~~Amendment, specifically the incremental changes PM concentrations across the modeled areas. In practice in the dispersion modeling the locations of both types of receptors were at the same place for both HRA and PM assessment. In the ambient air quality analysis these locations are referred to as ambient receptors. In the HRA (Section 5) these represent different types of sensitive receptors based on the land use in which they occur (e.g., schools, parks, or residential).

ICF first created a regular grid of receptors across the assessment domain, which was consistent across analysis years and spaced at 50 meters, consistent with CARB and South Coast Air Quality Management District (SCAQMD) recommendations (CARB 2005, SCAQMD n.d.). The consistency of the receptor grid across analysis years was to support incremental-risk calculations, except where changes in land use caused receptors to be in or out of a given year of modeling (e.g., a residential area projected to exist in 2050 where none existed in 2016, or vice versa) or where AADT or construction plans changed source locations or designations (e.g., a new major link is built in 2035, or AADT projections cause a link to go from minor to major status). ICF created the grid of receptors for a given analysis year to extend 500 feet (approximately 152 meters) from major links and rail lines, also including a 10-foot (approximately 3-meter) right-of-way buffer adjacent to a major link to account for the shoulder. No receptors were placed within a source. This approach ensured that receptor definitions were consistent with both available land-use definitions and specific sources defined in the proposed ~~Plan~~ Amendment. The 10-foot road edge buffer forming the inside boundary of receptors defined the road shoulder, setting the closest area of public access to the major link, and representing the "fenceline" of the project area, consistent with Caltrans road cross-sections provided by SANDAG (Uchitel pers. comm.); ICF assumed no shoulder for rail. The 500-foot outer boundary of receptors was a distance judged to provide adequate representation of the near-road or near-rail concentration gradient, consistent with CARB guidance (2005) for siting new sensitive land uses within 500 feet of a freeway, or urban road with more than 100,000 vehicles/day. Table 8 indicates the number of receptors for each modeling subdomain and analysis year.[31]

In determining health risk, the subset of the gridded receptors that were sensitive receptors represented residential, school, and recreational land uses, based on SANDAG's land-use models. The land-use models had codes facilitating identification of schools and recreational areas; for residential areas there were data on all four analysis years, and ICF required a land-use polygon to have at least one dwelling unit to be considered residential.[32] Recreational and school land uses do not change in this analysis.[33] Some land-use polygons could have multiple land uses.

Table 8. Number of Modeling Receptors, by Modeling Subdomain and Analysis Year

Modeling Subdomain	Analysis Year			
	2016	2025	2035	2050
Chula Vista	2,061~~2,093~~	2,161~~2,179~~	3,005~~2,950~~	2,832~~3,083~~
Downtown	2,962~~3,004~~	3,502~~3,499~~	4,444~~4,418~~	5,656~~5,711~~
El Cajon	1,645~~1,645~~	1,960~~1,953~~	1,916~~1,906~~	2,504~~2,522~~

[31] Note that number of receptors have changed in this proposed Amendment although the methodology has not. This is because the network of Major Links here has been updated to reflect the links in the approved Plan and receptors are determined by proximity to the major road links. From the Draft PEIR to the Final PEIR, SANDAG revised its ABM2+ model to reflect minor modifications to the transportation network improvements as well as minor modeling corrections. No update to the air quality modeling was required because those corrections did not materially change the conclusions in the air quality analysis in the PEIR. *See* Section 4.3, *Air Quality*, of the approved Plan PEIR, p. 4.3-52.

[32] Please note residential sensitive-receptor zones here represent residential land uses, not specific houses. These were used to characterize incremental health risk in residential locations. This is independent of the population in these areas, which could change, for example, if more residents move into the area due to denser housing stock.

[33] Note that there can still be "new" recreational or school receptors that are "turned on" by a new source. For example, a new rail that comes near an existing school that was not previously near enough to a source to be included in the modeling would be a "new" receptor for the modeling even though the land use is unchanged. This is explained further in Section 7.3.

Modeling Subdomain	Analysis Year			
	2016	2025	2035	2050
Escondido	2,031~~2,046~~	2,158~~2,155~~	2,148~~2,138~~	2,407~~2,391~~
Kearny	2,253~~2,253~~	2,339~~2,331~~	3,168~~3,156~~	3,742~~3,733~~
Oceanside	2,897~~2,909~~	3,095~~3,068~~	3,178~~3,151~~	3,173~~3,153~~
Total	**13,849~~13,950~~**	**15,215~~15,185~~**	**17,859~~17,719~~**	**20,314~~20,593~~**

ICF placed all ambient receptors for PM analysis at ground level (i.e., flagpole receptors at 0-meter height), consistent with SCAQMD guidelines (SDAPCD guidelines do not include guidance on receptor heights). ICF placed all sensitive receptors for HRA analysis a standard breathing height of 1.2 meters, consistent with HARP modeling default (CARB 2015b). These are heights above ground level, with terrain included.

Note that these sensitive receptors represent land use, not necessarily the "density" of a land use. That is, a residential sensitive receptor indicates that the land around that sensitive receptor is used for residential purposes (possibly among others); however, it does not indicate how many people live at that residence. This is explained further with the scope of the HRA in Chapter 5, *Estimating Health Risks*.

All receptors were modeled considering the underlying terrain elevation. ICF included terrain modeling in the analysis for all modeling subdomains, utilizing EPA's current version (version 18081) of AERMOD's terrain processor, AERMAP.

4.6 OTHER MODEL SPECIFICATIONS

Other model specifications were consistent with regulatory applications of AERMOD.

ICF used the ~~version of~~ AERMOD ~~current at the time of modeling of the original EIR (19191)~~ to conduct all dispersion analyses. This model version was maintained here for consistency. ICF included only model regulatory default (DFAULT) options except for use of the FASTALL computation method, which optimizes model runtime for area sources through a hybrid approach. As mentioned in Section 4.3, the meteorological data obtained from SDACPD were processed with 1-minute-averaged wind data where available (via EPA's AERMINUTE preprocessor), the sigma-theta AERMET option coupled with onsite measurements of turbulence, and typically with substitutions of missing temperature and cloud-cover values.

SDAPCD guidance for HRAs recommends rural dispersion throughout the San Diego region except on a case-by-case basis (SDAPCD 2022~~19~~). ICF used urban dispersion for modeling subdomains containing more than 50% of their land area designated as Census Urban Areas (i.e., for all modeling subdomains except Escondido). For the Escondido modeling subdomain (the only modeling subdomain with 50% or less of its land area designated as Census Urban Area), urban dispersion settings were on a source-by-source basis: if more than 50% of a major link segment, rail segment, or partial tract was in a Census Urban Area, then ICF modeled that source segment with urban dispersion. ICF used an urban population of 3,337,685 (U.S. Census Bureau 2017), for the San Diego-Carlsbad Major Statistical Area, consistent with the relatively isolated nature of San Diego's urban area (EPA 2018), for the urban dispersion setting.

This analysis excluded impacts of any trees or other mitigating barriers such as sound walls that could affect dispersion between sources and receptors.

4.7 BACKGROUND CONCENTRATIONS DATA

ICF did not include background concentrations in any AERMOD simulation. Background is important for establishment of cumulative risk, but not incremental risk (Chapter 5). It is also relevant for the PM thresholds (Section 6.1). Both are discussed below.

San Diego currently is in nonattainment for both the PM2.5 CAAQS (for which there is an annual standard) and the PM10 CAAQS (for which there are 24-hour and annual standards; both must not be exceeded for a region to be considered in attainment for PM10 CAAQS; CARB 2019).[34] ~~,~~ The monitor DVs based on 2016 data (CARB, n.d.-) show exceedances of the 24-hour PM10 CAAQS and the 24-hour and annual PM2.5 CAAQS at the Otay Mesa-Donovan monitor in the Chula Vista area, which ICF excluded from this analysis. (Because of this, none of the modeled subdomains are treated as nonattainment for PM2.5 for modeling purposes, although the county is thus designated. See discussion further below). The monitor DVs also show exceedances of the 24-hour PM10 CAAQS at the monitor ICF selected for the Downtown modeling subdomain, as well as the annual PM10 CAAQS at the Downtown monitor and the monitor ICF selected for the Chula Vista modeling subdomain. All other modeling subdomains and standards show exceedances of the applicable standards based on the 2016 monitor DVs.

For computation of PM thresholds, ICF assigned to each model subdomain a single background concentration (2016 DV [CARB n.d.]) for each pollutant and averaging period. There are relatively few available monitors to calculate PM DVs and other information related to AAQS for the modeling subdomains for the baseline project year of 2016. Therefore, ICF used a limited number of monitors to describe the baseline air quality across the assessment domain.

Table 9 presents the assignment of PM monitors and 2016 DVs to each modeling subdomain. Table 10 provides the metadata for each of the PM monitors chosen.

Table 9. Assignments of Monitors and Design Values (in micrograms per cubic meter) for Particulate Matter for each Modeling Subdomain

Modeling Subdomain	National Standards[1]						California Standards[2]					
	PM2.5				PM10		PM2.5		PM10			
	Annual (12.0)[3]		24 Hour (35)[4]		24 Hour (150)[5]		Annual (12)[6]		Annual (20)[g]		24 Hour (50)[7]	
	Monitor	DV	Monitor	DV	Monitor	DV	Monitor	DV	Monitor	DV	Monitor	DV
Oceanside	KVR	7.6	KVR	15	KVR	39	KVR	8	KVR	20	KVR	35
Escondido	KVR	7.6	KVR	15	KVR	39	KVR	8	KVR	20	KVR	35
Kearny	KVR	7.6	KVR	15	KVR	39	KVR	8	KVR	20	KVR	35
El Cajon	KVR	7.6	KVR	15	KVR	39	KVR	8	KVR	20	FSD/LES	44[i]
Downtown	CVA	8.8	CVA	19	DTN	53	DTN	10	**DTN**	**24**	**DTN**	**51**
Chula Vista	CVA	8.8	CVA	19	CVA	48	CVA	9[j]	**CVA**	**23**	CVA	48

[1] NAAQS available in Title 40, Part 50 of the Code of Federal Regulations: https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr50_main_02.tpl

[34] CARB Area Designations for State ~~PM2.5~~ Ambient Air Quality Standards are available at: https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations~~https://www.arb.ca.gov/desig/adm/2019/state_pm25.pdf?_ga=2.133211788.342428628.1625676234-2022182663.1612965600~~.

[2] CAAQS available in Section 70200 of Title 17 of California Code of Regulations: ~~https://ww3.arb.ca.gov/regs/title17/70200.pdf,~~ and summarized along with NAAQS by CARB: https://ww2.arb.ca.gov/sites/default/files/2020-07/aaqs2.pdf.

[3] The PM2.5 National Annual DV is calculated as the average of three consecutive national averages (shown here: average of 2014–2016).

[4] The PM2.5 National 24-hour DV is calculated as the average of three consecutive annual 98th percentile values (shown here: average of 2014–2016).

[5] The PM10 National 24-hour NAAQS standard is violated when the sum of exceedances over 3 years is greater than three. The DV given is the maximum 24-hour average concentration of PM10 over 2014–2016, which is a conservative overestimate of air quality with regard to 24-hour PM10.

[6] The PM2.5 State Annual DV is the maximum of three consecutive annual averages (shown here: maximum of 2014–2016).

[7] The PM10 State Annual DV is the maximum of three consecutive annual averages (shown here: maximum of 2014–2016).

[8] The PM10 State 24-hour DV is calculated as the maximum 24-hour PM10 average observed within the year (shown here: maximum in 2016).

[9] During 2016, the FSD monitor was moved to its current LES location. Considering the FSD and LES datasets together, the 2016 record of PM10 data is 95% complete, and the highest 24-hour PM10 value from that superset (actually from the LES location) is larger than at the KVR monitor.

[10] The Otay Mesa-Donovan monitor has a DV of 13 for 2016 (for the annual PM2.5 CAAQS), but ICF did not utilize it because it is non-FEM, and ICF was aware of some technical issues with the monitor that caused reporting problems.

Notes:

PM = particulate matter; PM10 = PM with aerodynamic diameter less than or equal to 10 micrometers; PM2.5 = PM with aerodynamic diameter less than or equal to 2.5 micrometers; DV = design value; KVR = Kearny Villa Road; CVA = Chula Vista; DTN = 1110 Beardsley Street; LES = Lexington Elementary School; FSD = Floyd Smith Drive.

Bold underline indicates an exceedance or violation of the standard. Parenthetical values in the third header row indicate the standard-level concentrations.

Table 10. Metadata on Monitoring Stations for Particulate Matter

Name	Latitude	Longitude	Elevation (meters)	Agency	Notes
Chula Vista (CVR)	32.63	-117.06	55	SDAPCD	Not available
Beardsley Street (DTN)	32.70	-117.15	141	SDAPCD	Not available
Kearny Villa Road (KVR)	32.85	-117.12	134	SDAPCD	Not available
Floyd Smith Drive (FSD)	32.82	-116.97	119	SDAPCD	FSD was moved back to its original site, LES, in late 2016.
Lexington Elementary School (LES)	32.79	-116.94	144	SDAPCD	Data from FSD and LES are combined in 2016 to create a complete record.

All the selected sites are either Federal Reference (FRM) or Federal Equivalent Method (FEM) for the pollutant they are supporting (SDAPCD 2017). This ensures that the DVs extracted are commensurate with their purpose here.

ICF chose PM monitors according to the amount of data completeness required to calculate 2016 DVs for all AAQS. When a modeling subdomain contained more than one PM monitor with DVs available for a given AAQS, ICF selected the monitor with the higher DV to be conservative.

- With one exception, ICF used KVR in the Escondido, El Cajon, and Oceanside modeling subdomains because it is the closest monitor to these modeling subdomains with the data completeness necessary to calculate DVs for 2016.

- The exception is for the 24-hour PM10 CAAQS specifically for the El Cajon modeling subdomain. During 2016, SDAPCD's FSD monitor was moved to its current LES location. Considering the FSD and LES datasets together, the 2016 record of PM10 data is 95% complete, and the highest 24-hour PM10 value from that superset (actually from the LES location) is larger than at the KVR monitor. To be conservative, ICF utilized the LES station for the 24-hour PM10 CAAQS.
- ICF used CVA DVs in the Downtown modeling subdomain for the PM2.5 24-hour and annual NAAQS, instead of DTN DVs due to data-completeness issues.

ICF considered the Pala Airpad Tribal monitor to the northeast of the overall assessment domain, but rejected it due to the lack of certified data along with low DVs for the data that were available. ICF considered the Otay Mesa-Donovan monitor but ultimately rejected it as the particulate monitors are not operated according to FEM/FRM standards, and ICF was made aware of some technical issues with the monitor that caused reporting problems during this period.

Figure 3 shows the locations of the PM monitors described in Table 9. Table 10 summarizes the monitoring station assignments by modeling subdomain.

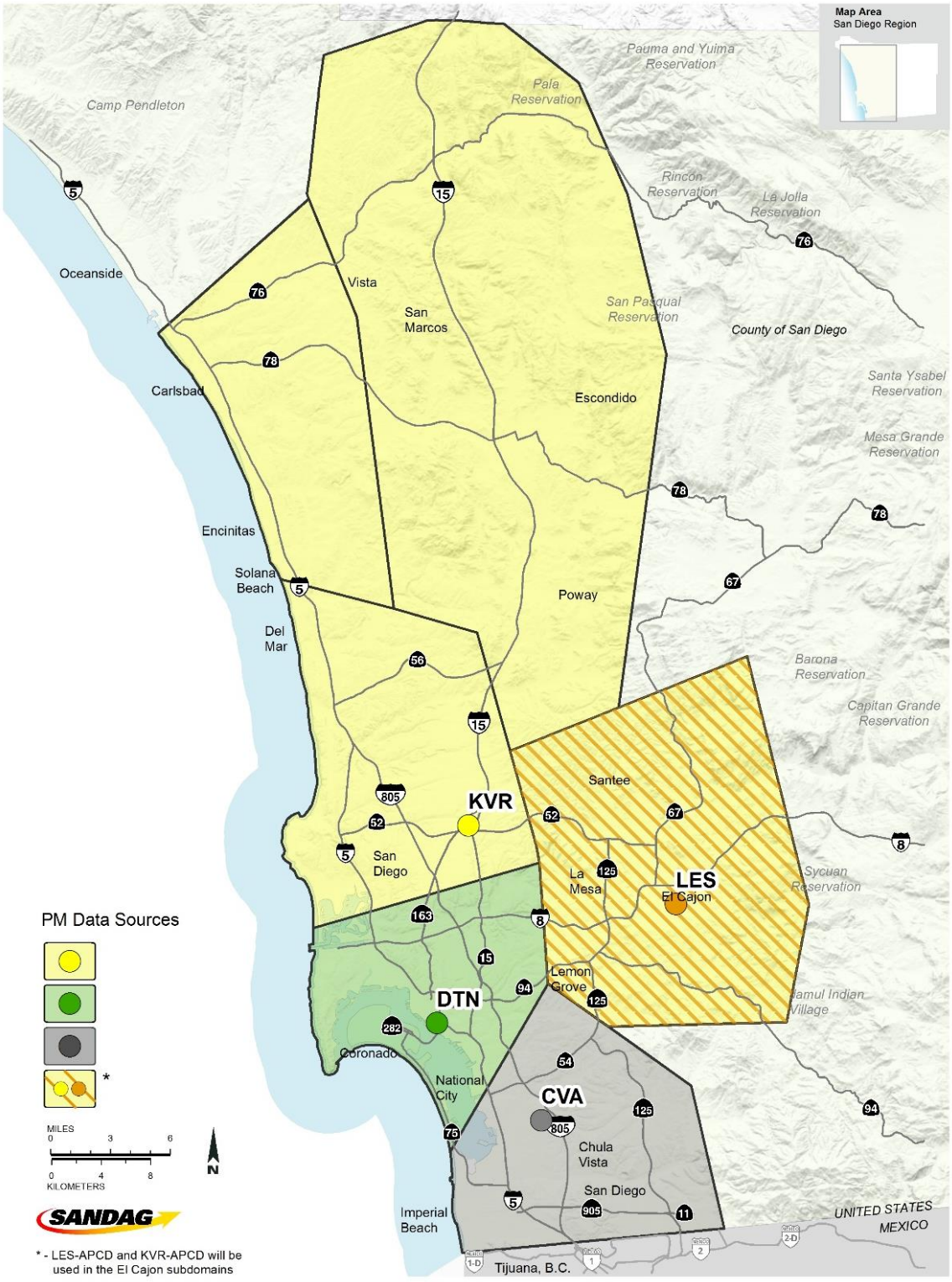


Figure 3. Sources of 2016 Design Values for Particulate Matter

Notes: Labels in the map indicate the monitor abbreviation (see Table 9 and Table 10). All monitors are managed by SDAPCD.

4.8 OUTPUTS

4.8.1 PARTICULATE MATTER

For PM2.5 modeling, ICF used AERMOD to determine the 24-hour-average NAAQS DVs, specifically the highest multi-year average of the 98th percentile 24-hour PM2.5 concentrations, which equates to the multi-year average of the annual eighth-highest 24-hour values. In AERMOD, ICF achieved this by setting the AERMOD keyword POLLID to PM2.5 and the output rank to 8TH, which outputs the multi-year average of the annual eight-highest 24-hour values at each ambient receptor. For PM2.5 annual standards, ICF modeled each year of meteorological data separately with annual-average outputs, so that ICF could identify the maximum annual concentration at each ambient receptor for the CAAQS DV and the multi-year-average annual concentration at each ambient receptor for the NAAQS DV.

For PM10 modeling, ICF used AERMOD to determine the 24-hour-average NAAQS DVs. The 24-hour NAAQS is violated when the 24-hour-average concentration exceeds the standard more than once per year on average over 3 years, such that the DV equates the High-N+1-High value of 24-hour-average concentrations over N years. In AERMOD, ICF arrived at this DV by setting the POLLID to PM10 and the output rank to 4TH, because N is 3 here. For the 24-hour CAAQS, ICF used AERMOD to determine the highest 24-hour-average concentration in the 3-year modeling period, which ICF used as the CAAQS DV though it is a conservative estimate because the CAAQS form refers to 1 year of analysis rather than 3 years (i.e., the highest 24-hour-average in 1 year rather than across 3 years). For the PM10 annual CAAQS, ICF modeled each year of meteorological data separately with annual-average outputs, so that ICF could identify the maximum annual concentration at each ambient receptor for the CAAQS DV.

ICF compared these DVs against PM thresholds, as described in Section 6.1.

4.8.2 HEALTH RISK ASSESSMENT

HRA dispersion modeling produces only interim results. ICF used AERMOD to output toxicity-weighted TAC concentrations as maximum 1-hour-average concentrations (for acute assessment) and period-average concentrations (for chronic non-cancer and cancer assessment) at each sensitive receptor for the 3-year modeling period. These concentrations were benzene-equivalents based on relative toxicity for a given health endpoint as discussed in Section 4.4, *Source Representation*. ICF used these AERMOD outputs in the HARP model to estimate cancer and acute and chronic non-cancer health risks for each sensitive-receptor type and modeling subdomain (Chapter 5).

5 ESTIMATING HEALTH RISKS

The health risks associated with pollutant exposure were estimated by translating the toxicity weighed TAC concentrations from Chapter 4 into exposure risks. ICF evaluated both incremental and cumulative health impacts from the proposed ~~Plan~~Amendment. Incremental risks are evaluated for cancer, acute non-cancer, and chronic non-cancer endpoints. Only cancer health impacts were evaluated for cumulative risks. The exposure parameters used in HARP2 to estimate excess lifetime cancer risks and non-cancer Hazard Indices (HI) for all potentially exposed populations are consistent with updated risk assessment guidelines from OEHHA. This section summarizes the methods and tools used to estimate health risks from exposures to TACs associated with the proposed ~~Plan~~Amendment.

5.1 POLLUTANTS ASSESSED

As discussed in Section 2.2, health risks associated with the proposed ~~Plan~~ Amendment were estimated for the following nine priority MSATs: 1,3-butadiene acetaldehyde, acrolein, benzene, DPM, ethylbenzene, formaldehyde, naphthalene, and POM. Only exhaust emissions were speciated, consistent with FHWA's approach for priority MSATs.

TACs can result in a variety of health impacts. For this assessment, cancer and short (acute) and long-term (chronic) non-carcinogenic impacts were assessed. The severity of adverse health impacts from TACs are dependent on the toxicity of the compound and the level of exposure. These priority MSAT pollutants do not have substantial multi-pathway exposure mechanisms.[35] Accordingly, this analysis considers the inhalation pathway only. All analyses were performed using OEHHA's HARP2 model. As with AERMOD, this analysis used the same version of the HARP model as the approved Plan PEIR for consistency with the previous analysis.

As discussed in Section 4.4, ICF used toxicity weighting to expedite the air quality modeling and risk assessment. TAC emissions were scaled based on toxicity weighting to benzene, utilizing OEHHA reference values for a given endpoint. Because of the relative differences in the health benchmark values used to assess cancer, non-cancer acute, and non-cancer chronic health effects, different toxicity weightings were used for each of the endpoints. This approach allows a single AERMOD simulation to represent the compound effects of all considered TACs, because although HARP can consider multi-pollutant impacts, AERMOD is a single pollutant model. However, this approach requires modeling the three health effects endpoints separately in HARP to accommodate the different weighting factors by different endpoint. See Section 4.4 and Table 5 for more information on this approach.

5.2 HEALTH EFFECTS ENDPOINTS

As noted, ICF used a benzene toxicity-weighting approach to estimate health effects from exposure to TAC emissions under the proposed ~~Plan~~ Amendment of the nine MSATs. Sections 5.2.1 and 5.2.2 provide more detail on carcinogenic and non-carcinogenic health evaluations, respectively.

5.2.1 CARCINOGENIC EFFECTS

Excess lifetime cancer risks are estimated as the increased likelihood that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). Cancer-risk age sensitivity factors (ASFs) are included to account for an anticipated special sensitivity to carcinogens of infants and children. The use of CPFs and ASFs is recommended by OEHHA in its 2015 Health Risk Guidelines and included in HARP.

Consistent with both OEHHA and SDAPCD recommendations for a 30-year exposure duration for estimating cancer risk for residential sensitive receptors, ICF determined cancer increments using a 30-year continuous exposure to the level of emissions associated with the proposed ~~Plan~~ Amendment in a given year. This is true for each of the three modeled ~~Plan~~ proposed Amendment years and the baseline (2016) at a given location. For example, the cancer risk associated with year 2025 is estimated as 30 years of exposure to the 2025 level of

[35] See Table 5.1 of OEHHA's Hot Spot Guidance, https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

emissions. The incremental risk for 2025 is based on 30-years of exposure at 2025 levels minus the risk from 30 years of exposure at the existing (2016) levels of emissions. These incremental risks are then compared to the incremental cancer risk thresholds (Section 6.2). The 30-year exposure applies only to the residential and recreational exposure scenarios. For the school scenario, an exposure duration of 13 years was used, although the same mathematical construct applies. See Section 5.3 for more detail on exposure settings.

Section 7.3, *HRA,* provides results for incremental changes in cancer risk and cumulative cancer risk for each proposed ~~Plan~~ Amendment year.

5.2.2 NON-CARCINOGENIC EFFECTS

The potential for exposure to result in chronic non-cancer effects is evaluated by comparing the estimated annual-average air concentration to the chemical-specific non-cancer chronic RELs, using HARP. Acute non-cancer effects utilize the peak 1-hour air concentration in comparison with the acute RELs. When calculated for a single chemical, the comparisons yield a ratio termed a hazard quotient (HQ). Consistent with OEHHA guidance, to assess the potential for adverse non-cancer health effects from simultaneous exposure to multiple chemicals, the chronic or acute HQs for all chemicals are summed for each target organ system, yielding an HI. Conservatively, HIs were reported for the most impacted organ system. Non-cancer chronic HIs utilized the period average concentrations from AERMOD. Non-cancer risks relied on the same sources and pollutants identified earlier.

ICF reports incremental changes in chronic and acute HI, similar to that discussed for cancer end points. Note that there is no quantitative evaluation of cumulative non-cancer impacts due to lack of data on background non-cancer risks.[36]

5.3 EXPOSURE SCENARIOS ASSESSED

For a given ambient concentration of pollutant, the potential for adverse health effects is a function of the types of persons exposed (e.g., adults, children, pregnant women) and the duration and extent of exposure. Based on guidance from the most recent version of the *Air Toxic Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* dated February 2015 (OEHHA 2015), health impacts were assessed for Residential, School, and Recreational exposure scenarios.

Residential

For residential sensitive receptors, lifetime cancer risks were conservatively based on an assumed 30-year exposure duration (ED) to TAC air concentrations with exposure beginning in the third trimester.[37] All HRA modeling was performed with HARP and included OEHHA's ASFs, as appropriate, and OEHHA-derived inhalation rates (i.e., 95th percentile inhalation rate).

OEHHA guidance suggests that the fraction of time at home (FAH) for residential sensitive receptors be set to 1 for ages less than 16 years for cases where a school lies within a 1 per million cancer isopleth of the site. For

[36] As discussed in Section 5.4.4, cumulative cancer risks rely on EPA's National Air Toxics Assessment (NATA), which reports cumulative cancer risks only. No attempt to calculate cumulative non-cancer risks was made given the lack of data.

[37] Note that ICF did not assess occupational cancer risk or 8-hour chronic HI.

the current assessment, ICF conservatively used an FAH of 1 for ages less than 16 for all residential sensitive receptors, regardless of school location. All other inputs were HARP default values for inhalation exposure.[38]

Non-cancer risks for the resident scenario were based on the relevant exposure parameters described above.

School

To assess health effects on sensitive receptors, a K-12 student scenario was evaluated. To assess cancer risks for the school scenario an ED of 13 years was used, with exposure beginning at age 5.[39] For school sensitive receptors, the fraction of time exposed was set to 12% (6 hours per day, 180 days per year) for all exposed ages starting at age 5. Preschools were not assessed.

Non-cancer risks for the school scenario were based on the relevant exposure parameters described above.

Recreational

To assess cancer risks for recreational sensitive receptors, the ED was set to 30 years and the fraction of time exposed was set to 4% (2 hours per day, 180 days per year), assuming the average amount of time spent daily in such locations.

Non-cancer risks for the recreational scenario were based on the relevant exposure parameters described above.

5.4 RISK ESTIMATION METHODS

The current version of CARB's HARP model[40] (version 21081) was used to estimate the short- and long-term health impacts from exposure to the pollutants emitted from operation of the road network and selected additional sources influenced by or expected to have compounding effects on the road emissions from the proposed ~~Plan~~Amendment.

Estimated ground-level concentrations (GLC) (discussed below) were used as inputs to HARP to calculate cancer, non-cancer acute, and non-cancer chronic health endpoints, for each modeled sensitive receptor in each modeled subdomain, for each assessed year, and for residential, school, and recreational sensitive receptors.

5.4.1 GROUND-LEVEL CONCENTRATIONS

GLCs for all TACs were based on the output of the air dispersion modeling, conducted with AERMOD, as described in Chapter 4. As noted in Section 2.2.2, the full universe of TACs evaluated was: 1,3-butadiene, acetaldehyde, acrolein, benzene, DPM, ethylbenzene, formaldehyde, naphthalene, and POM/PAH. POM/PAH

[38] Note that HARP was also used to translate TAC concentrations for stationary sources from the RSEI model to California-relevant risks. In that case, residential parameters were also used as described here. However, those did not include the conservative FAH approximation included for Plan sources. This is a small inconsistency that subtracts out in incremental risk calculation for most sensitive receptors. See Section 5.4.2.

[39] The 13-year exposure duration represents K–12 schools and is consistent with the approach OEHHA recommends. This is a conservative overestimate for other school types, such as K–5, as it assumes exposure will occur at the same location even if the student is at a different location for grades 5–12.

[40] Available at: https://ww2.arb.ca.gov/resources/documents/harp-air-dispersion-modeling-and-risk-tool~~https://www.arb.ca.gov/toxics/harp/admrt.htm~~.

comprised benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene, all expressed as benzo[a]pyrene-equivalents based on their OEHHA cancer PEFs. As indicated in Section 4.4, ICF did not include some TACs for some exposure scenarios due to absence of a promulgated toxicity reference value—assessments of acute non-cancer risks did not include exposures to DPM, ethylbenzene, naphthalene, and POM/PAH (benzo[a]pyrene), while assessments of chronic non-cancer risks also did not include exposures to POM/PAH. Cancer assessments did not include exposures to acrolein. ICF also did not include emissions of acenaphthene, acenaphthylene, anthracene, benzo[g,h,i]perylene, fluoranthene, fluorene, phenanthrene, and pyrene in the expression of POM/PAH emissions as benzo[a]pyrene-equivalents for the same reason. Finally, ICF expressed all TAC emissions as benzene-equivalents (toxicity-weighted).

The AERMOD modeling resulted in GLCs for benzene (actually, the sum of all TACs represented as benzene-risk-equivalent concentrations). The AERMOD output PLOTFILE files expressed the largest hourly concentration at each sensitive receptor in the multi-year modeling (for use in acute risk assessment) and the multi-year-average concentration at each sensitive receptor (for use in chronic non-cancer and cancer risk assessment) of this pseudo-pollutant, which is input to the HARP model.

5.4.2 STATIONARY SOURCES

The ~~proposed~~ approved Plan ~~has~~ had the potential to place new sensitive receptors at locations that previously were uninhabited and potentially in areas with high levels of pollutants due to nearby stationary sources. ICF assessed risks from both the mobile sources directly affected by the proposed ~~Plan~~Amendment, and indirectly from nearby stationary sources for all sensitive receptors.

Data from EPA's RSEI model was used to estimate chronic non-cancer and cancer risks for stationary sources within the modeling subdomains. Chemical-specific GLCs were taken from the RSEI model for stationary sources in San Diego C~~c~~ounty, then modeled using HARP to determine the risks in a manner consistent with OEHHA's approach. These risks were calculated using chemical-specific GLCs at centroid points of an 810- by 810-meter grid across San Diego County. Cancer and chronic non-cancer risks were assessed assuming a 30-year ED with exposure starting in the 3rd trimester. As stationary source impacts are not the primary concern, ICF approximated this step by conservatively modeling only with a residential exposure scenario but tempered the approach by using the default FAH values for children under the age of 16. The resulting risk on the 810-meter grid was then interpolated using a (12-point, power of 2) inverse distance weighting approach in ArcGIS to interpolate stationary risks to each sensitive-receptor point in each modeling subdomain. This interpolated value is ~~that~~ used in the increment calculation. As noted above, the same stationary source risk is used for all years as there is no projection of 2016 stationary source concentrations to future years.

Finally, as the stationary sources concentrations from RSEI reflect only long-term exposure concentrations and are not appropriate for short-term, acute assessments, we did not include them in calculations of acute incremental risks from the proposed ~~Plan~~Amendment.

5.4.3 INCREMENTAL HEALTH RISK ESTIMATION

Incremental risk is computed as the difference in risk values between the assessed ~~plan~~proposed Amendment year and the existing year for each sensitive receptor. For mobile source risks (i.e., risks associated directly with ~~Plan~~proposed -Amendment emissions), incremental risks are calculated as:

$$\underline{Mobile\ incremental\ risk = \sout{Plan}proposed\ Amendment\ year\ risk - 2016\ risk}$$

This is the form used for estimating acute exposures because the stationary source data does not include short-term concentrations. For chronic and cancer risk, however, ICF accounts for the potential for the proposed ~~Plan~~ Amendment to result in new sensitive receptors relocated to areas of high concentrations of stationary source pollutants by adding stationary source risks to those mobile source risks to estimate a "total" incremental risk at a given sensitive receptor location:

$$Total\ incremental\ risk = (\sim\sim Plan\sim\sim proposed\ Amendment\ year\ risk + stationary\ risk) - (2016\ risk + stationary\ risk)$$

In cases where a sensitive receptor exists in both the ~~Plan~~ proposed Amendment year and the existing year (i.e., 2016), stationary risks, which are constant across the years assessed, cancel out as can be seen in the total incremental risk formula above. Stationary risks, therefore, only affect the total incremental risk in cases where a sensitive receptor "turns off" (receptor exists in 2016, but not in the ~~Plan~~ proposed Amendment year) or "turns on" (receptor does not exist in 2016 but does exist in the proposed Amendment~~Plan~~ year). In the first case where a sensitive receptor "turns off," a sensitive receptor exists in 2016, which is not there in the assessed proposed Amendment~~Plan~~ year, resulting in a negative incremental risk. However, when a sensitive receptor "turns on," the total risk from the baseline 2016 year is zero, leaving the sum of the proposed Amendment~~Plan~~ year risk and stationary risk as total incremental risk. In this situation, the incremental risk is equal to the "total" risk (proposed Amendment~~Plan~~ plus stationary).

The summary results distinguish between risks that arise from existing sensitive receptors (receptors that exists in 2016) and risks that arise from new sensitive receptors (receptors that do not exist in 2016 but exist in the subsequent proposed Amendment~~Plan~~ years).

5.4.4 CUMULATIVE HEALTH RISK ESTIMATION

SDAPCD does not define a cumulative heath risk threshold and does not provide existing or expected cumulative risk values across the San Diego region to use in assessing cumulative health risk for the proposed Amendment~~Plan~~. ICF estimated cumulative health risk impacts by combining the health risk increment from the proposed ~~Plan~~ Amendment with the EPA's most recent assessment of risks in the modeled areas based on the 2014 National Air Toxics Assessment (NATA).[41] The 2014 NATA assessment includes emissions, ambient concentrations, and exposure estimates for about 180 air toxics plus DPM. NATA also provides estimates of cancer risk based on those chemicals for which there are carcinogenic health benchmarks for inhalation exposures. Because EPA does not have a carcinogenic health benchmark for DPM, DPM is not included in the risk estimates under NATA. However, DPM concentrations are provided under NATA. ICF used these DPM concentrations in HARP to calculate DPM cancer risks, then added those risks to the NATA cancer risk data to develop a total cancer risk, inclusive of DPM. ICF believes the NATA to be the most complete dataset to provide background risk levels for the modeled areas (i.e., risks to residents before the implementation of the proposed Amendment~~Plan~~). NATA results were used because the data were easily accessible, efficient to use, and sufficiently timely (i.e., based on 2014 emissions). NATA data is reported at the Census Tract level. The sensitive receptors were given the NATA plus DPM risk value of the Census Tract in which they lie.

ICF computed cumulative risk at each modeled location in each year as:

$$cumulative\ cancer\ risk = cancer\ risk_{NATA} + cancer\ risk_{\ NATA\ DPM} + mobile\ incremental\ risk$$

[41] https://www.epa.gov/national-air-toxics-assessment/2014-nata-assessment-results.

The first term was taken directly from NATA risk results and includes the risk for all carcinogenic pollutants and sources; however, as noted previously, it does not include risks from exposures to DPM. The second term was computed using residential exposure and cancer unit risk factors for DPM from OEHHA with the HARP tool for each sensitive receptor, following the same approach used for the other TACs described above, but based on total DPM concentrations from NATA, by census tract. It should be noted that these include all sources. This allows for the inclusion of DPM background risk values, using OEHHA methods, because NATA does not include DPM in their carcinogenic risk assessment. The third term is the mobile source cancer risk increment from the proposed ~~Plan~~ Amendment (project year minus existing), as discussed in Section 5.4.3, *Incremental Health Risk Estimation*. This term corrects the NATA values for the difference in mobile sources expected under the proposed ~~Plan~~ Amendment between project and existing years.

Note that the cumulative assessment is not an incremental evaluation. It is an estimate of the total risk from all sources in each modeling subdomain, from long-term exposure to the level of emissions associated with the proposed ~~Plan~~ Amendment and other sources that are included in NATA. Cumulative risks are reported for each of the proposed ~~Plan~~ Amendment years in Section 7.3. Note also that the mobile increment is essential to the cumulative risk calculation. Thus, cumulative risks are calculated only for sensitive receptors that exist in both the baseline and future years. (i.e., those receptors that are neither "turned on" or "turned off"). Finally, because NATA uses daily time-activity patterns to estimate long-term exposures, the NATA results were only used to estimate cumulative risks for residential sensitive receptors. School and recreational sensitive receptors would be inconsistent with the NATA characterization of risk given the small fraction of time spent in those environments.

6 THRESHOLDS

This section discusses the thresholds by which pollutant concentrations and risk are evaluated for significance.

6.1 PARTICULATE MATTER THRESHOLDS

As noted in Section 4.7, *Background Concentrations Data,* the San Diego region is currently in attainment of the PM10 and PM2.5 NAAQS and nonattainment of both PM10 and PM2.5 CAAQS.

The proposed ~~Plan~~ Amendment would have a significant local PM air-quality impact if it causes a new violation of the PM standards or contributes substantially to an existing or projected violation of the PM standards. Impacts were based on incremental concentration changes, similar to that used in the previous EIR (Section 4.3 of the EIR for the 2015 Regional Plan [SANDAG 2015]). These thresholds must be based on incremental concentration to avoid double counting that would occur if project concentrations were added to background and compared to the NAAQS or CAAQS. Any ambient receptor in a proposed ~~Plan~~ Amendment analysis year but not in the baseline year (e.g., a receptor modeled for 2050 but not for 2016, such as from a change in land use or new or expanded sources) could not be included in calculations of PM increments. That is, ~~Plan~~proposed Amendment increments cannot be calculated at ambient receptors that do not have modeled PM concentrations for the baseline year, and air-quality impacts cannot be determined at locations without ~~Plan~~ proposed Amendment increments because the existing sources are already included in the monitored (background) concentrations.

For modeling subdomains where the monitored DVs were below the applicable standard(s), ICF established subdomain-, pollutant-, and averaging-period–specific thresholds of incremental concentration. This threshold was the difference between the applicable NAAQS or CAAQS level for PM concentrations and the monitored DV for the subdomain. ICF then computed the incremental change in modeled PM DV between the ~~Plan~~ proposed

Amendment and existing (2016) conditions. Where the maximum of these modeled increments across the modeling subdomain was at or below the PM threshold, implementation of the proposed ~~Plan~~ Amendment would not cause a new exceedance of the applicable standard(s).

For the remaining areas (those where the monitored DVs are above the PM standard[s]; i.e., nonattainment modeling subdomains), ICF determined if the proposed ~~Plan~~ Amendment would significantly contribute to existing violations by comparing the maximum incremental concentrations to a significant change threshold. Because SANDAG does not have its own incremental thresholds, ICF used thresholds from relevant agencies based on substantial evidence, discussed in part here. The most relevant thresholds are those recommended by SDAPCD. The SDAPCD has not published formal guidance regarding California Environmental Quality Act (CEQA) compliance, but air-district rulemaking often is the source for CEQA thresholds (SDAPCD 1998).[42] SDAPCD Rule 20.2 (New Source Review for non-major stationary sources) defines an incremental increase as 5.0 µg/m^3 for 24-hour PM10 and 3.0 µg/m^3 for annual PM10 (SDAPCD 1998). The County of San Diego suggests the 5.0 µg/m^3 24-hour PM10 threshold in its CEQA guidance (County of San Diego 2007). Neither SDAPCD nor the County provide recommendations for analyzing ambient PM2.5. The federal significant impact levels (SILs), intended to define when changes are not meaningful and do not contribute to a violation of the NAAQS under the Prevention of Significant Deterioration (PSD) program, would imply less-than-significant impacts in all Class I, II, or III areas. The federal annual SILs are 1.0 and 0.2 µg/m^3, and the federal 24-hour SILs are 5.0 and 1.2 µg/m^3 for PM10 and PM2.5, respectively.

Based on this review of relevant thresholds, ICF used the incremental thresholds presented in Table 11 (the source for each is summarized in parentheses).

Table 11. Significant Impact Levels Utilized when Monitor Design Values Were Above the Threshold Concentration for Particulate Matter

Time Scale	PM10	PM2.5
Annual	3.0 (SDAPCD, San Diego County)	0.2 (EPA)
24-hour	5.0 (SDAPCD, San Diego County, EPA)	1.2 (EPA)

As mentioned, SDAPCD Rule 20.2 defines an incremental increase of both 24-hour and annual PM10 (5.0 µg/m^3 and 3.0 µg/m^3, respectively). The County of San Diego, in its CEQA guidance, defines a significant impact on ambient air as an exceedance of the SDAPCD's 24-hour PM10 standard (defined as 5.0 µg/m^3). As noted, neither the SDAPCD nor County has provided recommendations for analyzing ambient PM2.5 concentrations. For PM2.5, ICF believes the SCAQMD PM2.5 Significant Change Thresholds are the most appropriate for use in the San Diego region over the more conservative federal SILs given the logic above about air quality in the South Coast region being much worse than the San Diego region and the fact that the use of SCAQMD Significant Change Thresholds are already conservative and health-protective. Note that the PM2.5 thresholds shown in Table 11 are more conservative than those used in the previous EIR (SANDAG 2015)~~;)~~. The PM10 thresholds also differ for the reasons discussed.

ICF shows each subdomain-, pollutant-, and averaging-period–specific threshold of incremental concentration in Section 7.2, *Particulate Matter,* alongside the results of the PM assessment.

[42] For example, SCAQMD's *Significant Change Threshold* is based on rulemaking for New Source Review, and County of San Diego Screening Level Thresholds for mass emissions are based on permit levels for New Source Review.

6.2 HRA THRESHOLDS

The HRA considered incremental changes in cancer, chronic, and acute risks at residential, school, and recreational sensitive receptor locations. Each is defined in terms of an incremental change (increase) in risk from the proposed ~~Plan~~ Amendment relative to existing conditions.

- Carcinogenic health impacts are represented as the estimated excess 30-year cancer risk increment. A significant cancer health impact is defined as an excess cancer risk increment (net new) of 10 in a million or greater under the proposed ~~Plan~~ Amendment relative to baseline conditions anywhere in the modeling subdomain.
- A significant chronic non-cancer health impact is defined as an incremental chronic HI of 1.0 or greater anywhere in the modeling subdomain.
- A significant acute health impact is also defined as an incremental acute HI of 1.0 or greater anywhere in the modeling subdomain.

These criteria are consistent with SDAPCD levels of significance for public notification.[43]

ICF also considered cumulative health risks in each modeled subdomain under the proposed ~~Plan~~Amendment. As above, these only apply for residential sensitive receptor types and only for cancer health risks. A significant cumulative health impact is determined by exceedance of the following cumulative threshold:

- A cancer risk of 100 per million or greater for residential sensitive receptors.

Note that a cumulative cancer risk of 100 per million was also used in the previous EIR (SANDAG 2015).

7 RESULTS

ICF first developed an inventory of the pollutant emissions associated with the ~~Plan~~proposed Amendment. This included link-based emissions for on-road mobile sources and source-based emissions for passenger and freight rail and other major stationary sources. ICF then conducted dispersion modeling to estimate localized PM10, PM2.5, and TAC concentrations under baseline (2016) conditions and three future-year (2025, 2035, and 2050) conditions with implementation of the proposed ~~Plan~~Amendment. ICF then assessed incremental carcinogenic, acute non-cancer, and chronic non-cancer risks based on the modeled concentrations of TACs from the ~~Plan~~ proposed Amendment and supplemented with additional risk values for potentially exposed populations. The methodology and details of these analyses are described in Chapters 2, 3 and 4, above. Here we summarize the results of each analysis step.

7.1 MASS EMISSIONS

ICF started with link- and time-resolved ABM outputs for 2016, 2025, 2035, and 2050. Vehicle speeds are time resolved, congested speeds from the ABM. Those activity data were coupled with EMFAC-based, speed resolved emission factors for San Diego County for the same years from EMFAC. ICF also incorporated road dust emissions into the air quality modeling determined with the CARB method and used MOVES-based speciation values to compute MSAT emissions; however, the summary Table 12 does not show MSAT or road dust emissions. Table 12 represents total road emissions in the assessment domain, although these were split among major and minor links based on an AADT threshold, vehicle type, and time period as described above

[43] https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Misc/APCD_HRA_Guidelines.pdf.

for dispersion modeling. These emissions levels were compared against both SANDAG-provided conformity results and EMFAC model defaults to quality assure results, as described in Section 3.1. Figure 4 summarizes emissions of all pollutants in each year. Figure 5 summarizes the PM emissions by component and year. Although exhaust PM is dramatically reduced over this time period compared to the 2016 baseline (82% reduction by 2050 for both PM2.5 and PM10), total PM (exhaust plus brake and tire wear plus road dust) is reduced, then steadily increases over time due to increased vehicle miles traveled, so the net change by 2050 is only slightly different from the 2016 baseline. Specifically, total road emissions of PM2.5 show a 9% decrease by 2050, while PM10 shows a 2% increase in region-wide emissions.

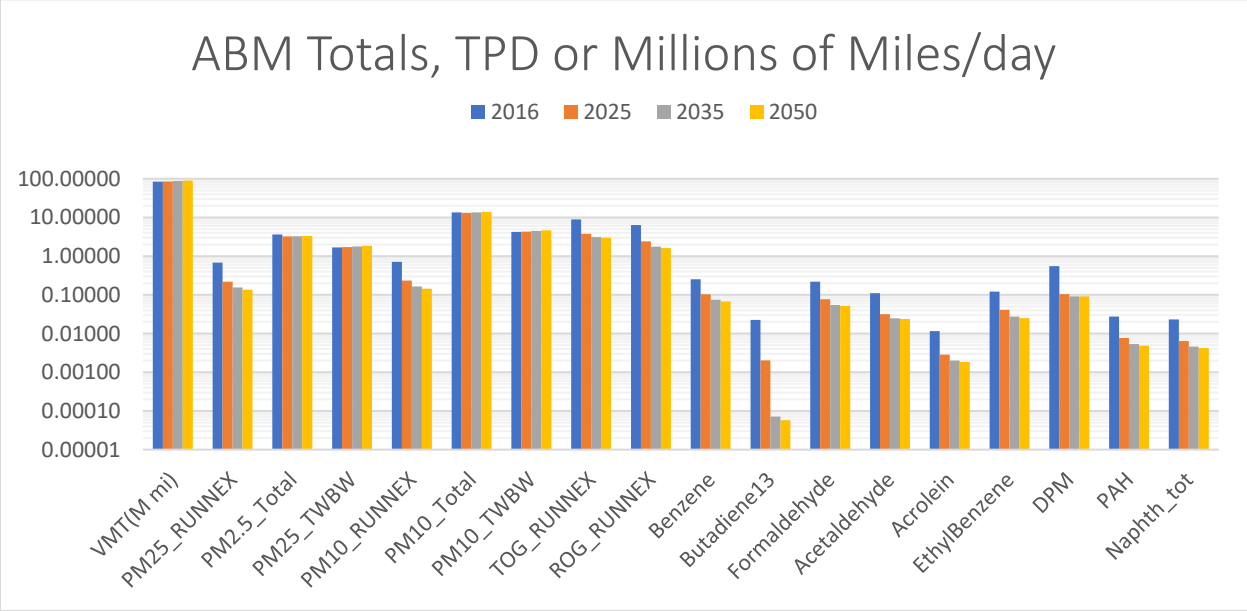
Table 12. Average Daily On-Road Emissions (tons) and Vehicle Miles Traveled (millions of miles) Modeled for the Proposed Amendment~~Plan~~ and Baseline Conditions[1]

Year	PM2.5	PM10	TOG	ROG	NO_X	SO_X	CO	VMT
2016	3.6~~3.6~~	13~~14.~~	8.9~~9.0~~	6.4~~6.4~~	33~~33.~~	0.36~~0.36~~	142~~145~~	~~858~~4.
2025	3.2~~3.2~~	13~~13.~~	3.8~~3.8~~	2.4~~2.4~~	12~~11.~~	0.28~~0.28~~	6~~667.~~	~~858~~5.
2035	3.3~~3.2~~	13~~13.~~	3.1~~3.2~~	1.8~~1.8~~	8.6~~8.0~~	0.24~~0.24~~	53~~53.~~	~~878~~7.
2050	3.3~~3.3~~	14~~14.~~	3.0~~3.1~~	1.6~~1.6~~	8.3~~7.5~~	0.23~~0.23~~	50~~51.~~	~~909~~0.

Year	1,3-Buta-diene~~1, 3~~	Acetal-dehyde	Acrolein	Benzene	Ethyl-Benzene	Formal-dehyde	Naph-thalene	PAH[2]	DPM
2016	0.023~~0.023~~	0.11~~0.11~~	0.012~~0.012~~	0.25~~0.26~~	0.12~~0.12~~	0.22~~0.22~~	0.023~~0.023~~	2.7E-02~~7.5E-05~~	0.55~~0.53~~
2025	0.0020~~0.0020~~	0.032~~0.032~~	0.0028~~0.0029~~	0.10~~0.10~~	0.041~~0.041~~	0.077~~0.079~~	0.0064~~0.0065~~	7.7E-03~~4.4E-05~~	0.10~~0.093~~
2035	7.1E-05~~7.2E-05~~	0.025~~0.025~~	0.0020~~0.0020~~	0.075~~0.075~~	0.028~~0.028~~	0.055~~0.055~~	0.0046~~0.0046~~	5.4E-03~~2.4E-05~~	0.092~~0.078~~
2050	5.7E-05~~5.7E-05~~	0.024~~0.024~~	0.0018~~0.0018~~	0.067~~0.068~~	0.025~~0.025~~	0.052~~0.052~~	0.0042~~0.0042~~	4.9E-03~~1.8E-05~~	0.091~~0.071~~

[1] Top table shows criteria pollutants and precursors; bottom table shows air toxics. Additionally, throughout this table and in all other results in this report that are compared to the approved Plan it is important to note that results are those from the conditions modeled in this SEIR. These include the removal of the regional road usage charge and its influence on vehicle travel and speeds, but also other changes to the network and the mix of vehicles on the network due to the modeling corrections noted in Chapter 2 of this SEIR. These additional changes affect results in all years. Thus, changes presented here are the net result of all differences between the approved Plan EIR and this SEIR, and are not solely due to the removal of the regional road usage charge.

[2] PAH values are the sum of the individual components, toxicity-weighted.



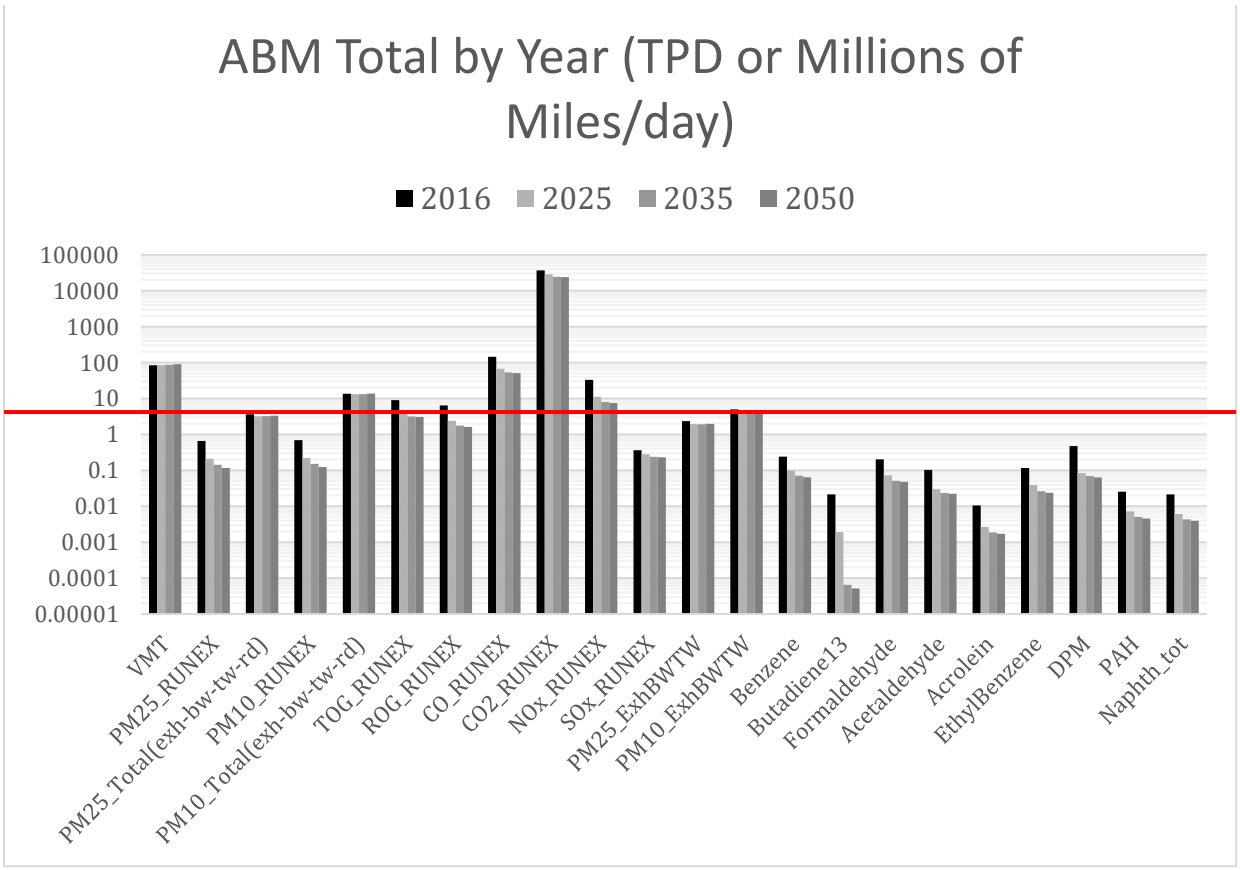
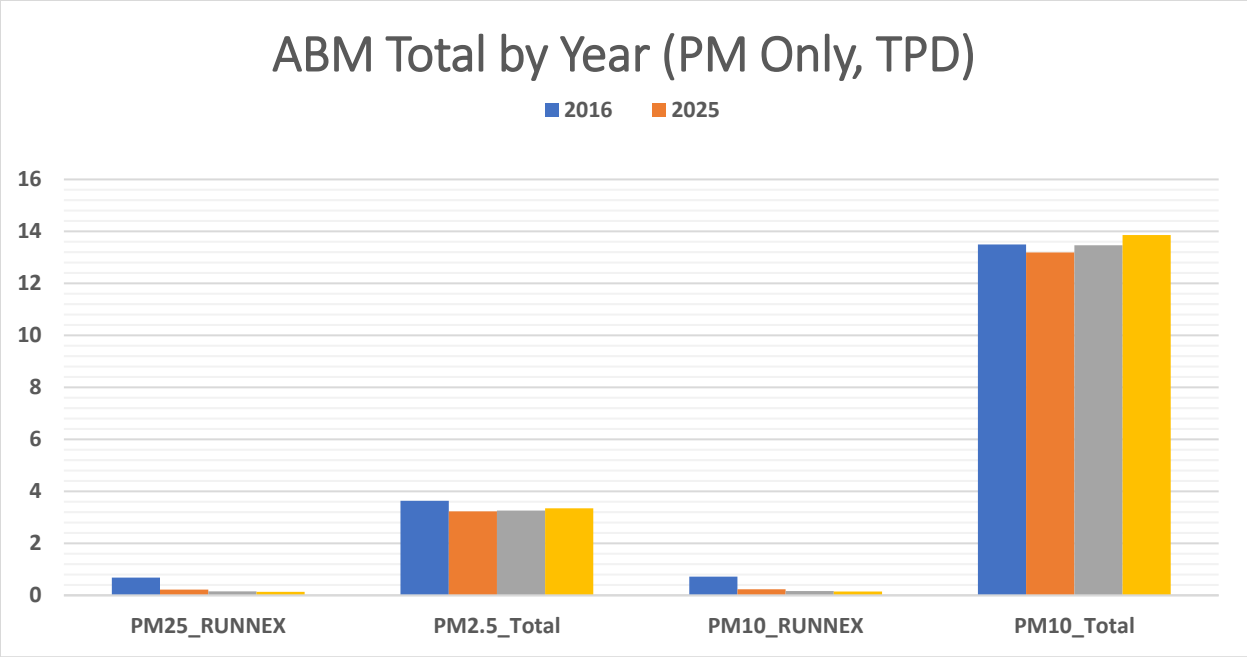


Figure 4. Summary of all Pollutant Emissions by Year



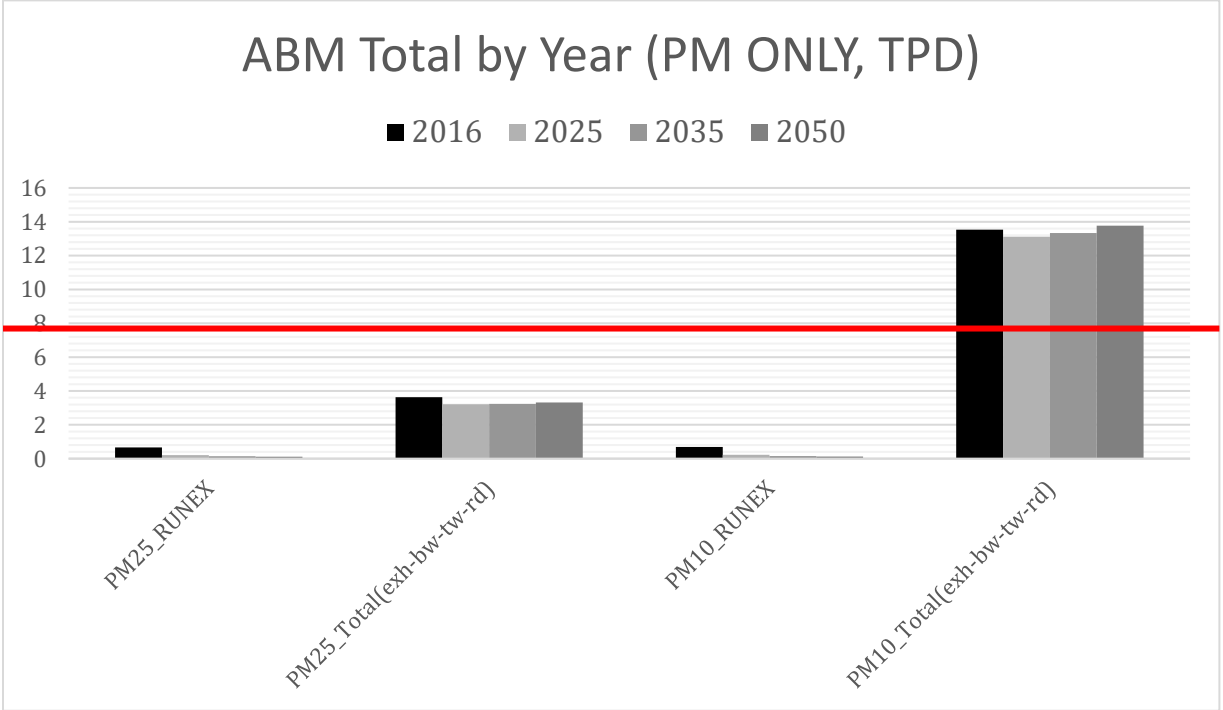


Figure 5. ABM-Based Calculation of PM2.5 and PM10 Emissions by Year

Note: exh=exhaust; bw=brake wear; tw=tire wear; rd=road dust; RUNEX=running exhaust.

Table 13 and Table 14 show the Rail emissions under the proposed Amendment~~Plan~~ by year. Table 13 shows the criteria pollutants and precursors, while Table 14 shows the mobile source air toxic pollutants calculated for rail countywide.

Table 13. Average Daily Emissions of Criteria Pollutants and Precursors (tons) for Rail Activity Under the Proposed Amendment~~Plan~~ and Baseline Conditions

Year	PM10	PM25	VOC	NO_X	SO_X	NH_3
2016	0.067	0.064	0.13	2.3	0.029	0.0013
2025	0.016	0.015	0.039	0.82	0.051	0.0017
2035	0.016	0.015	0.041	0.84	0.12	0.0031
2050	0.033	0.031	0.078	1.7	0.28	0.0066

Table 14. Average Daily Emissions of Air Toxics (tons) for Rail Activity Under the Proposed Amendment~~Plan~~ and Baseline Conditions

Year	1,3-Buta-diene	Acetal-dehyde	Acrolein	Benzene	Ethyl-Benzene	Formal-dehyde	Naph-thalene	PAH[1]	DPM
2016	2.4E-04	0.011	0.0032	0.0041	9.4E-04	0.031	7.3E-04	2.3E-07	0.067
2025	5.0E-05	0.0032	5.7E-04	0.0011	2.3E-04	0.010	3.8E-04	1.3E-07	0.016
2035	3.8E-05	0.0029	4.9E-04	0.0007	2.6E-04	0.009	4.5E-04	9.3E-08	0.016
2050	6.9E-05	0.006	8.7E-04	0.0012	4.9E-04	0.017	1.2E-03	1.7E-07	0.033

[1] PAH values are the sum of the individual components, toxicity-weighted.

7.2 PARTICULATE MATTER

As discussed above, ICF modeled both pollutants (PM2.5 and PM10) at each ambient receptor and year for all applicable DVs. ICF then differenced the modeled concentrations between the proposed Amendment~~Plan~~ year and the 2016 baseline year to show whether the increment is positive—that is, whether the proposed Amendment~~Plan~~ would lead to an increased concentration of the pollutant at any ambient receptor in any future year relative to current conditions. Note that ICF calculated this increment only at ambient receptors that existed in both the baseline and proposed Amendment~~Plan~~ years (i.e., existing ambient receptors. See Section 6.1.) A positive increment alone does not necessarily indicate that a significant air quality impact would result—that is determined by comparing this increment to the thresholds applicable to each modeling subdomain discussed in Section 6.1.

Table 15 shows the results of this analysis. The first column shows the modeling subdomain (or whole assessment domain) to which the results apply. The second column shows which of the six air quality standards is being evaluated (NAAQS or CAAQS; 24-hour or annual averaging period). The third column shows the applicable threshold, which varies by air quality standard, averaging period, and modeling subdomain (described further in Section 6.1). The rest of the columns show the resulting data, grouped by modeled year (2025, 2035, and 2050). In each case there are two datasets. The first is the approximate land area with ambient receptors (a) exceeding the applicable ambient air quality threshold, or (b) showing a positive increment (i.e., an increase in concentrations) but less than the applicable threshold. As ambient receptors are placed on a regular grid, this area is estimated from the number of receptors observed beyond each metric. The number is

indicative of the total land area matching each of these categories, which was thus estimated.[44] If at least one ambient receptor's incremental concentration exceeds the applicable threshold (see red shading in Table 15), a significant air quality impact is observed. However, the number of ambient receptors or total land area is not itself indicative of any standard. The second dataset for each year is shown by the third column—the maximum incremental concentration increase in a modeling subdomain for a given standard and year, where values of 0 indicate no change in concentration and all other values quantify the increase in concentration relative to 2016. Because these are incremental concentrations relative to 2016, Table 15 does not show results for the 2016 baseline year.

Across the entire modeled area, a small number of ambient receptors showed incremental concentrations that exceeded either or both PM10 CAAQS thresholds (i.e., that exhibited significant PM10 ambient concentration impacts), particularly for the annual standard. For the PM10 annual CAAQS, the ~~Kearny,~~ El Cajon, ~~and~~ Escondido, and Oceanside modeling subdomains all showed exceedances in at least 1 year, with incremental concentrations up to 4 µg/m^3 in Escondido in 2050, which is compared to a threshold of 0 (the monitored DV was equal to the standard, such that any incremental concentration above 0 would trigger an exceedance in this case). For the PM10 24-hour CAAQS, all exceedances occurred in the Chula Vista modeling subdomain, where the maximum exceedance was at most a factor of 1.5~~2~~ above the threshold. At many other ambient receptors, the modeled incremental concentrations were above 0, up to a value of 1~~5~~4 µg/m^3, meaning the proposed Amendment~~Plan~~ was causing higher concentrations than the 2016 baseline conditions, but those increments did not exceed the thresholds. No locations in the entire modeling domain showed an increase in PM10 above the NAAQS level.

No locations in the entire assessment domain showed an increase in PM2.5 that exceeded any of the relevant thresholds. Thus, there are no significant air quality impacts for PM2.5 anywhere in the assessment domain. This is important as PM2.5 is the pollutant most associated with adverse health impacts.

[44] Each receptor is deterined from a regularly spaced, 50-m grid. See Section 4.5. Thus, the total land area represented by a single receptor is approximately 2,500 m2 (0.62 acres). This is approximate as it simplifies receptors at the edges of a source.

Table 15. Summary of Results for Incremental Concentrations of Particulate Matter for ~~Plan~~ Proposed Amendment by Year, Relative to the 2016 Baseline

~~Modeling Sub-domain~~	~~Standard~~	~~Threshold (µg/m³)~~	~~2025~~			~~2035~~			~~2050~~		
			~~Approximate Land Area (acres)~~		~~Maximum Incremental Concentration~~	~~Approximate Land Area (acres)~~		~~Maximum Incremental Concentration~~	~~Approximate Land Area (acres)~~		~~Maximum Incremental Concentration~~
			~~Above Threshold~~	~~With Positive Increment but Not Above Threshold~~	~~Value (µg/m³)~~	~~Above Threshold~~	~~With Positive Increment but Not Above Threshold~~	~~Value (µg/m³)~~	~~Above Threshold~~	~~With Positive Increment but Not Above Threshold~~	~~Value (µg/m³)~~
~~Whole Assessment Domain~~	~~PM2.5 Annual NAAQS~~	~~Varies~~	~~0~~	~~18~~	~~0.6~~	~~0~~	~~117~~	~~0.6~~	~~0~~	~~232~~	~~0.7~~
	~~PM2.5 24 Hour NAAQS~~		~~0~~	~~1~~	~~1~~	~~0~~	~~34~~	~~1~~	~~0~~	~~30~~	~~2~~
	~~PM10 24 Hour NAAQS~~		~~0~~	~~168~~	~~4~~	~~0~~	~~376~~	~~10~~	~~0~~	~~687~~	~~10~~
	~~PM2.5 Annual CAAQS~~		~~0~~	~~1~~	~~1~~	~~0~~	~~1~~	~~1~~	~~0~~	~~5~~	~~1~~
	~~PM10 Annual CAAQS~~		~~33~~	~~33~~	~~2~~	~~113~~	~~19~~	~~3~~	~~273~~	~~16~~	~~4~~
	~~PM10 24 Hour CAAQS~~		~~1~~	~~179~~	~~6~~	~~6~~	~~475~~	~~14~~	~~2~~	~~716~~	~~15~~
~~Kearny~~	~~PM2.5 Annual NAAQS~~	~~4.4~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~13~~	~~0.1~~
	~~PM2.5 24 Hour NAAQS~~	~~20~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	~~PM10 24 Hour NAAQS~~	~~111~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~38~~	~~1~~
	~~PM2.5 Annual CAAQS~~	~~4~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	~~PM10 Annual CAAQS~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~6~~	~~0~~	~~1~~
	~~PM10 24 Hour CAAQS~~	~~15~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~12~~	~~1~~
~~Downtown~~	~~PM2.5 Annual NAAQS~~	~~3.2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	~~PM2.5 24 Hour NAAQS~~	~~16~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	~~PM10 24 Hour NAAQS~~	~~97~~	~~0~~	~~31~~	~~1~~	~~0~~	~~30~~	~~1~~	~~0~~	~~27~~	~~1~~
	~~PM2.5 Annual CAAQS~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	~~PM10 Annual CAAQS~~	~~3 (SIL)~~	~~0~~	~~22~~	~~1~~	~~0~~	~~7~~	~~1~~	~~0~~	~~12~~	~~1~~
	~~PM10 24 Hour CAAQS~~	~~5 (SIL)~~	~~0~~	~~32~~	~~1~~	~~0~~	~~25~~	~~1~~	~~0~~	~~25~~	~~1~~
~~Chula Vista~~	~~PM2.5 Annual NAAQS~~	~~3.2~~	~~0~~	~~13~~	~~0.6~~	~~0~~	~~12~~	~~0.3~~	~~0~~	~~17~~	~~0.2~~
	~~PM2.5 24 Hour NAAQS~~	~~16~~	~~0~~	~~1~~	~~1~~	~~0~~	~~6~~	~~1~~	~~0~~	~~0~~	~~0~~
	~~PM10 24 Hour NAAQS~~	~~102~~	~~0~~	~~20~~	~~4~~	~~0~~	~~12~~	~~3~~	~~0~~	~~20~~	~~2~~
	~~PM2.5 Annual CAAQS~~	~~3~~	~~0~~	~~1~~	~~1~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	~~PM10 Annual CAAQS~~	~~3 (SIL)~~	~~0~~	~~11~~	~~2~~	~~0~~	~~12~~	~~1~~	~~0~~	~~4~~	~~1~~
	~~PM10 24 Hour CAAQS~~	~~2~~	~~1~~	~~23~~	~~4~~	~~6~~	~~18~~	~~3~~	~~2~~	~~30~~	~~3~~

Modeling Sub-domain	Standard	Threshold (µg/m³)	2025			2035			2050		
			Approximate Land Area (acres)		Maximum Incremental Concentration	Approximate Land Area (acres)		Maximum Incremental Concentration	Approximate Land Area (acres)		Maximum Incremental Concentration
			Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)	Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)	Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)
El Cajon	PM2.5 Annual NAAQS	4.4	0	0	0	0	2	0.1	0	14	0.6
	PM2.5 24 Hour NAAQS	20	0	0	0	0	0	0	0	3	1
	PM10 24 Hour NAAQS	111	0	0	0	0	0	0	0	24	6
	PM2.5 Annual CAAQS	4	0	0	0	0	0	0	0	1	1
	PM10 Annual CAAQS	0	0	0	0	1	0	1	25	0	3
	PM10 24 Hour CAAQS	6	0	0	0	0	0	0	0	25	6
Escondido	PM2.5 Annual NAAQS	4.4	0	5	0.1	0	103	0.6	0	188	0.7
	PM2.5 24 Hour NAAQS	20	0	0	0	0	28	1	0	27	2
	PM10 24 Hour NAAQS	111	0	117	4	0	334	10	0	551	10
	PM2.5 Annual CAAQS	4	0	0	0	0	1	1	0	4	1
	PM10 Annual CAAQS	0	33	0	1	112	0	3	242	0	4
	PM10 24 Hour CAAQS	15	0	124	6	0	431	14	0	609	15
Oceanside	PM2.5 Annual NAAQS	4.4	0	0	0	0	0	0	0	0	0
	PM2.5 24 Hour NAAQS	20	0	0	0	0	0	0	0	0	0
	PM10 24 Hour NAAQS	111	0	0	0	0	0	0	0	27	1
	PM2.5 Annual CAAQS	4	0	0	0	0	0	0	0	0	0
	PM10 Annual CAAQS	0	0	0	0	0	0	0	0	0	0
	PM10 24 Hour CAAQS	15	0	0	0	0	1	1	0	15	1

Modeling Sub-domain	Standard	Threshold (µg/m³)	2025			2035			2050		
			Approximate Land Area (acres)		Maximum Incremental Concentration	Approximate Land Area (acres)		Maximum Incremental Concentration	Approximate Land Area (acres)		Maximum Incremental Concentration
			Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)	Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)	Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)
Whole Assessment Domain	PM2.5 Annual NAAQS	Varies	0	0	0	0	99	0.5	0	209	0.6
	PM2.5 24 Hour NAAQS		0	0	0	0	21	1	0	23	1
	PM10 24 Hour NAAQS		0	193	5	0	448	10	0	722	9
	PM2.5 Annual CAAQS		0	0	0	0	1	1	0	2	1
	PM10 Annual CAAQS		28	22	1	136	16	3	303	14	4
	PM10 24 Hour CAAQS		0	227	6	0	561	14	2	740	13
Kearny	PM2.5 Annual NAAQS	4.4	0	0	0	0	0	0	0	2	0.1
	PM2.5 24 Hour NAAQS	20	0	0	0	0	0	0	0	0	0
	PM10 24 Hour NAAQS	111	0	0	0	0	5	1	0	3	1
	PM2.5 Annual CAAQS	4	0	0	0	0	0	0	0	0	0
	PM10 Annual CAAQS	0	0	0	0	0	0	0	0	0	0
	PM10 24 Hour CAAQS	15	0	0	0	0	11	1	0	15	1
Downtown	PM2.5 Annual NAAQS	3.2	0	0	0	0	0	0	0	0	0
	PM2.5 24 Hour NAAQS	16	0	0	0	0	0	0	0	0	0
	PM10 24 Hour NAAQS	97	0	31	1	0	25	1	0	16	1
	PM2.5 Annual CAAQS	2	0	0	0	0	0	0	0	0	0
	PM10 Annual CAAQS	3 (SIL)	0	22	1	0	14	1	0	6	1
	PM10 24 Hour CAAQS	5 (SIL)	0	32	1	0	20	1	0	7	1
Chula Vista	PM2.5 Annual NAAQS	3.2	0	0	0	0	1	0.2	0	22	0.2
	PM2.5 24 Hour NAAQS	16	0	0	0	0	0	0	0	0	0
	PM10 24 Hour NAAQS	102	0	0	0	0	36	1	0	49	2
	PM2.5 Annual CAAQS	3	0	0	0	0	0	0	0	0	0
	PM10 Annual CAAQS	3 (SIL)	0	0	0	0	2	1	0	8	1
	PM10 24 Hour CAAQS	2	0	0	0	0	77	1	2	47	3
El Cajon	PM2.5 Annual NAAQS	4.4	0	0	0	0	3	0.1	0	17	0.4
	PM2.5 24 Hour NAAQS	20	0	0	0	0	0	0	0	1	1
	PM10 24 Hour NAAQS	111	0	0	0	0	1	1	0	24	4
	PM2.5 Annual CAAQS	4	0	0	0	0	0	0	0	0	0
	PM10 Annual CAAQS	0	0	0	0	1	0	1	22	0	2
	PM10 24 Hour CAAQS	6	0	0	0	0	1	1	0	25	5
Escondido	PM2.5 Annual NAAQS	4.4	0	0	0	0	95	0.5	0	168	0.6
	PM2.5 24 Hour NAAQS	20	0	0	0	0	21	1	0	22	1
	PM10 24 Hour NAAQS	111	0	162	5	0	377	10	0	605	9
	PM2.5 Annual CAAQS	4	0	0	0	0	1	1	0	2	1

Modeling Sub-domain	Standard	Threshold (µg/m³)	2025			2035			2050		
			Approximate Land Area (acres)		Maximum Incremental Concentration	Approximate Land Area (acres)		Maximum Incremental Concentration	Approximate Land Area (acres)		Maximum Incremental Concentration
			Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)	Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)	Above Threshold	With Positive Increment but Not Above Threshold	Value (µg/m³)
	PM10 Annual CAAQS	0	28	0	1	135	0	3	274	0	4
	PM10 24 Hour CAAQS	15	0	195	6	0	448	14	0	626	13
Oceanside	PM2.5 Annual NAAQS	4.4	0	0	0	0	0	0	0	0	0
	PM2.5 24 Hour NAAQS	20	0	0	0	0	0	0	0	0	0
	PM10 24 Hour NAAQS	111	0	0	0	0	4	1	0	25	1
	PM2.5 Annual CAAQS	4	0	0	0	0	0	0	0	0	0
	PM10 Annual CAAQS	0	0	0	0	0	0	0	7	0	1
	PM10 24 Hour CAAQS	15	0	0	0	0	4	1	0	20	1

Notes:

PM = particulate matter; PM10 = PM with aerodynamic diameter less than or equal to 10 micrometers; PM2.5 = PM with aerodynamic diameter less than or equal to 2.5 micrometers; NAAQS = National Ambient Air Quality Standard; CAAQS = California Ambient Air Quality Standard; µg/m³ = micrograms per cubic meter; SIL = significant impact threshold.

Thresholds: All values were derived from monitored design values and the standard concentration, except where "(SIL)" indicates usage of a significant impact level due to the monitored design-value concentration being above the standard concentration (see Sections 4.7 and 6.1).

Shading: "Above Threshold" column = red shading indicates one or more ambient receptors had maximum incremental concentration values above the given threshold; "With Positive Increment but Not Above Threshold" column = orange shading indicates one or more ambient receptors had an incremental concentration above 0 but below the threshold; "Value (µg/m³)" = orange shading indicates a value above 0, while red shading indicates a value above the threshold.

7.3 HRA

Table 16 through Table 19 summarize the results of the HRA described in Chapter 5 and Section 6.2.

Table 16, Table 18, and Table 19 show results by modeling subdomain, by receptor type, by year, and by health endpoint. All tables show both risks and corresponding areas. Table 16 shows 2016 risk values and 2025, 2035, and 2050 incremental changes in HI or cancer risk per million relative to 2016. Cancer risks are shown first for each modeling subdomain and receptor type. For 2016, maximum risks and area exceeding the 10 per million risk threshold are shown. For the projected years, incremental risk and incremental area are shown. These are followed by acute risks and chronic risks, with the same layout. Table 16 presents the analysis for "sensitive receptors near existing emission sources"—that is, those that are exposed to existing rail and/or roadway buffers, not those driven by new sources "turning on" new receptors.

Table 18 and Table 19 have a similar layout. They also show results by subdomain and year with results grouped first for cancer, then acute, and finally chronic risks. Table 18 and Table 19 are both for cases where new receptors are "turned on" due to two types of changes in the proposed ~~Plan~~Amendment. Thus, these tables do not show values for 2016 and list the total value in future years. Those changes are new emission sources, such as new rail lines (Table 18) or new land uses, such as new residential development (Table 19). In each case, the maximum value is shown (cancer risks per million or HI) followed by the land area (in acreage)—based on number of sensitive receptors—exceeding the threshold. Cancer impacts are shown first, then acute, then chronic. As in Section 7.2, the impacted area is estimated from the number of sensitive receptors exceeding thresholds. This does not indicate number of units (see footnote 44).

Table 17 shows the cumulative cancer risk impacts by year under the ~~Plan~~ proposed Amendment for residential land uses.

Table 16. Results Summary of the Maximum Health Impacts at Existing Sensitive Receptors

Cancer		2016		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Cancer Risk	Area (acres) Exceeding 10 per Million	Maximum Incremental Cancer Risk	Incremental Area (acres) Exceeding 10 per Million	Maximum Incremental Cancer Risk	Incremental Area (acres) Exceeding 10 per Million	Maximum Incremental Cancer Risk	Incremental Area (acres) Exceeding 10 per Million
Chula Vista	Residential	265	1,201	-5	0	-6	0	-6	0
Chula Vista	Recreational	11	2	-1	0	-1	0	-1	0
Chula Vista	School	0	0	0	0	0	0	0	0
Downtown	Residential	447	1,423	-26	0	-31	0	-32	0
Downtown	Recreational	13	22	-1	0	-2	0	-2	0
Downtown	School	8	0	-4	0	-5	0	-5	0
El Cajon	Residential	314	995	-12	0	-14	0	-14	0
El Cajon	Recreational	7	0	-2	0	-2	0	-2	0
El Cajon	School	0	0	0	0	0	0	0	0
Escondido	Residential	416	1,229	-5	0	-6	0	-5	0
Escondido	Recreational	8	0	-2	0	-3	0	-3	0
Escondido	School	5	0	-3	0	-4	0	-4	0
Kearny	Residential	401	1,025	-10	0	-11	0	-11	0
Kearny	Recreational	7	0	0	0	0	0	0	0
Kearny	School	11	2	-3	0	-3	0	-3	0
Oceanside	Residential	255	1,690	-10	0	-12	0	-12	0
Oceanside	Recreational	8	0	-1	0	-1	0	-1	0
Oceanside	School	8	0	-1	0	-1	0	-1	0
Regional Maximum and Sum of Area		447	7,590	0	0	0	0	0	0

Cancer		2016		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Cancer Risk	Area (acres) Exceeding 10 per Million	Maximum Incremental Cancer Risk	Incremental Area (acres) Exceeding 10 per Million	Maximum Incremental Cancer Risk	Incremental Area (acres) Exceeding 10 per Million	Maximum Incremental Cancer Risk	Incremental Area (acres) Exceeding 10 per Million
Chula Vista	Residential	267	1,184	-5	0	-6	0	-6	0
Chula Vista	Recreational	12	2	-1	0	-1	0	-1	0
Chula Vista	School	0	0	0	0	0	0	0	0
Downtown	Residential	444	1,418	-26	0	-31	0	-31	0
Downtown	Recreational	14	20	-1	0	-2	0	-2	0
Downtown	School	0	0	0	0	0	0	0	0
El Cajon	Residential	327	995	-11	0	-13	0	-14	0
El Cajon	Recreational	7	0	-2	0	-2	0	-2	0
El Cajon	School	0	0	0	0	0	0	0	0
Escondido	Residential	406	1,220	-5	0	-6	0	-5	0
Escondido	Recreational	8	0	-2	0	-3	0	-3	0
Escondido	School	5	0	-3	0	-4	0	-4	0
Kearny	Residential	399	1,025	-13	0	-15	0	-14	0
Kearny	Recreational	7	0	0	0	0	0	0	0
Kearny	School	11	2	-3	0	-3	0	-3	0
Oceanside	Residential	266	1,689	-12	0	-14	0	-14	0
Oceanside	Recreational	8	0	-1	0	-1	0	-1	0
Oceanside	School	0	0	0	0	0	0	0	0
Regional Maximum and Sum of Area		444	7,555	0	0	0	0	0	0

Acute		2016		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Acute Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Acute Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Acute Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	1.8	49	-0.1	0	0	0	0.5	0
Chula Vista	Recreational	1.2	10	-0.1	0	-0.1	0	0.2	0
Chula Vista	School	0	0	0	0	0	0	0	0
Downtown	Residential	2.1	314	-0.3	0	-0.2	0	-0.2	0
Downtown	Recreational	2.3	131	-0.3	0	-0.3	0	-0.3	0
Downtown	School	1	1	-0.6	0	-0.6	0	-0.6	0
El Cajon	Residential	1.7	70	-0.2	0	-0.2	0	0.2	0
El Cajon	Recreational	1.1	2	-0.2	0	-0.2	0	-0.2	0
El Cajon	School	0	0	0	0	0	0	0	0
Escondido	Residential	6.9	751	-0.3	0	-0.3	0	-0.3	0
Escondido	Recreational	2.3	17	-0.4	0	-0.5	0	-0.5	0
Escondido	School	1	1	-0.6	0	-0.7	0	-0.7	0
Kearny	Residential	2	153	-0.2	0	-0.2	0	-0.2	0
Kearny	Recreational	1.5	7	-0.2	0	-0.3	0	-0.3	0
Kearny	School	1.5	4	-0.4	0	-0.4	0	-0.4	0
Oceanside	Residential	2.3	261	-0.1	0	-0.2	0	-0.2	0
Oceanside	Recreational	1.8	43	-0.2	0	-0.2	0	-0.2	0
Oceanside	School	1.5	2	-0.4	0	-0.4	0	-0.4	0
Regional Maximum and Sum of Area		6.9	1,815	0	0	0.0	0	0.5	0

Acute		2016		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Acute Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Acute Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Acute Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	1.7	35	-0.1	0	-0.1	0	0.0	0
Chula Vista	Recreational	1.2	9	-0.1	0	-0.2	0	-0.1	0
Chula Vista	School	0.0	0	0.0	0	0.0	0	0.0	0
Downtown	Residential	2.0	225	-0.2	0	-0.3	0	-0.3	0
Downtown	Recreational	1.9	76	-0.3	0	-0.3	0	-0.3	0
Downtown	School	0.0	0	0.0	0	0.0	0	0.0	0
El Cajon	Residential	1.7	49	-0.2	0	-0.2	0	-0.2	0
El Cajon	Recreational	1.1	1	-0.2	0	-0.2	0	-0.2	0
El Cajon	School	0.0	0	0.0	0	0.0	0	0.0	0
Escondido	Residential	7.1	702	-0.3	0	-0.3	0	-0.3	0
Escondido	Recreational	2.3	17	-0.4	0	-0.5	0	-0.5	0
Escondido	School	0.8	0	-0.6	0	-0.6	0	-0.6	0
Kearny	Residential	1.8	102	-0.2	0	-0.2	0	-0.2	0
Kearny	Recreational	1.1	1	-0.2	0	-0.2	0	-0.2	0
Kearny	School	1.4	2	-0.3	0	-0.4	0	-0.4	0
Oceanside	Residential	2.2	112	-0.1	0	-0.2	0	-0.2	0
Oceanside	Recreational	1.5	23	-0.2	0	-0.2	0	-0.2	0
Oceanside	School	0.0	0	0.0	0	0.0	0	0.0	0
Regional Maximum and Sum of Area		7.1	1,355	0.0	0	0.0	0	0.0	0

Chronic		2016		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Chronic Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Chronic Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Chronic Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	31.6	1,205	-0.6	0	-0.8	0	-0.8	0
Chula Vista	Recreational	31.3	88	-1.8	0	-2.1	0	-2.2	0
Chula Vista	School	0	0	0	0	0	0	0	0
Downtown	Residential	52.9	1,423	-3.3	0	-3.8	0	-4	0
Downtown	Recreational	37	431	-4.1	0	-4.8	0	-4.9	0
Downtown	School	17.3	7	-9.7	0	-11.2	0	-11.6	0
El Cajon	Residential	37.2	995	-1.5	0	-1.7	0	-1.8	0
El Cajon	Recreational	20.2	22	-5.3	0	-6	0	-6.1	0
El Cajon	School	0	0	0	0	0	0	0	0
Escondido	Residential	49.2	1,232	-0.6	0	-0.8	0	-0.6	0
Escondido	Recreational	23.6	32	-6.8	0	-7.9	0	-8	0
Escondido	School	12.3	4	-7.2	0	-8.3	0	-8.4	0
Kearny	Residential	47.6	1,025	-1.2	0	-1.4	0	-1.4	0
Kearny	Recreational	20.1	368	-0.8	0	-0.9	0	-0.9	0
Kearny	School	24.9	36	-6.4	0	-7.3	0	-7.5	0
Oceanside	Residential	30.2	1,690	-1.2	0	-1.4	0	-1.5	0
Oceanside	Recreational	22.4	102	-1.7	0	-2	0	-2	0
Oceanside	School	18.8	7	-2.4	0	-2.7	0	-2.8	0
Regional Maximum and Sum of Area		52.9	8,666	0	0	0	0	0	0

Chronic		2016		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Chronic Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Chronic Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index	Maximum Incremental Chronic Risk	Incremental Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	32.0	1,187	-0.6	0	-0.7	0	-0.7	0
Chula Vista	Recreational	31.7	85	-1.7	0	-2.0	0	-2.1	0
Chula Vista	School	0.0	0	0.0	0	0.0	0	0.0	0
Downtown	Residential	52.8	1,418	-3.2	0	-3.7	0	-3.9	0
Downtown	Recreational	40.0	418	-4.0	0	-4.7	0	-4.8	0
Downtown	School	0.0	0	0.0	0	0.0	0	0.0	0
El Cajon	Residential	38.7	995	-1.5	0	-1.7	0	-1.7	0
El Cajon	Recreational	20.9	22	-5.0	0	-5.7	0	-5.8	0
El Cajon	School	0.0	0	0.0	0	0.0	0	0.0	0
Escondido	Residential	47.9	1,223	-0.7	0	-0.8	0	-0.6	0
Escondido	Recreational	23.5	32	-6.8	0	-7.9	0	-8.1	0
Escondido	School	12.0	4	-7.0	0	-8.1	0	-8.3	0
Kearny	Residential	47.6	1,025	-1.2	0	-1.4	0	-1.3	0
Kearny	Recreational	19.9	368	-0.8	0	-0.9	0	-0.9	0
Kearny	School	25.0	36	-6.1	0	-7.0	0	-7.3	0
Oceanside	Residential	31.2	1,689	-1.2	0	-1.9	0	-1.5	0
Oceanside	Recreational	22.1	102	-1.7	0	-1.9	0	-2.0	0
Oceanside	School	0.0	0	0.0	0	0.0	0	0.0	0
Regional Maximum and Sum of Area		52.8	8603	0.0	0	0.0	0	0.0	0

Notes:

HI = Hazard Index; Risk = cancer risk values in risks per million; Mobile increment = HI/risk increment from 2016 baseline year, without stationary risks (acute has no stationary HI); Total increment = HI/risk increment from 2016 baseline year, including stationary risks; Cumulative = sum of mobile increment cancer risk, NATA 2014 cancer risk, and NATA 2014 DPM cancer risk (only for the cancer scenario and for residential sensitive receptors that exist in both the proposed Amendment~~plan~~ year and in the 2016 baseline year)

Thresholds: Non-cancer (acute and chronic) HI threshold of 1; incremental cancer threshold of 10; cumulative cancer threshold of 100.

Rounding: Non-cancer HIs were rounded to one decimal place; cancer risks were rounded to a whole number.

Table 17. Results Summary of the Maximum Cumulative Health Impacts at Existing Sensitive Receptors

~~Modeling Subdomain~~	~~Type of Sensitive Receptor~~	~~Maximum Cumulative Cancer Risk (per million)~~				~~Area (Acres) Exceeding 100 per million~~			
		~~2016~~	~~2025~~	~~2035~~	~~2050~~	~~2016~~	~~2025~~	~~2035~~	~~2050~~
~~Chula Vista~~	~~Residential~~	~~619~~	~~544~~	~~559~~	~~558~~	~~1,205~~	~~1,166~~	~~1,133~~	~~1,126~~
~~Downtown~~	~~Residential~~	~~1,015~~	~~946~~	~~928~~	~~922~~	~~1,423~~	~~1,405~~	~~1,373~~	~~1,371~~
~~El Cajon~~	~~Residential~~	~~479~~	~~453~~	~~449~~	~~449~~	~~995~~	~~977~~	~~896~~	~~954~~
~~Escondido~~	~~Residential~~	~~392~~	~~346~~	~~339~~	~~339~~	~~1,232~~	~~1,226~~	~~1,200~~	~~1,183~~
~~Kearny~~	~~Residential~~	~~476~~	~~422~~	~~413~~	~~412~~	~~1,025~~	~~1,013~~	~~1,001~~	~~994~~
~~Oceanside~~	~~Residential~~	~~378~~	~~361~~	~~358~~	~~357~~	~~1,690~~	~~1,653~~	~~1,611~~	~~1,604~~
~~Regional Maximum and Sum of Area~~	~~Residential~~	~~1,015~~	~~946~~	~~928~~	~~922~~	~~7,570~~	~~7,439~~	~~7,214~~	~~7,232~~

Modeling Subdomain	**Type of Sensitive Receptor**	**Maximum Cumulative Cancer Risk (per million)**				**Area (Acres) Exceeding 100 per million**			
		2016	**2025**	**2035**	**2050**	**2016**	**2025**	**2035**	**2050**
Chula Vista	Residential	619	548	539	563	1,188	1,145	1,153	1,091
Downtown	Residential	1,015	934	915	912	1,418	1,396	1,365	1,365
El Cajon	Residential	479	454	450	450	995	977	898	936
Escondido	Residential	392	344	337	336	1,223	1,218	1,197	1,183
Kearny	Residential	476	418	408	407	1,025	1,013	1,001	994
Oceanside	Residential	378	357	354	354	1,689	1,651	1,604	1,598
Regional Maximum and Sum of Area	Residential	1,015	934	915	912	7,537	7,400	7,217	7,167

Table 18. Results Summary of the Maximum Health Impacts from New Emission Sources[1]

Cancer		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Cancer Risk	Area (acres) Exceeding 10 per million	Maximum Cancer Risk	Area (acres) Exceeding 10 per million	Maximum Cancer Risk	Area (acres) Exceeding 10 per million
Chula Vista	Residential	26	5	59	418	24	408
Chula Vista	Recreational	1	0	2	0	2	0
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	54	2	123	527	110	1,236
Downtown	Recreational	3	0	2	0	3	0
Downtown	School	0	0	0	0	0	0
El Cajon	Residential	0	0	132	2	131	324
El Cajon	Recreational	0	0	0	0	1	0
El Cajon	School	0	0	0	0	1	0
Escondido	Residential	0	0	0	0	24	150
Escondido	Recreational	0	0	0	0	0	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	0	0	33	309	30	359
Kearny	Recreational	0	0	1	0	1	0
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	8	0	12	5	46	4
Oceanside	Recreational	0	0	0	0	0	0
Oceanside	School	0	0	0	0	0	0
Regional Maximum and Sum of Area		54	7	132	1,261	131	2,480

Cancer		2025		2035		2050	
Modeling Subdomain	**Type of Sensitive Receptor**	**Maximum Cancer Risk**	**Area (acres) Exceeding 10 per million**	**Maximum Cancer Risk**	**Area (acres) Exceeding 10 per million**	**Maximum Cancer Risk**	**Area (acres) Exceeding 10 per million**
Chula Vista	Residential	0	0	62	441	34	403
Chula Vista	Recreational	1	0	2	0	2	0
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	53	2	114	528	102	1,237
Downtown	Recreational	0	0	2	0	18	1
Downtown	School	0	0	0	0	0	0
El Cajon	Residential	0	0	104	2	98	323
El Cajon	Recreational	0	0	0	0	1	0
El Cajon	School	0	0	0	0	2	0
Escondido	Residential	0	0	0	0	24	150
Escondido	Recreational	0	0	0	0	0	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	0	0	32	314	30	379
Kearny	Recreational	0	0	1	0	1	0
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	9	0	13	7	50	6
Oceanside	Recreational	0	0	0	0	0	0
Oceanside	School	0	0	0	0	0	0
Regional Maximum and Sum of Area		53	2	114	1,292	102	2,498

Acute		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	0.1	0	0.3	0	0.8	0
Chula Vista	Recreational	0.1	0	0.2	0	0.6	0
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	0.2	0	0.5	0	0.9	0
Downtown	Recreational	0.3	0	0.2	0	0.3	0
Downtown	School	0	0	0	0	0	0
El Cajon	Residential	0	0	0.8	0	0.8	0
El Cajon	Recreational	0	0	0	0	0.3	0
El Cajon	School	0	0	0	0	0.2	0
Escondido	Residential	0	0	0	0	0.3	0
Escondido	Recreational	0	0	0	0	0	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	0	0	0.3	0	0.5	0
Kearny	Recreational	0	0	0.2	0	0.3	0
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	0.1	0	0.1	0	0.3	0
Oceanside	Recreational	0	0	0	0	0	0
Oceanside	School	0	0	0	0	0	0
Regional Maximum and Sum of Area		0.3	0	0.8	0	0.9	0

Acute		2025		2035		2050	
Modeling Subdomain	**Type of Sensitive Receptor**	**Maximum Acute Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Acute Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Acute Risk**	**Area (acres) Exceeding 1.0 Hazard Index**
Chula Vista	Residential	0.0	0	0.2	0	0.3	0
Chula Vista	Recreational	0.1	0	0.1	0	0.2	0
Chula Vista	School	0.0	0	0.0	0	0.0	0
Downtown	Residential	0.2	0	0.4	0	0.4	0
Downtown	Recreational	0.0	0	0.1	0	0.2	0
Downtown	School	0.0	0	0.0	0	0.0	0
El Cajon	Residential	0.0	0	0.5	0	0.5	0
El Cajon	Recreational	0.0	0	0.0	0	0.1	0
El Cajon	School	0.0	0	0.0	0	0.1	0
Escondido	Residential	0.0	0	0.0	0	0.3	0
Escondido	Recreational	0.0	0	0.0	0	0.0	0
Escondido	School	0.0	0	0.0	0	0.0	0
Kearny	Residential	0.0	0	0.1	0	0.2	0
Kearny	Recreational	0.0	0	0.1	0	0.1	0
Kearny	School	0.0	0	0.0	0	0.0	0
Oceanside	Residential	0.1	0	0.1	0	0.3	0
Oceanside	Recreational	0.0	0	0.0	0	0.0	0
Oceanside	School	0.0	0	0.0	0	0.0	0
Regional Maximum and Sum of Area		0.2	0	0.5	0	0.5	0

Chronic		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	2.7	5	6.1	418	2	401
Chula Vista	Recreational	1.5	4	3	74	3.1	158
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	5.4	2	13.2	527	11.6	1,236
Downtown	Recreational	6.8	1	4.7	24	4.3	43
Downtown	School	0	0	0	0	0	0
El Cajon	Residential	0	0	14.2	2	13.8	324
El Cajon	Recreational	0	0	0	0	2.5	2
El Cajon	School	0	0	0	0	2.2	1
Escondido	Residential	0	0	0	0	2.5	150
Escondido	Recreational	0	0	0	0	0	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	0	0	3	313	2.7	362
Kearny	Recreational	0	0	2.3	25	2.5	96
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	0.9	0	1.3	6	4.8	4
Oceanside	Recreational	0	0	0	0	0	0
Oceanside	School	0	0	0	0	0	0
Regional Maximum and Sum of Area		6.8	12	14.2	1,389	13.8	2,777

Chronic		2025		2035		2050	
Modeling Subdomain	**Type of Sensitive Receptor**	**Maximum Chronic Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Chronic Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Chronic Risk**	**Area (acres) Exceeding 1.0 Hazard Index**
Chula Vista	Residential	0.0	0	6.8	440	1.9	389
Chula Vista	Recreational	1.7	7	3.3	77	1.9	69
Chula Vista	School	0.0	0	0.0	0	0.0	0
Downtown	Residential	5.2	2	12.3	528	10.7	1,237
Downtown	Recreational	0.0	0	3.0	25	4.1	49
Downtown	School	0.0	0	0.0	0	0.0	0
El Cajon	Residential	0.0	0	11.4	2	10.3	323
El Cajon	Recreational	0.0	0	0.0	0	2.4	6
El Cajon	School	0.0	0	0.0	0	2.1	1
Escondido	Residential	0.0	0	0.0	0	2.4	150
Escondido	Recreational	0.0	0	0.0	0	0.0	0
Escondido	School	0.0	0	0.0	0	0.0	0
Kearny	Residential	0.0	0	2.8	309	2.5	360
Kearny	Recreational	0.0	0	2.2	28	2.3	96
Kearny	School	0.0	0	0.0	0	0.0	0
Oceanside	Residential	0.9	0	0.0	0	5.2	4
Oceanside	Recreational	0.0	0	0.0	0	0.0	0
Oceanside	School	0.0	0	0.0	0	0.0	0
Regional Maximum and Sum of Area		5.2	9	12.3	1,410	10.7	2,684

[1] Results show maximum health values and number of sensitive receptors above threshold by Year, Subdomain, and Receptor. Cancer Impacts are Shown First, then Acute, then Chronic.

Notes: HI = Hazard Index; Risk = cancer risk values in risks per million; Mobile increment = HI/risk increment from 2016 baseline year, without stationary risks (acute has no stationary HI); Total increment = HI/risk increment from 2016 baseline year, including stationary risks; Cumulative = sum of mobile increment cancer risk, NATA 2014 cancer risk, and NATA 2014 DPM cancer risk (only for the cancer scenario and for residential sensitive receptors that exist in both the proposed Amendment~~plan~~ year and in the 2016 baseline year)

Thresholds: Non-cancer (acute and chronic) HI threshold of 1; incremental cancer threshold of 10; cumulative cancer threshold of 100.

Rounding: Non-cancer HIs were rounded to one decimal place; cancer risks were rounded to a whole number.

Table 19. Results Summary of the Maximum Health Impacts at New Land Use Sensitive Receptors[1]

Cancer		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Cancer Risk	Area (acres) Exceeding 10 per million	Maximum Cancer Risk	Area (acres) Exceeding 10 per million	Maximum Cancer Risk	Area (acres) Exceeding 10 per million
Chula Vista	Residential	53	83	34	86	29	86
Chula Vista	Recreational	0	0	0	0	0	0
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	149	381	137	436	133	472
Downtown	Recreational	0	0	0	0	0	0
Downtown	School	0	0	0	0	0	0
El Cajon	Residential	138	209	122	259	106	262
El Cajon	Recreational	0	0	0	0	0	0
El Cajon	School	0	0	0	0	0	0
Escondido	Residential	120	69	57	68	77	93
Escondido	Recreational	0	0	0	0	0	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	58	69	40	140	37	147
Kearny	Recreational	0	0	0	0	0	0
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	57	137	38	166	33	163
Oceanside	Recreational	0	0	0	0	0	0
Oceanside	School	0	0	0	0	0	0
Regional Maximum and Sum of Area		149	948	137	1,156	133	1,224

Cancer		2025		2035		2050	
Modeling Subdomain	**Type of Sensitive Receptor**	**Maximum Cancer Risk**	**Area (acres) Exceeding 10 per million**	**Maximum Cancer Risk**	**Area (acres) Exceeding 10 per million**	**Maximum Cancer Risk**	**Area (acres) Exceeding 10 per million**
Chula Vista	Residential	53	98	34	95	30	97
Chula Vista	Recreational	2	0	2	0	2	0
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	149	381	137	436	135	459
Downtown	Recreational	18	2	18	2	17	2
Downtown	School	3	0	2	0	2	0
El Cajon	Residential	136	209	100	259	94	262
El Cajon	Recreational	1	0	1	0	1	0
El Cajon	School	0	0	0	0	0	0
Escondido	Residential	132	69	59	67	79	93
Escondido	Recreational	2	0	1	0	1	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	60	69	40	141	37	148
Kearny	Recreational	3	0	2	0	2	0
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	58	137	38	203	31	194
Oceanside	Recreational	2	0	1	0	1	0
Oceanside	School	3	0	2	0	2	0
Regional Maximum and Sum of Area		149	964	137	1,203	135	1,256

Acute		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Acute Risk	Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	0.3	0	0.2	0	0.5	0
Chula Vista	Recreational	0	0	0	0	0	0
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	0.6	0	0.4	0	0.6	0
Downtown	Recreational	0	0	0	0	0	0
Downtown	School	0	0	0	0	0	0
El Cajon	Residential	0.5	0	0.7	0	0.7	0
El Cajon	Recreational	0	0	0	0	0	0
El Cajon	School	0	0	0	0	0	0
Escondido	Residential	2.1	5	1.4	2	1.5	2
Escondido	Recreational	0	0	0	0	0	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	0.3	0	0.2	0	0.3	0
Kearny	Recreational	0	0	0	0	0	0
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	0.4	0	0.3	0	0.3	0
Oceanside	Recreational	0	0	0	0	0	0
Oceanside	School	0	0	0	0	0	0
Regional Maximum and Sum of Area		2.1	5	1.4	2	1.5	2

Acute		2025		2035		2050	
Modeling Subdomain	**Type of Sensitive Receptor**	**Maximum Acute Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Acute Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Acute Risk**	**Area (acres) Exceeding 1.0 Hazard Index**
Chula Vista	Residential	0.3	0	0.2	0	0.2	0
Chula Vista	Recreational	0.1	0	0.1	0	0.1	0
Chula Vista	School	0.0	0	0.0	0	0.0	0
Downtown	Residential	0.6	0	0.4	0	0.3	0
Downtown	Recreational	0.4	0	0.2	0	0.2	0
Downtown	School	0.3	0	0.1	0	0.1	0
El Cajon	Residential	0.5	0	0.4	0	0.4	0
El Cajon	Recreational	0.1	0	0.1	0	0.1	0
El Cajon	School	0.0	0	0.0	0	0.0	0
Escondido	Residential	2.1	3	1.3	1	1.4	2
Escondido	Recreational	0.7	0	0.4	0	0.4	0
Escondido	School	0.0	0	0.0	0	0.0	0
Kearny	Residential	0.3	0	0.2	0	0.2	0
Kearny	Recreational	0.3	0	0.2	0	0.2	0
Kearny	School	0.0	0	0.0	0	0.0	0
Oceanside	Residential	0.3	0	0.2	0	0.2	0
Oceanside	Recreational	0.3	0	0.2	0	0.2	0
Oceanside	School	0.3	0	0.2	0	0.2	0
Regional Maximum and Sum of Area		2.1	3	1.3	1	1.4	2

Chronic		2025		2035		2050	
Modeling Subdomain	Type of Sensitive Receptor	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index	Maximum Chronic Risk	Area (acres) Exceeding 1.0 Hazard Index
Chula Vista	Residential	5.4	83	3.4	88	2.8	82
Chula Vista	Recreational	0	0	0	0	0	0
Chula Vista	School	0	0	0	0	0	0
Downtown	Residential	13.2	381	8	436	7.1	472
Downtown	Recreational	0	0	0	0	0	0
Downtown	School	0	0	0	0	0	0
El Cajon	Residential	14.9	210	13.2	259	11.2	262
El Cajon	Recreational	0	0	0	0	0	0
El Cajon	School	0	0	0	0	0	0
Escondido	Residential	12.9	69	5.9	70	7.9	93
Escondido	Recreational	0	0	0	0	0	0
Escondido	School	0	0	0	0	0	0
Kearny	Residential	6.3	69	4.2	141	3.8	148
Kearny	Recreational	0	0	0	0	0	0
Kearny	School	0	0	0	0	0	0
Oceanside	Residential	6.1	138	4	167	3.4	161
Oceanside	Recreational	0	0	0	0	0	0
Oceanside	School	0	0	0	0	0	0
Regional Maximum and Sum of Area		14.9	950	13.2	1,162	11.2	1,218

Chronic		2025		2035		2050	
Modeling Subdomain	**Type of Sensitive Receptor**	**Maximum Chronic Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Chronic Risk**	**Area (acres) Exceeding 1.0 Hazard Index**	**Maximum Chronic Risk**	**Area (acres) Exceeding 1.0 Hazard Index**
Chula Vista	Residential	5.5	98	3.4	89	2.9	88
Chula Vista	Recreational	3.8	1	2.5	1	2.2	1
Chula Vista	School	0.0	0	0.0	0	0.0	0
Downtown	Residential	13.8	381	8.2	436	7.1	459
Downtown	Recreational	9.5	12	6.0	12	5.2	12
Downtown	School	5.9	7	3.7	7	3.2	15
El Cajon	Residential	15.1	209	10.9	259	9.9	262
El Cajon	Recreational	3.7	5	2.4	5	2.2	5
El Cajon	School	0.0	0	0.0	0	0.0	0
Escondido	Residential	14.0	69	6.2	69	8.1	93
Escondido	Recreational	5.0	10	3.2	10	3.0	10
Escondido	School	0.0	0	0.0	0	0.0	0
Kearny	Residential	6.6	69	4.3	139	3.9	146
Kearny	Recreational	6.8	4	4.2	4	3.6	4
Kearny	School	0.0	0	0.0	0	0.0	0
Oceanside	Residential	6.3	137	0.0	0	3.2	164
Oceanside	Recreational	4.5	24	3.0	17	2.5	12
Oceanside	School	0.0	0	3.9	4	2.9	7
Regional Maximum and Sum of Area		15.1	1,025	10.9	1,051	9.9	1,278

[1] Results show maximum health values and number of sensitive receptors above threshold by Year, Subdomain, and Receptor. Cancer Impacts are Shown First, then Acute, then Chronic.

Notes: HI = Hazard Index; Risk = cancer risk values in risks per million; Mobile increment = HI/risk increment from 2016 baseline year, without stationary risks (acute has no stationary HI); Total increment = HI/risk increment from 2016 baseline year, including stationary risks; Cumulative = sum of mobile increment cancer risk, NATA 2014 cancer risk, and NATA 2014 DPM cancer risk (only for the cancer scenario and for residential sensitive receptors that exist in both the proposed Amendment~~plan~~ year and in the 2016 baseline year)

Thresholds: Non-cancer (acute and chronic) HI threshold of 1; incremental cancer threshold of 10; cumulative cancer threshold of 100.

Rounding: Non-cancer HIs were rounded to one decimal place; cancer risks were rounded to a whole number.

Table 16 shows that the increment in cancer risk is less than or equal to zero for all receptor types for all modeling subdomains for all three projected years. That is, the proposed ~~Plan~~ Amendment does not increase cancer risk, acute health risk, or chronic health risks for existing sensitive receptors in any year. ~~For acute health risk, the maximum incremental risk does increase for any type of receptor until 2050. In 2050 there is a maximum increase in incremental acute risk for residential and recreational receptors in in the Chula Vista subdomain and residential receptors in the El Cajon subdomain. However, none of these increases are above the significance threshold of 1.0 incremental HI. As for cancer, incremental and chronic risks~~All show incremental values ~~are~~ less than or equal to zero in all subdomains and all projected years.

Table 17 shows that cumulative risks exceed the 100 per million cancer risk threshold in all domains and all years. However, the increment compared to 2016 is always negative. That is, total cancer risk to which residents are exposed is being reduced in every year under the proposed ~~Plan~~Amendment.

For sensitive receptors that are "turned on" in future years (Table 18 and Table 19), the cancer and non-cancer risks can be significant, because there is no 2016 risk from which to increment. That is, these are new receptors for the modeling, with no recorded value in 2016. Without a 2016 modeled value from which to calculate a difference, the reported values for a future year are the value alone in that future year (there is no baseline value to subtract from the projected year to compute an increment). Note that this does not mean there is no risk in these locations in 2016, just that it was not modeled. Note also that the cancer and chronic risks presented here include both mobile (rail and on-road) and stationary risks, while acute considers only mobile sources under the proposed ~~Plan~~Amendment. For new receptors activated by new emissions sources (Table 18), the cancer risk exceeds 10 per million ~~only~~ for both some residential and recreational receptor types. However, most exceedances are for residential receptors, as only Downtown in 2050 shows any exceedances for recreational ~~, but in all three modeled years~~receptors. The chronic risk HI exceeds 1.0 for residential and recreational receptors in 2025 and 2035 and for all receptor types in 2050~~multiple subdomains for all three years~~. The acute risk HI does not exceed 1.0 in any subdomain or year for these "new" receptors.

For new sensitive receptors "turned on" by new land uses (Table 19), the cancer risk exceeds 10 per million ~~only~~ for both residential and recreational receptors, ~~but~~ and in all three modeled years. However, only the Downtown ~~and every~~ modeling subdomain has recreational receptors above the 10 per million threshold. ~~Similarly, t~~The chronic risk HI exceeds 1.0 ~~only~~ for all three receptor types and ~~new residential receptors in all subdomains for~~ all years. The acute risk HI ~~also~~ exceeds 1.0 only for residential receptor types and only in the Escondido subdomain, but for all years for these "new" receptors.

Also, note that all rail emissions in this analysis are conservatively modeled as if all trains are diesel fueled and at- or above-grade. The ~~proposed~~ approved Plan considers tunneling or other approaches to move these sources underground and locating portals, adits, windows and other venting features away from sensitive receptors, which would reduce or eliminate the passenger rail impacts on public health. The engineering to support such a reduction would be conducted at the individual project level and is not included in this analysis but ~~is~~ was included as a mitigation measure in the approved Plan PEIR and would remain applicable to the proposed Amendment. Similarly, it is anticipated that locomotives in the proposed ~~Plan~~ Amendment would eventually move to zero emissions technology, such as zero-emission multiple units (ZMU), hydrogen fuel cell, or hybridization of locomotives. This would eliminate or reduce PM and MSAT emissions from the vehicles, and thus the health impacts, because there would be no exhaust emissions. SANDAG anticipates that the cost assumptions already in the ~~proposed~~ approved Plan for rail equipment are adequate to introduce ZMU trains by 2035. (Veeh pers. comm.) This ~~is~~ was discussed further in the body of the approved Plan PEIR (Section 4.3, *Air Quality*).

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Attachment B-1

Supplemental Air Quality Calculations

Supplemental Calculations for Section 4.1 - Air Quality

Table 4.1-1

Air Quality Conformity Emissions (tons per day)

SIP Year	Year	ROG				NO_X			
		SIP Budget	Approved Plan	Proposed Amendment	Change from approved Plan	SIP Budget	Approved Plan	Proposed Amendment	Change from approved Plan
2020 SIP	2023	13.6	13.5	13.4	-0.1	19.3	17.2	17.3	0.1
	2025	*12.6*	*12.1*	*12.2*	0.1	*18*	*15.5*	*15.8*	0.3
	2026	12.1	11.4	11.6	0.2	17.3	14.7	15	0.3
	2029	11	10.2	10.3	0.1	15.9	13.4	13.5	0.1
	2032	10	9.3	9.2	-0.1	15.1	12.6	12.6	0
	2035	*10*	*8.6*	*8.5*	-0.1	*15.1*	*12.3*	*12.2*	-0.1
	2040	10	7.4	7.3	-0.1	15.1	11.7	11.6	-0.1
	2050	10	6.8	6.7	-0.1	15.1	12	11.9	-0.1

Table 4.1-2

Proposed Amendment Emission Estimates Prior to Mitigation

Emission Category	Emissions (tons per day)					
	ROG	NO_X	CO	PM10	PM2.5	SO_X
2016						
On-Road Sources	6.4	33.5	141.9	13.5	3.6	0.4
Freight Rail	0.0	0.8	0.2	0	0	0
Passenger Rail	0.1	1.4	0	0.1	0	0
Total 2016	6.5	35.7	142.1	13.6	3.7	0.4
2016 Approved Plan	6.5	35.3	145.3	13.6	3.7	0.4
Change from Approved Plan[1]	0	0.4	-3.2	0	0	0
2025						
On-Road Sources	2.4	11.7	66.1	13.2	3.2	0.3
Freight Rail	0	0.5	0.2	0	0	0
Passenger Rail	0	0.3	0	0	0	0.1
Total 2025	2.4	12.5	66.3	13.2	3.2	0.3
2025 Approved Plan	2.4	12	67.4	13.1	3.2	0.3
Change from Approved Plan	0	0.5	-1.1	0.1	0	0
Net Change From 2016	-4.1	-23.2	-75.8	-0.4	-0.5	0

2035						
On-Road Sources	1.8	8.6	52.5	13.5	3.3	0.2
Freight Rail	0	0.3	0.3	0	0	0
Passenger Rail	0	0.6	0	0	0	0.1
Total 2035	1.8	9.5	52.8	13.5	3.3	0.4
2035 Approved Plan	1.8	8.8	53.7	13.4	3.2	0.4
Change from Approved Plan	0	0.7	-0.9	0.1	0.1	0
Net Change From 2016	-4.7	-26.2	-89.3	-0.1	-0.4	- 0.0
2050						
On-Road Sources	1.6	8.3	50	13.9	3.3	0.2
Freight Rail	0	0.3	0.3	0	0	0
Passenger Rail	0.1	1.4	0	0	0	0.3
Total 2050	1.7	10	50.3	13.9	3.4	0.5
2050 Approved Plan	1.7	9.2	51.4	13.8	3.4	0.5
Change from Approved Plan	0	0.8	-1.1	0.1	0	0
Net Change From 2016	-4.8	-25.7	-91.8	0.3	-0.3	0.1

Table 4.1-3

Proposed Amendment Emission Estimates After Mitigation for 2050

Emission Category	Emissions (tons per day)					
	ROG	NO_X	CO	PM10	PM2.5	SO_X
2050 Mitigated						
On-Road Sources[1]	1.6	8.3	50	13.9	3.4	0.3
Freight Rail[1]	0	0.3	0.3	0	0	0
Passenger Rail[2]	0	0.8	0	0	0	0.2
Total 2050	1.7	9.4	50.3	13.9	3.4	0.4
Approved Plan 2050	1.7	8.5	51.4	13.8	3.3	0.4
Change from Approved Plan	0	0.9	-1.1	0.1	0.1	0
Net Change From 2016	-4.8	-26.3	-91.8	0.3	-0.3	0

[1] Onroad and Freight Rail emissions are unchanged from the unmitigated emission estimates shown in Table 4.1-2.

[2] Passenger Rail emissions assume a 46 percent decrease in fuel consumption in 2035.

Emission Category	Emissions (tons per day)					
	ROG	NO_X	CO	PM10	PM2.5	SO_X
Unmitigated Passenger Rail (from Table 4.1-2)	0.1	1.4	0	0	0	0.3
46% Reduction from MM AQ-2b	0.0	0.6	0.0	0.0	0.0	0.1
Mitigated Passenger Rail[3]	0.0	0.8	0.0	0.0	0.0	0.2

[3] Totals may not add up due to rounding.

Table 4.1-4
Summary of Incremental PM2.5 Concentrations, 2025

Standard	Maximum Incremental Concentration (µg/m^3)			Area of Threshold Exceedance (acres)			Significant Impact?
	Proposed Amendment	Approved Plan	Change from Approved Plan	Proposed Amendment	Approved Plan	Change from Approved Plan	
PM2.5 Annual CAAQS	0	0.6	-0.6	0	0	0	No
PM2.5 24-hr NAAQS	0	1	-1	0	0	0	No
PM2.5 Annual NAAQS	0	1	-1	0	0	0	No

Table 4.1-5
Summary of Incremental PM10 Concentrations, 2025

Standard	Maximum Incremental Concentration (µg/m^3)			Area of Threshold Exceedance (acres)			Significant Impact?
	Proposed Amendment	Approved Plan	Change from Approved Plan	Proposed Amendment	Approved Plan	Change from Approved Plan	
PM10 24-hr NAAQS	5	4	1	0	0	0	No
PM10 Annual CAAQS	1	2	-1	28	33	-5	Yes [1]
PM10 24-hour CAAQS	6	6	0	0	1	-1	No

Table 4.1-6

Summary of Incremental PM2.5 Concentrations, 2035

Standard	Maximum Incremental Concentration (µg/m^3)			Area of Threshold Exceedance (acres)			Significant Impact?
	Proposed Amendment	Approved Plan	Change from Approved Plan	Proposed Amendment	Approved Plan	Change from Approved Plan	
PM2.5 Annual CAAQS	1	0.6	0.4	0	0	0	No
PM2.5 24-hr NAAQS	1	1	0	0	0	0	No
PM2.5 Annual NAAQS	0.5	1	-0.5	0	0	0	No

Table 4.1-7

Summary of Incremental PM10 Concentrations, 2035

Standard	Maximum Incremental Concentration (µg/m^3)			Area of Threshold Exceedance (acres)			Significant Impact?
	Proposed Amendment	Approved Plan	Change from Approved Plan	Proposed Amendment	Approved Plan	Change from Approved Plan	
PM10 24-hr NAAQS	10	10	0	0	0	0	No
PM10 Annual CAAQS	3	3	0	136	113	23	Yes [1]
PM10 24-hour CAAQS	14	14	0	0	6	-6	No

Table 4.1-8
Summary of Incremental PM2.5 Concentrations, 2050

Standard	Maximum Incremental Concentration (µg/m^3)			Area of Threshold Exceedance (acres)			Significant Impact?
	Proposed Amendment	Approved Plan	Change from Approved Plan	Proposed Amendment	Approved Plan	Change from Approved Plan	
PM2.5 Annual CAAQS	1	0.7	0.3	0	0	0	No
PM2.5 24-hr NAAQS	1	2	-1	0	0	0	No
PM2.5 Annual NAAQS	0.6	1	-0.4	0	0	0	No

Table 4.1-9
Summary of Incremental PM10 Concentrations, 2050

Standard	Maximum Incremental Concentration (µg/m^3)			Area of Threshold Exceedance (acres)			Significant Impact?
	Proposed Amendment	Approved Plan	Change from Approved Plan	Proposed Amendment	Approved Plan	Change from Approved Plan	
PM10 24-hr NAAQS	9	10	-1	0	0	0	No
PM10 Annual CAAQS	4	4	0	303	273	30	Yes [1]
PM10 24-hour CAAQS	13	15	-2	2	2	0	Yes [2]

Table 4.1-10a

Summary of Cancer Health Risk, 2025

Receptor Type	2016		2025	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	444	7,555	-5	0
Recreational	14	20	0	0
School	11	2	0	0
New Sources				
Residential	--	--	53	2
Recreational	--	--	1	0
School	--	--	0	0
New Land Uses				
Residential	--	--	149	964
Recreational	--	--	18	2
School	--	--	3	0

Approved Plan

Summary of Cancer Health Risk, 2025

Receptor Type	2016		2025	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	447	7,563	-5	0
Recreational	13	24	0	0
School	11	2	0	0
New Sources				
Residential	--	--	54	7
Recreational	--	--	3	0
School	--	--	0	0
New Land Uses				
Residential	--	--	149	948
Recreational	--	--	0	0
School	--	--	0	0

Table 4.1-10b

Change in Cancer Health Risk from Approved Plan, 2025

Receptor Type	2016		2025	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	-3	-8	0	0
Recreational	1	-4	0	0
School	0	0	0	0
New Sources				
Residential	--	--	-1	-5
Recreational	--	--	-2	0
School	--	--	0	0
New Land Uses				
Residential	--	--	0	16
Recreational	--	--	18	2
School	--	--	3	0

Table 4.1-11

Summary of Cumulative Health Risk, 2025

Receptor Type	2016		2025		2025 vs. 2016	
	Maximum Cumulative Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Cumulative Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Change in Maximum Cumulative Cancer Risk (per million)	Change in Area of Threshold Exceedance (acres)
Residential	1,015	7,537	934	7,400	-81	-137
Approved Plan	1,015	7,570	946	7,439	-69	-131
Change from Approved Plan	0	-33	-12	-39	-12	-6

Table 4.1-12

Summary of Toxic Air Contaminants Tons per Year, 2025

Year	Butadiene1,3	Acetaldehyde	Acrolein	Benzene	Ethyl Benzene	Formaldehyde	Naphthalene	PAH	DPM
2016	0.023	0.11	0.012	0.25	0.12	0.22	0.023	0.027	0.55
2025	0.002	0.032	0.0028	0.1	0.041	0.077	0.0064	0.0077	0.1
2025 Approved Plan	0.002	0.032	0.0029	0.1	0.041	0.079	0.0065	0.00004	0.093
Change vs. 2016	-91%	-71%	-77%	-60%	-66%	-65%	-72%	-71%	-82%
Change from Approved Plan	0	0	-0.0001	0	0	-0.002	-0.0001	0.0076	0.007

Table 4.1-13a
Summary of Noncancer Hazards, 2025

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	7.1	52.8	-0.1	-0.6	0	0
Recreational	2.3	40	-0.2	-0.8	0	0
School	1.4	25	0	0	0	0
New Sources						
Residential	--	--	0.2	5.2	0	2
Recreational	--	--	0.1	1.7	0	7
School	--	--	0	0	0	0
New Land Uses						
Residential	--	--	2.1	15.1	3	963
Recreational	--	--	0.7	9.5	0	56
School	--	--	0.3	5.9	0	7

Approved Plan
Summary of Noncancer Hazards, 2025

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	6.9	52.9	-0.1	-0.6	0	0
Recreational	2.3	37	-0.1	-0.8	0	0
School	1.5	24.9	0	0	0	0
New Sources						
Residential	--	--	0.2	5.4	0	7
Recreational	--	--	0.3	6.8	0	5
School	--	--	0	0	0	0
New Land Uses						
Residential	--	--	2.1	14.9	5	950
Recreational	--	--	0	0	0	0
School	--	--	0	0	0	0

Table 4.1-13b
Change in Noncancer Hazards from Approved Plan, 2025

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	0.2	-0.1	0	0	0	0
Recreational	0	3	-0.1	0	0	0
School	-0.1	0.1	0	0	0	0
New Sources						
Residential	--	--	0	-0.2	0	-5
Recreational	--	--	-0.2	-5.1	0	2
School	--	--	0	0	0	0
New Land Uses						
Residential	--	--	0	0.2	-2	13
Recreational	--	--	0.7	9.5	0	56
School	--	--	0.3	5.9	0	7

Table 4.1-14a

Summary of Cancer Health Risk, 2035

Receptor Type	2016		2035	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	444	7,555	-6	0
Recreational	14	20	0	0
School	11	2	0	0
New Sources				
Residential	--	--	114	1,292
Recreational	--	--	2	0
School	--	--	0	0
New Land Uses				
Residential	--	--	137	1,201
Recreational	--	--	18	2
School	--	--	2	0

Approved Plan

Summary of Cancer Health Risk, 2035

Receptor Type	2016		2035	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	447	7,563	-6	0
Recreational	13	24	0	0
School	11	2	0	0
New Sources				
Residential	--	--	132	1,261
Recreational	--	--	2	0
School	--	--	0	0
New Land Uses				
Residential	--	--	137	1,155
Recreational	--	--	0	0
School	--	--	0	0

Table 4.1-14b
Change in Cancer Health Risk from Approved Plan, 2035

Receptor Type	2016		2035	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	-3	-8	0	0
Recreational	-1	-5	0	0
School	0	0	0	0
New Sources				
Residential	--	--	-18	31
Recreational	--	--	0	0
School	--	--	0	0
New Land Uses				
Residential	--	--	0	46
Recreational	--	--	18	2
School	--	--	2	0

Table 4.1-15

Summary of Cumulative Health Risk, 2035

Receptor Type	2016		2035		2035 vs. 2016	
	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Change in Maximum Cumulative Cancer Risk	Change In Area of Threshold Exceedance (acres)
Residential	1,015	7,537	915	7,217	-100	-320
Approved Plan	1,015	7,570	928	7,214	-87	-356
Change from Approved Plan	0	-33	-13	3	-13	36

Table 4.1-16

Summary of Toxic Air Contaminants Emissions per Year, 2035

Year	Butadiene1,3	Acetaldehyde	Acrolein	Benzene	Ethyl Benzene	Formaldehyde	Naphthalene	PAH	DPM
2016	0.023	0.11	0.012	0.25	0.12	0.22	0.023	0.027	0.55
2035	0.0001	0.025	0.002	0.075	0.028	0.055	0.0046	0.005	0.092
2035 Approved Plan	0.0001	0.025	0.002	0.075	0.028	0.055	0.0046	0.00002	0.078
Change vs. 2016	-100%	-77%	-83%	-70%	-77%	-75%	-80%	-81%	-83%
Change from Approved Plan	0	0	0	0	0	-0.002	-0.0001	0.005	0.014

Table 4.1-17a
Summary of Noncancer Hazards, 2035

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	7.1	52.8	-0.1	-0.7	0	0
Recreational	2.3	40	-0.2	-0.9	0	0
School	1.4	25	0	0	0	0
New Sources						
Residential	-	-	0.5	12.3	0	1,280
Recreational	-	-	0.1	3.3	0	130
School	-	-	0	0	0	0
New Land Uses						
Residential	-	-	1.3	10.9	1	992
Recreational	-	-	0.2	6	0	49
School	-	-	0.2	3.9	0	11

Approved Plan
Summary of Noncancer Hazards, 2035

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	6.9	52.9	0	-0.8	0	0
Recreational	2.3	37	-0.1	-0.9	0	0
School	1.5	24.9	0	0	0	0
New Sources						
Residential	-	-	0.8	14.2	0	1,266
Recreational	-	-	0.2	4.7	0	123
School	-	-	0	0	0	0
New Land Uses						
Residential	-	-	1.4	13.2	2	1,161
Recreational	-	-	0	0	0	0
School	-	-	0	0	0	0

Table 4.1-17b
Change in Noncancer Hazards from Approved Plan, 2035

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	0.2	-0.1	-0.1	0.1	0	0
Recreational	0	3	-0.1	0	0	0
School	-0.1	-0.1	0	0	0	0
New Sources						
Residential	-	-	-0.3	-1.9	0	14
Recreational	-	-	-0.1	-1.4	0	7
School	-	-	0	0	0	0
New Land Uses						
Residential	-	-	0.1	2.3	-1	-169
Recreational	-	-	0.2	6	0	49
School	-	-	0.2	3.9	0	11

Table 4.1-18a

Summary of Cancer Health Risk, 2050

Receptor Type	2016		2050	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	444	7,555	-5	0
Recreational	14	20	0	0
School	11	2	0	0
New Sources				
Residential	--	--	102	2,497
Recreational	--	--	18	1
School	--	--	2	0
New Land Uses				
Residential	--	--	135	1,254
Recreational	--	--	17	2
School	--	--	0	0

Approved Plan

Summary of Cancer Health Risk 2050

Receptor Type	2016		2050	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	447	7,563	-5	0
Recreational	13	25	0	0
School	11	2	0	0
New Sources				
Residential	--	--	131	2,481
Recreational	--	--	3	0
School	--	--	1	0
New Land Uses				
Residential	--	--	133	1,223
Recreational	--	--	0	0
School	--	--	0	0

Table 4.1-18b

Change in Cancer Health Risk from Approved Plan, 2050

Receptor Type	2016		2050	
	Maximum Cancer Risk (per million)	Area of Threshold Exceedance (acres)	Maximum Incremental Cancer Risk (per million)	Incremental Area of Threshold Exceedance (acres)
Existing Sources				
Residential	-3	-8	0	0
Recreational	1	-5	0	0
School	0	0	0	0
New Sources				
Residential	--	--	-29	16
Recreational	--	--	15	1
School	--	--	1	0
New Land Uses				
Residential	--	--	2	31
Recreational	--	--	17	2
School	--	--	0	0

Table 4.1-19

Summary of Cumulative Health Risk, 2050

Receptor Type	2016		2050		2050 vs. 2016	
	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Maximum Cumulative Cancer Risk	Area of Threshold Exceedance (acres)	Change in Maximum Cumulative Cancer Risk	Change in Area of Threshold Exceedance (acres)
Residential	1,015	7,537	912	7,167	-103	-370
Approved Plan	1,015	7,570	922	7,232	-93	-338
Change from Approved Plan	0	-33	-10	-65	-10	-32

Table 4.1-20

Contaminants Tons per Year, 2050

Year	Butadiene1,3	Acetaldehyde	Acrolein	Benzene	Ethyl Benzene	Formaldehyde	Naphthalene	PAH	DPM
2016	0.023	0.11	0.012	0.25	0.12	0.22	0.023	0.027	0.55
2050	0.0001	0.024	0.0018	0.067	0.025	0.055	0.0042	0.005	0.091
2050 Approved Plan	0.0001	0.024	0.0018	0.068	0.025	0.052	0.0042	0.00002	0.071
Change vs. 2016	-100%	-78%	-85%	-73%	-79%	-75%	-82%	-81%	-83%
Change from Approved Plan	0	0	0	-0.001	0	0.003	0	0.005	0.02

Table 4.1-21a

Summary of Noncancer Hazards, 2050

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	7.1	52.8	0	-0.7	0	0
Recreational	2.3	40	-0.1	-0.9	0	0
School	1.4	25	0	0	0	0
New Sources						
Residential	--	--	0.5	10.7	0	2,463
Recreational	--	--	0.2	4.1	0	220
School	--	--	0.1	2.1	0	1
New Land Uses						
Residential	--	--	1.4	9.9	2	1,212
Recreational	--	--	0.4	5.2	0	44
School	--	--	0.1	3.2	0	22

Approved Plan

Summary of Noncancer Hazards, 2050

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	6.9	52.9	0.5	-0.6	0	0
Recreational	2.3	37	0.2	-0.9	0	0
School	1.5	24.9	0	0	0	0
New Sources						
Residential	--	--	0.9	13.8	0	2,477
Recreational	--	--	0.6	4.3	0	299
School	--	--	0.2	2.2	0	1
New Land Uses						
Residential	--	--	1.5	11.2	2	1,218
Recreational	--	--	0	0	0	0
School	--	--	0	0	0	0

Table 4.1-21b

Change in Noncancer Hazards from Approved Plan, 2050

Receptor Type	2016 Maximum Hazard Index		Maximum Incremental Change vs. 2016		Incremental Area of Threshold Exceedance (acres)	
	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard	Acute Hazard	Chronic Hazard
Existing Sources						
Residential	0.2	-0.1	-0.5	-0.1	0	0
Recreational	0	3	-0.3	0	0	0
School	-0.1	0.1	0	0	0	0
New Sources						
Residential	--	--	-0.4	-3.1	0	-14
Recreational	--	--	-0.4	-0.2	0	-79
School	--	--	-0.1	-0.1	0	0
New Land Uses						
Residential	--	--	-0.1	-1.3	0	-6
Recreational	--	--	0.4	5.2	0	44
School	--	--	0.1	3.2	0	22

Appendix C
Updated GHG Calculations

SB 375 GHG Reduction Targets and GHG Emissions under the Proposed Amendment from Passenger Vehicles and Light-Duty Trucks, 2035

	Proposed Amendment Per Capita Reductions from 2005 Levels	Approved Plan Per Capita Reductions from 2005 Levels	Change from Approved Plan PEIR
Per Capita Reduction under the Proposed Amendment (On-Model Results Only)	-17.7%	-19.3%	1.6%
Per Capita Reduction under the Proposed Amendment (Off-Model Results Only)	-3.0%	-3.0%	0.0%
CARB Adjustment Factor for EMFAC 2007–2014[1]	1.7%	1.7%	0.0%
Induced Demand Adjustment Factor[2]	0.3%	0.2%	0.1%
Per Capita Reductions	-18.6%	-20.4%	1.8%
CARB Target	-19%	-19%	

Calculation to Estimate Per-Capita GHG Emissions from the Entire On-Road Transportation Sector, 2035 compared to 2016

Components Used in the Calculation	2016	2035 Proposed Amendment	2035 Approved Plan	Change from 2035 Approved Plan PEIR
Total Emissions from the Entire On-Road Transportation Sector ($MMTCO_2$)	12.2	7.6	7.5	0.1
Total Population in the San Diego Region (Residents)	3,287,280	3,620,348	3,620,348	0
Per Capita Emissions ($MTCO_2$/capita)	3.71	2.10	2.07	0.027621654
Percent Reduction under the proposed Amendment, 2035 compared to 2016	**-43%**		**-44%**	**1%**

Reference Point and GHG Emissions under the Proposed Amendment, 2030

	Proposed Amendment Annual Emissions ($MMTCO_2e$)	Approved Plan Annual Emissions ($MMTCO_2e$)	Change from Approved Plan PEIR
GHG Emissions in the San Diego Region in 2016	25.8	25.8	0
GHG emissions in the San Diego Region in 2030[1]	20.4	20.3	0.1
2030 SB 32 Reference Point (40% below 2016 levels)	15.6	15.6	0
Accelerated 2030 Scoping Plan Reference Point (48% below 2016 levels)	13.4	N/A	N/A

Reference Points and GHG Emissions under the Proposed Amendment, 2045 and 2050

	Proposed Amendment Annual Emissions ($MMTCO_2e$)	Approved Plan Annual Emissions ($MMTCO_2e$)	Change from Approved Plan PEIR
GHG Emissions in the San Diego Region in 2016	25.8	25.8	0
GHG Emissions in the San Diego Region in 2045 with proposed Amendment[1,2]	17.6	17.5	0.1
2045 Reference Point (carbon neutral target in EO B-55-18 and AB 1279)	3.9	0	3.9
GHG Emissions in the San Diego Region in 2050 with proposed Amendment[1]	17.8	17.7	0.1
2050 Reference Point (80% below 2016 levels per EO S-3-05)	5.2	5.2	0

Emissions Category		2021 Regional Plan
		Legislative-adjusted Projection
On-road Transportation	Activity - VMT	Light-Duty Vehicles: **California Advanced Clean Car (ACC) Program** (meet 1 million EV by 2025), without SAFE rule impact Heavy Duty Vehicles: 1. Senate Bill 1 (The Road Repair and Accountability Act of 2017) and **CARB Tractor Trailer GHG Regulation** 2. **EPA Phase 2 GHG Regulation**
	Emission Factor - g CO2e per mile	Data Source: EMFAC2017
Energy - Electricity	Activity - MWh	Title 20, Title 24, federal appliance efficiency standards up to 2019 Current rate structures and behind-the-meter storage and generation Solar capacity assumed in CEC forecast below through 2030 Data Sources and Assumptions: Latest CEC 2020 IEPR demand forecast 2020–2030 mid demand case (draft version as of Dec 2020, to be adopted by early 2021)
	Emission Factor - lbs CO2e per MWh	**SB100 (2018):** 1. RPS-eligible renewable resources: 50% by 2026, 60% by 2030 2. RPS- eligible renewable resources and zero-carbon supply: 100% by 2045 **Community Choice Energy Programs (operational by RP adoption at the end of 2021):** 100% renewable by 2030 or 2035 goal 1. San Diego Community Power (Chula Vista, Encinitas, Imperial Beach, La Mesa and San Diego) - phased roll-out starts 2021, with 55% GHG free electricity offering and 95% participation rates in both residential and commercial sector 2. Clean Energy Alliance (Carlsbad, Del Mar, and Solana Beach) - single phase roll-out beginning in May 2021, 90% participation rate of bundled customer, renewable target consistent with SB100 (60% RE by 2030)
Energy - Natural Gas	Activity - therms	Title 20, Title 24, federal appliance efficiency standards up to 2019 Data Sources and Assumptions: CEC 2019 IEPR demand forecast 2020–2030 mid demand case (adopted early 2020)
	Emission Factor - MT CO2e per therm	0.00545 MT CO2e per therm

<table>
<tr><td>Industrial</td><td>GHG Emissions</td><td><u>Data Sources and Assumptions:</u>
San Diego region jobs projection (SANDAG)</td></tr>
<tr><td>Aviation</td><td>GHG Emissions</td><td><u>Data Sources and Assumptions:</u>
Airport Development Plan (2019) constrained passenger projection through 2050</td></tr>
<tr><td>Marine Vessels</td><td>GHG Emissions</td><td>Commercial Harbor Craft (CHC) Regulation (2007, amended in 2010, fully implemented by 2022) to reduce emissions of diesel particulate matter (PM), oxides of nitrogen (NOx), and Reactive Organic Gases (ROG) from diesel engines used on CHC operated in Regulated California Waters (within 24 nautical miles of the California coast).

Ocean-Going Vessel Clean Fuel Regulation (beginning in 2009) and North American Emission Control Area (beginning in 2015) to reduce sulfur content of diesel fuel used in OGV.
Ocean-Going Vessel At-Berth Regulation (2007) and proposed regulation (implementation through 2029) to require container vessels, passenger vessels, and refrigerated-cargo vessels to connect to shore power for a percent of their visits or use an approved alternative to shore power.

<u>Data Sources and Assumptions:</u>
CARB ORION Database v1.0.1</td></tr>
<tr><td>Water</td><td>GHG Emissions</td><td><u>Data Sources and Assumptions:</u>
San Diego County Water Authority's estimate of active and passive conservation savings (Post-2018)
Active: Implementation of water conservation program
Passive: future savings from appliance standards, plumbing code change, and updated MWELO</td></tr>
<tr><td>Wastewater</td><td>GHG Emissions</td><td>San Diego region population projection</td></tr>
<tr><td rowspan="2">Solid Waste</td><td>Annual tons generated</td><td>San Diego region population projection</td></tr>
<tr><td>Emission factor, MT CO2e/short ton</td><td>0.79 MT CO2e/short ton</td></tr>
<tr><td>Agriculture</td><td>GHG Emissions</td><td>Average cattle population of the years 2017-2019 was used for the projection years 2020-2050.</td></tr>
<tr><td>Rail</td><td>GHG Emissions</td><td>San Diego region rail transportation jobs projection</td></tr>
<tr><td>Other fuel</td><td>GHG Emissions</td><td>The CARB GHG inventory values for the years 2016-2018 were downloaded from the CARB GHG inventory Query tool. These CARB values were projected to 2050 using the forecast function and these were scaled down to San Diego region values using ratios below:

<table>
<tr><th>Sector</th><th>Ratio</th></tr>
<tr><td>Agriculture</td><td>SD Ag revenue/CA Ag revenue</td></tr>
<tr><td>Commercial</td><td>SD Manufacturing sector Employees/CA manufacturing sector employees</td></tr>
<tr><td>Residential</td><td>SD population/CA population</td></tr>
<tr><td>Transportation</td><td>SD VMT/CA VMT</td></tr>
<tr><td>Energy</td><td>SD T&D establishments/A T&D establishments</td></tr>
<tr><td>Manufacturing</td><td>SD Manufacturing sector Employees/CA manufacturing sector employees</td></tr>
</table></td></tr>
</table>

Off-road Transportation	GHG Emissions	Data Sources and Assumptions: OFFROAD ORION v1.0.1. SORE2020 Model (v1.1) RV2018 Model Database PC2014 Model Database
Fertilizerr	GHG Emissions	Emissions from fertilizer use were calculated based on ICLEI method. Farm nitrogen, non-farm nitrogen, urea, lime and crop residue nitrogen were projected using the GROWTH function in Excel (b=1). Data sources and assumptions The fertilizer tonnage report by year were downloaded from the cdfa website to calculate the emissions according to the ICLEI model of N2O emissions from managed soils, and CO2 emissions from Lime and Urea Applications

Summary - Proposed Amendment

	Emission Category	GHG Emissions (MT CO2e)							GHG Emissions (MMT CO2e)				
		2016		2025	2035	2045	2050		2016	2025	2035	2045	2050
1	On-Road Transportation (LDV)	10,856,923	42%	8,169,375	6,228,319	6,101,459	6,038,030	34%	10.9	8.2	6.2	6.1	6.0
2	Electricity	5,267,039	20%	3,392,104	1,304,499	204,014	204,014	1%	5.3	3.4	1.3	0.2	0.2
3	Natural Gas	3,103,209	12%	3,339,523	3,443,573	3,526,720	3,569,024	20%	3.1	3.3	3.4	3.5	3.6
4	Industrial	2,051,828	8%	2,237,964	2,353,073	2,468,051	2,514,430	14%	2.1	2.2	2.4	2.5	2.5
5	On-Road Transportation (HDV)	1,348,565	5%	1,362,061	1,359,596	1,385,626	1,398,642	8%	1.3	1.4	1.4	1.4	1.4
6	Other Fuels	1,137,608	4%	1,362,321	1,452,015	1,514,022	1,540,707	9%	1.1	1.4	1.5	1.5	1.5
7	Off-Road Transportation	621,322	2%	723,203	830,318	912,542	953,704	5%	0.62	0.72	0.83	0.91	0.95
8	Solid Waste	590,873	2%	623,868	650,740	668,596	673,339	4%	0.59	0.62	0.65	0.67	0.67
9	Water	244,337	1%	280,803	152,921	-	(0)	0.0%	0.24	0.28	0.15	-	(0.00)
10	Aviation	213,353	1%	289,052	343,726	399,142	429,874	2%	0.21	0.29	0.34	0.40	0.43
11	Rail	111,282	0.4%	170,658	186,130	198,060	202,099	1%	0.11	0.17	0.19	0.20	0.20
12	Wastewater	73,014	0.3%	77,091	80,412	82,618	83,204	0.5%	0.07	0.08	0.08	0.08	0.08
13	Agriculture	53,265	0.2%	60,758	60,758	60,758	60,758	0.3%	0.05	0.06	0.06	0.06	0.06
14	Marine Vessels	48,000	0.2%	55,131	64,877	76,623	82,368	0.5%	0.05	0.06	0.06	0.08	0.08
15	Soil Management	47,041	0.2%	35,115	37,764	40,614	42,119	0.2%	0.05	0.04	0.04	0.04	0.04
	Total	**25,767,658**	**100%**	**22,179,027**	**18,548,721**	**17,638,845**	**17,792,311**	100%	**25.8**	**22.2**	**18.5**	**17.6**	**17.8**

Summary - Approved Plan w/o SAFE Vehicle Corrections

	Emission Category	GHG Emissions (MT CO2e)							GHG Emissions (MMT CO2e)				
		2016		2025	2035	2045	2050		2016	2025	2035	2045	2050
1	On-Road Transportation (LDV)	10,404,317	40%	7,786,162	5,783,611	5,637,500	5,596,652	32%	10.4	7.8	5.8	5.6	5.6
2	Electricity	5,267,039	20%	3,392,104	1,304,499	204,014	204,014	1%	5.3	3.4	1.3	0.2	0.2
3	Natural Gas	3,103,209	12%	3,339,523	3,443,573	3,526,720	3,569,024	20%	3.1	3.3	3.4	3.5	3.6
4	Industrial	2,051,828	8%	2,240,740	2,348,822	2,468,051	2,508,103	14%	2.1	2.2	2.3	2.5	2.5
5	On-Road Transportation (HDV)	1,761,445	7%	1,682,590	1,659,696	1,690,091	1,709,802	10%	1.8	1.7	1.7	1.7	1.7
6	Other Fuels	1,137,608	4%	1,362,355	1,451,963	1,514,022	1,540,629	9%	1.1	1.4	1.5	1.5	1.5
7	Off-Road Transportation	621,322	2%	723,203	830,318	912,542	953,704	5%	0.62	0.72	0.83	0.91	0.95
8	Solid Waste	590,873	2%	623,868	650,740	668,596	673,339	4%	0.59	0.62	0.65	0.67	0.67
9	Water	244,337	1%	280,803	152,921	-	(0)	0.0%	0.24	0.28	0.15	-	(0.00)
10	Aviation	213,353	1%	289,052	343,726	399,142	429,874	2%	0.21	0.29	0.34	0.40	0.43
11	Rail	111,282	0.4%	170,658	186,130	198,060	202,099	1%	0.11	0.17	0.19	0.20	0.20
12	Wastewater	73,014	0.3%	77,091	80,412	82,618	83,204	0.5%	0.07	0.08	0.08	0.08	0.08
13	Agriculture	53,265	0.2%	60,758	60,758	60,758	60,758	0.3%	0.05	0.06	0.06	0.06	0.06
14	Marine Vessels	48,000	0.2%	55,131	64,877	76,623	82,368	0.5%	0.05	0.06	0.06	0.08	0.08
15	Soil Management	47,041	0.2%	35,115	37,764	40,614	42,119	0.2%	0.05	0.04	0.04	0.04	0.04
	Total	**25,727,932**	**100%**	**22,119,154**	**18,399,809**	**17,479,351**	**17,655,688**	100%	**25.8**	**22.1**	**18.4**	**17.5**	**17.7**

Change from Approved Plan EIR w/o SAFE Vehicle Corrections

Emission Category	GHG Emissions (MMT CO2e)				
	2016	2025	2035	2045	2050
On-Road Transportation (LDV)	0.5	0.4	0.4	0.5	0.4
Electricity	0.0	0.0	0.0	0.0	0.0
Natural Gas	0.0	0.0	0.0	0.0	0.0
Industrial	0.0	0.0	0.0	0.0	0.0
On-Road Transportation (HDV)	-0.5	-0.3	-0.3	-0.3	-0.3
Other Fuels	0.0	0.0	0.0	0.0	0.0
Off-Road Transportation	0.0	0.0	0.0	0.0	0.0
Solid Waste	0.0	0.0	0.0	0.0	0.0
Water	0.0	0.0	0.0	0.0	0.0
Aviation	0.0	0.0	0.0	0.0	0.0
Rail	0.0	0.0	0.0	0.0	0.0
Wastewater	0.0	0.0	0.0	0.0	0.0
Agriculture	0.0	0.0	0.0	0.0	0.0
Marine Vessels	0.0	0.0	0.0	0.0	0.0
Soil Management	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.1	0.1	0.2	0.1

On-road Transportation (LDV + HDV)

Results and Output Summary

LDV

No SAFE Rule

Projection Year	2025	2035	2050
VMT (Miles per weekday)*	80,488,000	81,971,912	84,143,843
CO2 Emissions (Tons per weekday)**	25,716	20,920	20,139
Conversion Factor	318	317	318
GHG Emissions (MT CO2e)	8,169,375	6,641,611	6,394,751
GHG Emissions (MMT CO2e)	8.2	6.6	6.4
GHG Reduction from SANDAG EV Programs (Subtracted)	-	(0.34)	(0.28)
GHG Reduction from SANDAG TDM Programs (Subtracted)	-	(0.08)	(0.08)
GHG Emissions (MT CO2e)	8,169,375	6,228,319	6,038,030
GHG Emissions (MMT CO2e)	8.2	6.2	6.0

HDV

Projection Year	2025	2035	2050
VMT (Miles per weekday)*	4,659,318	5,366,307	5,938,672
CO2 Emissions (Tons per weekday)*	4,549	4,545	4,674
Conversion Factor	299	299	299
GHG Emissions (MT CO2e)	1,362,061	1,359,596	1,398,642
GHG Emissions (MMT CO2e)	1.4	1.4	1.4

EV Off-Model

	2025	2035	2050	
Combined Regional Charger + Vehicle Incentive Programs (MT CO2 per year) (1)	N/A	334,556	276,677	
Conversion Factor (MT CO2e per MT CO2)		1.01	1.01	GAS LDA, LDT1, LDT2, MDV under EMFAC2017
GHG Reduction from SANDAG EV Programs (MT CO2e)		337,352	278,990	
GHG Reduction from SANDAG EV Programs (MMT CO2e)		0.34	0.28	

TDM Off-Model

Total Weekday Vehicle Miles + Vehicle Trips Reduction

GHG Emission Avoided	2025	2035	2050
Total avoided (Trips + Miles) - MT CO2e	N/A	75,939	77,732
Total avoided (Trips + Miles) - MMT CO2e		0.08	0.08

Total Weekday Vehicle Trip Reduction

	2025	2035	2050	
Vanpool - weekday trips (2)	N/A	7,853	8,837	
Carshare (N/A) (3)				
Pooled Rides (4)		2,123	2,106	
TDMO (5)		46,121	72,436	net trip reduction
Total - average weekday		56,097	83,379	
Total Annual Trips		19,465,777	28,932,559	weekday * 347 (weekday per year for LDA, LT1, LDT2, MDV)
gram per trip avoided (No SAFE Rule)		6	6	
GHG avoided (No SAFE Rule) - MT CO2e		**110**	**159**	

Total Weekday Vehicle Miles Reduction

	2025	2035	2050	
Vanpool - weekday miles (2)		400,805	450,486	Within SD county
Carshare (No 2050) (3)		176,896		
Pooled Rides (4)		11,658	11,540	
TDMO (5)	N/A	364,337	579,172	Net VMT reduction
Total		953,696	1,041,198	
Total Annual Miles		330,932,552	361,295,803	weekday * 347 (weekday per year for LDA, LT1, LDT2, MDV)
gram per mile avoided		229	215	
GHG avoided - MT CO2e		**75,829**	**77,573**	

May prorate, but not included here
linear interpolation

References

Reference name, link and access date

1 "Copy of SANDAG_EV_Scenario_Model_10012020_Final RP Preferred Scenario", SANDAG, provided 10/07/21
2 "DRAFT_GHG Calculator Vanpool", SANDAG provided 10/07/21
3 "DRAFT_GHG Calculator Carshare", SANDAG provided 10/07/21
4 "DRAFT_GHG Calculator Pooled Rides", SANDAG, provided 10/07/21
5 "DRAFT_GHG Calculator TDMO", SANDAG, provided 10/07/21

On-road Transportation 2016

Results and Output Summary

83,935,181	SANDAG Series 14 VMT, average weekday miles
80,146,048	SANDAG Series 14 VMT, average weekday miles, LDV
3,789,133	SANDAG Series 14 VMT, average weekday miles, HDV
28,957,637,331	SANDAG Series 14 VMT, annual miles
12,205,488	MT CO2e emissions, TOTEX
10,856,923	MT CO2e emissions, TOTEX, LDV
1,348,565	MT CO2e emissions, TOTEX, HDV

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)
LDV	34,024	319	10,856,923
HDV	4,492	300	1,348,565
Total	38,516	N/A	12,205,488

SANDAG ABM Input and Output for 2016 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX	
Annual	83,822,214	37,624	170.2	721.2	38,516	tons per day

On-road Transportation 2025

Results and Output Summary

85,147,318	SANDAG Series 14 VMT, average weekday miles
80,488,000	SANDAG Series 14 VMT, average weekday miles, LDV
4,659,318	SANDAG Series 14 VMT, average weekday miles, HDV
29,375,824,816	SANDAG Series 14 VMT, annual miles
9,531,436	MT CO2e emissions, TOTEX
8,169,375	MT CO2e emissions, TOTEX, LDV
1,362,061	MT CO2e emissions, TOTEX, heavy-duty
9,279,858	MT CO2e emissions, RUNEX only
316	gram CO2e per mile, RUNEX only

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)
LDV	25,716	318	8,169,375
HDV	4,549	299	1,362,061
Total	30,266	N/A	9,531,436

SANDAG ABM Input and Output for 2025 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX	
Annual	85,147,318.3	29,466.9	212.6	586.3	30,265.8	tons per day

On-road Transportation 2035

Results and Output Summary

87,338,219	SANDAG Series 14 VMT, average weekday miles
81,971,912	SANDAG Series 14 VMT, average weekday miles, LDV
11,582,338	SANDAG Series 14 VMT, average weekday trips, LDV
5,366,307	SANDAG Series 14 VMT, average weekday miles, HDV
30,131,685,615	SANDAG Series 14 VMT, annual miles
28,280,309,553	SANDAG Series 14 VMT, annual miles, LDV
3,995,906,462	SANDAG Series 14 VMT, annual trips, LDV
8,001,206	MT CO2e emissions, TOTEX
6,641,611	MT CO2e emissions, TOTEX, LDV
1,359,596	MT CO2e emissions, TOTEX, heavy-duty
7,779,206	MT CO2e emissions, RUNEX only
6,480,086	MT CO2e emissions, RUNEX only, LDV
159,761	MT CO2e emissions, STARTEX only, LDV
258	gram CO2e per mile, RUNEX only
229	gram CO2e per mile, RUNEX only, LDV
6	gram CO2e per trip, STARTEX only, LDV

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)	CO2_RUNEX (tons per day)	CO2e_RUNEX (MT per year)	CO2_STARTEX (tons per day)	CO2e_START (MT per year)
LDV	20,920	317	6,641,611	20,412	6,480,086	503	159,761
HDV	4,545	299	1,359,596	4,343	1,299,121	-	-
Total	25,465	N/A	8,001,206	24,754	7,779,206	503	159,761

SANDAG ABM Input and Output for 2035 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX	
Annual	87,338,219.2	24,754.2	207.7	503.2	25,465.2	tons per day

On-road Transportation 2050

Results and Output Summary

90,082,516	SANDAG Series 14 VMT, average weekday miles
84,143,843	SANDAG Series 14 VMT, average weekday miles, LDV
12,669,115	SANDAG Series 14 VMT, average weekday trips, LDV
5,938,672	SANDAG Series 14 VMT, average weekday miles, HDV
31,078,467,851	SANDAG Series 14 VMT, annual miles
29,029,625,853	SANDAG Series 14 VMT, annual miles, LDV
4,370,844,520	SANDAG Series 14 VMT, annual trips, LDV
7,793,393	MT CO2e emissions, TOTEX
6,394,751	MT CO2e emissions, TOTEX, Light-duty SB375 Vehicles
1,398,642	MT CO2e emissions, TOTEX, heavy-duty
7,567,679	MT CO2e emissions, RUNEX only
6,232,857	MT CO2e emissions, RUNEX only, LDV
159,836	MT CO2e emissions, STARTEX only, LDV
244	gram CO2e per mile, RUNEX only
215	gram CO2e per mile, RUNEX only, LDV
6	gram CO2e per trip, STARTEX only, LDV

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)	CO2_RUNEX (tons per day)	CO2e_RUNEX (MT per year)	CO2_STARTEX (tons per day)	CO2e_START (MT per year)
LDV	20,139	318	6,394,751	19,629	6,232,857	503	159,836
HDV	4,674	299	1,398,642	4,461	1,334,821	-	-
Total	24,814	N/A	7,793,393	24,091	7,567,679	503	159,836

SANDAG ABM Input and Output for 2050 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX	
Annual	90,082,515.5	24,090.5	219.8	503.4	24,813.7	tons per day

Electricity

Results and Output Summary

1.082	Transmission and Distribution Losses, CED 2020-2030
527	lbs CO2e per MWh, SDG&E 2016 Emission Factor
43%	SDG&E 2016 Renewable Content
836	lbs CO2e per MWh, DA Emission Factor
10%	DA Renewable Content

Calendar Year	Renewable/GHG-free Conrtent (%)			Electricity Emission Factor (lbs CO2e/MWh)		
	San Diego Community Power	SDG&E Bundled or CEA	Direct Access	San Diego Community Power	SDG&E Bundled	Direct Access
2025	67%	47%	47%	308	493	493
2030	100%	60%	60%	0	370	370
2035	100%	73%	73%	-	249	249
2045	100%	100%	100%	-	-	-
2050	100%	100%	100%	-	-	-

Calendar Year	SD Region Electricity Sales (GWh)			Electricity Emission Factor (lbs CO2e/MWh)			GHG Emissions from Grid Supply (MT CO2e)	GHG Emissions Removed from Natual Gas & Added to Electricity (MT CO2e)	Electricity Associated with Water Treatment & Removed from Electricity (MT CO2e)	Total GHG Emissions (MT CO2e)
	San Diego Community Power	SDG&E Bundled	Direct Access	San Diego Community Power	SDG&E Bundled	Direct Access				
2025	7,408	5,775	3,059	308	493	493	3,256,139	204,014	68,048	3,392,104
2030	7,189	6,403	3,154	0	370	370	1,733,379	204,014	53,095	1,884,298
2035	7,459	6,137	3,155	-	249	249	1,137,543	204,014	37,058	1,304,499
2045	8,031	5,573	3,157	-	-	-	-	204,014	-	204,014
2050	8,333	5,275	3,158	-	-	-	(0)	204,014	(0)	204,014

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	5,267,039
2017	5,079,953
2018	4,985,318
2019	4,580,431
2020	4,340,868
2021	3,432,788
2022	2,350,338
2023	3,909,669
2024	3,701,614

2025	3,392,104
2026	3,083,528
2027	2,781,064
2028	2,480,200
2029	2,181,751
2030	1,884,298
2031	1,765,877
2032	1,648,672
2033	1,532,699
2034	1,417,970
2035	1,304,499
2036	1,188,299
2037	1,073,425
2038	959,893
2039	847,718
2040	736,915
2041	627,493
2042	519,476
2043	412,880
2044	307,721
2045	204,014
2046	204,014
2047	204,014
2048	204,014
2049	204,014
2050	204,014

References

Reference name, link and access date

1 "Encinitas-SD Community Power Implementation Plan"
https://perma.cc/2N6X-FNYM
accessed August 4, 2020

2 "SDCP May2020 Board Meeting re Procurement"
https://perma.cc/76Y3-58D2
accessed August 4, 2020

3 CEC IEPR Forecast 2020-2030 (CED 2019)
"TN231525_20200115T103018_CED 2019 Forecast - SDGE Mid Demand Case"
Accessed March 3, 2020

4 CEC IEPR Forecast 2020-2030 (CEDU 2020)
"TN235861_20201204T150530_DRAFT CEDU 2020-2030 Forecast Update - IOU Planning Area Consumption and Sa"
Accessed Dec 3, 2020

Natural Gas

Results and Output Summary

0.0054540 MT per therm of natural gas

Calendar Year	SD Region Natural Gas Sales (therms)	GHG Emissions (MT CO2e)	GHG Emissions associated with Electric Gen & Removed from Natural Gas (MT CO2e)	GHG Emissions associated with UEG co-gen Therms & Added to Natural Gas (MT CO2e)	Total GHG Emissions (MT CO2e)
2016	585,360,937	3,192,578	207,608	118,239	3,103,209
2025	628,689,290	3,428,892	207,608	118,239	3,339,523
2030	640,276,291	3,492,088	207,608	118,239	3,402,719
2035	647,766,840	3,532,942	207,608	118,239	3,443,573
2045	663,011,857	3,616,089	207,608	118,239	3,526,720
2050	670,768,387	3,658,393	207,608	118,239	3,569,024

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	3,103,209
2017	3,150,849
2018	3,168,934
2019	3,279,568
2020	3,282,447
2021	3,289,410
2022	3,302,439
2023	3,315,303
2024	3,331,280
2025	3,339,523
2026	3,354,375
2027	3,370,158
2028	3,384,559
2029	3,394,605
2030	3,402,719
2031	3,410,852
2032	3,419,004
2033	3,427,174

2034	3,435,364
2035	3,443,573
2036	3,451,801
2037	3,460,048
2038	3,468,314
2039	3,476,600
2040	3,484,905
2041	3,493,229
2042	3,501,572
2043	3,509,935
2044	3,518,318
2045	3,526,720
2046	3,535,141
2047	3,543,582
2048	3,552,043
2049	3,560,524
2050	3,569,024

References

Reference name, link and access date

1 "TN231608_20200121T095704_CED 2019 Baseline Natural Gas Forecast - Mid Demand Case"
CEC IEPR Forecast 2020-2030 (CED 2019)
Accessed March 3, 2020

Industrial

Results and Output Summary

Calendar Year	Manufacturing Sector jobs Increase Compared with 2016 (%)	Population Increase Compared with 2016 (%)	VMT Increase Compared with 2016 (%)	Housing Increase Compared with 2016 (%)	Jobs Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	0%	0%	0%	0%	0%	2,051,828
2025	15%	6%	1%	9%	12%	2,237,964
2030	21%	8%	3%	14%	12%	2,277,624
2035	26%	10%	3%	19%	17%	2,353,073
2045	34%	13%	5%	23%	24%	2,473,225
2050	37%	14%	6%	24%	27%	2,514,430

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	2,051,828
2017	2,078,069
2018	2,101,038
2019	2,123,998
2020	2,146,981
2021	2,169,963
2022	2,192,945
2023	2,215,927
2024	2,238,910
2025	2,237,964
2026	2,245,896
2027	2,253,828
2028	2,261,760
2029	2,269,692
2030	2,277,624
2031	2,292,714
2032	2,307,804
2033	2,322,894
2034	2,337,983
2035	2,353,073
2036	2,365,089
2037	2,377,104
2038	2,389,119

2039	2,401,134
2040	2,413,149
2041	2,425,164
2042	2,437,179
2043	2,449,194
2044	2,461,210
2045	2,473,225
2046	2,481,466
2047	2,489,707
2048	2,497,948
2049	2,506,189
2050	2,514,430

References

Reference name, link and access date

1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21

2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020

4 CARB GHG Inventory Query tool, download 09/22/2020

Other fuel

Results and Output Summary

Calendar Year	SD Region jobs in manufacturing sector	SD Manufacturing Sector jobs Increase Compared with 2016 (%)	SD Region jobs in Transmission and Distribution (T&D) sector	SD T&D jobs Increase Compared with 2016 (%)	SD Region Population	SD Population Increase Compared with 2016 (%)	SD Region annual VMT	SD VMT Increase Compared with 2016 (%)	Ag ratio	CARB Ag fuel emissions	Total Commercial GHG Emissions (MT CO2e)	Total Electricity Transportation and Distribution GHG Emissions (MT CO2e)	Total Residential GHG Emissions (MT CO2e)	Total Transportation GHG Emissions (MT CO2e)	Total Manufacturing GHG Emissions (MT CO2e)	Total Ag GHG Emissions (MT CO2e)	Total GHG emissions
2016	100,498	0%	3,226	0%	3,287,280	0%	29,269,804,435	0%	0.038	3,254,861	195,449	436,328	132,701	6,339	243,316	123,476	1,137,608
2025	116,046	15%	4,536	41%	3,470,848	6%	29,419,469,989	1%	0.032	2,946,067	225,687	613,475	140,112	6,371	280,959	95,718	1,362,321
2030	121,359	21%	4,741	47%	3,552,485	8%	30,099,876,093	3%	0.030	2,706,327	236,020	641,285	143,407	6,519	293,822	82,484	1,403,537
2035	126,618	26%	4,947	53%	3,620,348	10%	30,106,743,494	3%	0.029	2,708,924	246,247	669,095	146,147	6,520	306,555	77,451	1,452,015
2045	134,848	34%	5,230	62%	3,719,685	13%	30,797,122,430	5%	0.025	2,430,985	262,253	707,363	150,157	6,670	326,480	61,164	1,514,087
2050	137,503	37%	5,371	67%	3,746,073	14%	31,169,562,483	6%	0.024	2,368,989	267,416	726,497	151,222	6,750	332,908	55,914	1,540,707

Output Summary

Calendar Year	Total GHG Emissions
2016	1,137,608
2017	1,123,275
2018	1,186,375
2019	1,223,844
2020	1,261,956
2021	1,301,318
2022	1,340,607
2023	1,381,167
2024	1,423,234
2025	1,362,321
2026	1,372,223
2027	1,383,649
2028	1,389,843
2029	1,395,562
2030	1,403,537
2031	1,411,826
2032	1,419,507
2033	1,430,327
2034	1,441,631
2035	1,452,015
2036	1,456,990
2037	1,463,640
2038	1,470,163
2039	1,476,523
2040	1,482,771
2041	1,488,859
2042	1,494,866
2043	1,500,934
2044	1,507,427
2045	1,514,087
2046	1,519,645
2047	1,525,127
2048	1,530,403

2049	1,535,595
2050	1,540,707

References

Reference name, link and access date

1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020
3 County Business Patterns, download 12/22/2020
4 CARB GHG Inventory Query tool, download 09/22/2020
5 California Agriculture Statistics review, download 12/22/2020

Off road

Results and Output Summary

	2025	2035	2050
Horse Power>25 HP emissions (MMT CO2e emissions)	0.51	0.60	0.69
Horsepower = 25 HP emissions (MMT CO2e emissions)	0.03	0.03	0.03
Horse Power <25 HP emissions (MMT CO2e emissions)	0.10	0.11	0.12
Pleasure Craft emissions (MMT CO2e emissions)	0.07	0.08	0.10
Recreational vehicles emissions (MMT CO2e emissions)	0.00	0.00	0.00
Total	**0.72**	**0.83**	**0.95**

Assumption

Number of days per year	365

Model runs results and sources

1 ORION HP > 25 emissions by vehicle Category (tons/day)

	2025	2035	2050
Agricultural	3.3	3.3	3.3
Airport Ground Support	55.0	65.3	72.5
Cargo Handling Equipment	10.8	15.9	16.7
Construction and Mining	671.3	817.6	944.1
Industrial	291.9	309.2	325.6
Light Commercial	73.8	77.0	79.1
Military Tactical Support	59.6	59.6	59.6
Portable Equipment	222.9	271.7	365.7
Transportation Refrigeration Unit	21.1	23.5	27.3
Grand Total	**1,409.7**	**1,643.2**	**1,894.0**

ORION HP = 25 emissions by vehicle Category (tons/day)

1

	2025	2035	2050
Agriculture	11.7	10.8	10.4
Airport Ground Support	0.020	0.021	0.025
Construction and Mining	3.9	4.3	4.5
Industrial	1.1	1.1	1.1
Light Commercial	6.7	7.0	7.2
Transportation Refrigeration Unit	1.6	1.8	2.1

Grand Total	**25.0**	**25.0**	**25.3**

SORE HP = 25 emissions by vehicle Category (tons/day)

2

	2025	**2035**	**2050**
Agriculture	0.0001	0.0001	0.0001
Industrial	0.0002	0.0001	0.0001
Lawn	46.35	50.92	58.84
Light Commercial	8.33	8.96	9.54
Grand Total	**54.68**	**59.88**	**68.38**

SORE HP < 25 model emissions by vehicle category (tons/day)

2

	2025	**2035**	**2050**
Agriculture	0.0007	0.0008	0.0008
Airport	0.0000	0.0000	0.0000
Industrial	0.0001	0.0001	0.0001
Lawn	116.79	120.43	121.16
Light Commercial	158.49	178.69	202.38
Transport	3.94	4.12	4.27
Grand Total	**279.2**	**303.2**	**327.8**

RV emissions (tons/day)

3

	2025	**2035**	**2050**
Sum of Red_EXHAUST_CO2	0.12	0.03	0.02
Sum of EXHAUST_CO2	9.51	11.10	13.57

Pleasure Craft emissions (tons/day)

4

	2025	**2035**	**2050**
SumOf_CO2-Baseline	203.2	232.5	283.8

References

Reference name, link and access date

1 OFFROAD ORION v1.0.1. model, downloaded 01/03/2021

2 SORE2020 Model (v1.1) , downloaded 12/22/2030

3 RV2018 Model Database, downloaded 12/24/2020

4 PC2014 Model Database CY2020 to CY2050 , downloaded 12/21/2020

Solid Waste

Results and Output Summary

Calendar Year	SD Region Population	Annual tons generated	Tonnage Increase Compared with 2016 (%)	Emission factor, MT CO2e/short ton	Capture rate	Oxidation rate	Total GHG Emissions (MT CO2e)
2016	3,287,280	3,317,216	0.0%	0.79	75%	10%	590,873
2025	3,470,848	3,502,456	5.6%	0.79	75%	10%	623,868
2030	3,552,485	3,584,836	8.1%	0.79	75%	10%	638,542
2035	3,620,348	3,653,317	10.1%	0.79	75%	10%	650,740
2045	3,719,685	3,753,559	13.2%	0.79	75%	10%	668,596
2050	3,746,073	3,780,187	14.0%	0.79	75%	10%	673,339

Output Summary

Calendar Year	Total GHG Emissions
2016	590,873
2017	609,941
2018	632,097
2019	602,467
2020	606,034
2021	609,601
2022	613,168
2023	616,735
2024	620,301
2025	623,868
2026	626,803
2027	629,738
2028	632,673
2029	635,607
2030	638,542
2031	640,982
2032	643,421
2033	645,861
2034	648,301
2035	650,740
2036	652,526
2037	654,311
2038	656,097
2039	657,882

2040	659,668
2041	661,453
2042	663,239
2043	665,024
2044	666,810
2045	668,596
2046	669,544
2047	670,493
2048	671,441
2049	672,390
2050	673,339

References

Reference name, link and access date

1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020
3 Multi-year Countywide Origin Summary, download 04/01/2020
4 City of San Diego Waste Characterization Study 2012-2013, download 2015
5 "Oceanside_Characterization Summary_022417" provided by Colleen Foster, Oceanside, 04/11/19
6 "Chula Vista Waste Characterization Study Report_1-2016_FINAL", Provided by Manuel Medrano, via Cory Downs, Jan 31, 2019
7 EPA WARM Model v15, May 2019 model updated October 2019, downloaded 09/15/2020

Water

Results and Output Summary

1.082	Transmission and Distribution Losses, CED 2020-2030
527	lbs CO2e per MWh, SDG&E 2016 Emission Factor
43%	SDG&E 2016 Renewable Content
530	Upstream electricity emission factor, CAMX EF from eGRID2016 (lbs CO2e/MWh)
1,862	Imported treated water energy intensity (kWh/AF) (3)
1,817	Imported untreated water energy intensity (kWh/AF) (3)

Calendar Year	Renewable/GHG-free Content (%)		Electricity Emission Factor (lbs CO2e/MWh)	
	CAMX Average	SDG&E Bundled	California Average	SDG&E Bundled
2016	43%	43%	530	527
2025	47%	47%	493	493
2030	60%	60%	370	370
2035	73%	73%	249	249
2045	100%	100%	-	-
2050	100%	100%	(0)	(0)

Calendar Year	Water Demand (AF)		Water Treated at Local WTPs (MWD untreated + Local Surface + Local Ground + Desal) (AF)	CAMX Average Emission Factor (lbs CO2e/MWh)	SDG&E Emission Factor (lbs CO2e/MWh)	Upstream GHG Emissions (MT CO2e)	Local Water Treatment GHG Emissions - Removed from Electricity (MT CO2e)	Total GHG Emissions (MT CO2e)
	Imported Treated	Imported Raw						
2016	138,312	282,726	436,306	530	527	185,411	58,925	244,337
2025	170,707	348,945	538,496	493	493	212,754	68,048	280,803
2030	177,593	363,020	560,218	370	370	166,002	53,095	219,097
2035	183,634	375,368	579,273	249	249	115,863	37,058	152,921
2045	193,411	395,354	610,115	-	-	-	-	-
2050	198,619	406,000	626,544	(0)	(0)	(0)	(0)	(0)

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)	GHG Emissions Removed from Electricity (MT CO2e)
2016	244,337	58,925
2017	254,489	60,691
2018	276,912	67,084
2019	245,897	58,910
2020	254,041	61,000
2021	262,145	63,090
2022	270,209	65,180
2023	278,233	67,270
2024	286,218	69,361
2025	280,803	68,048
2026	268,915	65,168
2027	256,800	62,232
2028	244,459	59,241
2029	231,891	56,195
2030	219,097	53,095
2031	206,249	49,982
2032	193,208	46,821
2033	179,973	43,614
2034	166,544	40,359
2035	152,921	37,058
2036	138,334	33,523
2037	123,591	29,950
2038	108,690	26,340
2039	93,633	22,691
2040	78,420	19,004
2041	63,074	15,285
2042	47,559	11,525
2043	31,875	7,724
2044	16,022	3,883
2045	-	-
2046	-	-
2047	-	-
2048	-	-
2049	-	-
2050	(0)	(0)

References

Reference name, link and access date

1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21

2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020

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7 2020 Urban Water Management Plan Progress Memo, Nov 2020, accessed Jan 3, 2021
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Accessed 01/03/2021

Rail

Results and Output Summary

Calendar Year	SD Region jobs in support activities for rail transportation	Rail Transportation jobs Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	39	0%	111,282
2025	60	53%	170,658
2030	63	60%	178,456
2035	65	67%	186,130
2045	69	78%	198,060
2050	71	82%	202,099

Output Summary

Calendar Year	Total GHG Emissions
2016	111,282
2017	122,696
2018	130,689
2019	138,683
2020	146,677
2021	152,006
2022	157,335
2023	162,664
2024	167,993
2025	170,658
2026	172,217
2027	173,777
2028	175,337
2029	176,896
2030	178,456
2031	179,991
2032	181,526
2033	183,061
2034	184,596
2035	186,130
2036	187,323
2037	188,516
2038	189,709
2039	190,902
2040	192,095

2041	193,288
2042	194,481
2043	195,674
2044	196,867
2045	198,060
2046	198,868
2047	199,675
2048	200,483
2049	201,291
2050	202,099

References

Reference name, link and access date

1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21

2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020

3 County Business Patterns, download 12/22/2020

Wastewater

Results and Output Summary

Calendar Year	SD Region Population	Population Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	3,287,280	0%	73,014
2025	3,470,848	6%	77,091
2030	3,552,485	8%	78,904
2035	3,620,348	10%	80,412
2045	3,719,685	13%	82,618
2050	3,746,073	14%	83,204

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	73,014
2017	73,510
2018	74,032
2019	74,447
2020	74,887
2021	75,328
2022	75,769
2023	76,210
2024	76,650
2025	77,091
2026	77,454
2027	77,817
2028	78,179
2029	78,542
2030	78,904
2031	79,206
2032	79,507
2033	79,809
2034	80,110
2035	80,412
2036	80,632
2037	80,853
2038	81,074

2039	81,294
2040	81,515
2041	81,736
2042	81,956
2043	82,177
2044	82,398
2045	82,618
2046	82,735
2047	82,853
2048	82,970
2049	83,087
2050	83,204

References

Reference name, link and access date

1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21

2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020

Aviation

Results and Output Summary

1.6% Annual Increase, Constrained Passenger Forecast

Calendar Year	SD Airport Total Passenger	Passenger Increase Compared with 2016 (%)	SAN Total GHG Emissions (MT CO2e)	CRQ Total Emissions (MT CO2e)	Total GHG Emissions (MT CO2e)
2016	20,729,353	0%	202,422	10,931	213,353
2025	27,736,698	34%	270,849	18,204	289,052
2030	30,027,785	45%	293,221	22,244	315,465
2035	32,508,118	57%	317,442	26,284	343,726
2045	38,100,345	84%	372,050	27,093	399,142
2050	41,247,483	99%	402,781	27,093	429,874

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	213,353
2017	228,263
2018	249,259
2019	259,598
2020	264,346
2021	269,157
2022	274,032
2023	278,972
2024	283,979
2025	289,052
2026	294,194
2027	299,405
2028	304,686
2029	310,039
2030	315,465
2031	320,965
2032	326,539
2033	332,190
2034	337,919
2035	343,726
2036	349,613
2037	354,774
2038	360,016
2039	365,343

2040	370,755
2041	376,254
2042	381,840
2043	387,516
2044	393,283
2045	399,142
2046	405,095
2047	411,143
2048	417,288
2049	423,531
2050	429,874

References

Reference name, link and access date

1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20

2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020

3 San Diego Airport Air Traffic Reports
https://www.san.org/news/air-traffic-reports
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Marine Vessel

Results and Output Summary

Calendar Year	Ocean-Going Vessel - OFFROAD Adopted Rule (tons per day)	Harbor Craft - OFFROAD Adopted Rule (tons per day)
2016	334	71
2025	438	71
2030	507	71
2035	582	71
2045	762	70
2050	852	69

Calendar Year	Ocean-Going Vessel - OFFROAD compared to 2016	Ocean-Going Vessel - Port of SD Inventory (MT CO2e)	Harbor Craft - OFFROAD compared to 2016	Harbor Craft - Port of SD Inventory (MT CO2e)	Total GHG Emissions (MT CO2e)
2016	0%	22,500	0%	25,500	48,000
2025	31%	29,525	0%	25,606	55,131
2030	52%	34,204	1%	25,646	59,850
2035	75%	39,264	0%	25,613	64,877
2045	128%	51,412	-1%	25,211	76,623
2050	156%	57,501	-2%	24,867	82,368

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	48,000
2017	48,792
2018	49,585
2019	50,377
2020	51,169
2021	51,961
2022	52,754
2023	53,546
2024	54,338
2025	55,131
2026	56,074
2027	57,018
2028	57,962

2029	58,906
2030	59,850
2031	60,855
2032	61,861
2033	62,866
2034	63,871
2035	64,877
2036	66,051
2037	67,226
2038	68,401
2039	69,575
2040	70,750
2041	71,925
2042	73,099
2043	74,274
2044	75,448
2045	76,623
2046	77,772
2047	78,921
2048	80,070
2049	81,219
2050	82,368

References

Reference name, link and access date

1 "OFFROAD2017-Equipment Sectors-SanDiego-All Adopted Rules - Exhaust-20201223155946"
OFFROAD ORION v1.0.1. https://arb.ca.gov/emfac/emissions-inventory
Download 12/23/2020

Agriculture

Results and Output Summary

Calendar Year	SD Region Cattle Population	Cattle Population Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	10,900	0%	53,265
2025	12,433	14%	60,758
2030	12,433	14%	60,758
2035	12,433	14%	60,758
2045	12,433	14%	60,758
2050	12,433	14%	60,758

Output Summary

Calendar Year	Total GHG Emissions
2016	53,265
2017	52,776
2018	64,993
2019	64,504
2020	60,758
2021	60,758
2022	60,758
2023	60,758
2024	60,758
2025	60,758
2026	60,758
2027	60,758
2028	60,758
2029	60,758
2030	60,758
2031	60,758
2032	60,758
2033	60,758
2034	60,758
2035	60,758
2036	60,758
2037	60,758
2038	60,758
2039	60,758
2040	60,758

2041	60,758
2042	60,758
2043	60,758
2044	60,758
2045	60,758
2046	60,758
2047	60,758
2048	60,758
2049	60,758
2050	60,758

References

Reference name, link and access date

1 United States Department of Agriculture National Agricultural Statistics Service quick stats, download 09/15/2020

Soil Management

Results and Output Summary

Calender Year	Oats Acres Harvested	Crop residue Nitrogen [kg N]	Farm Nitrogen [kg N]	Non-Farm Nitrogen [kg N]	Nitrogen EF [Kg N2O-N/kg N]	Farm N volatalized [kg]	Non-Farm N volatalized [kg]	N Volatalization EF [kg N-N2O/(kg NH3 - N+NOx-N volatlised)]	Farm N Leached [kg]	Non-farm N Leached [kg]	Leaching EF [kg N2O-N/(kg N leaching/runoff)]	Amount of Lime applied to soil [tonnes]	Lime EF [ton C/tonnes of Lime]	Amount of Urea Applied to Soil	Ures EF [tonne C/tonne Urea]	Total Farm fertilizer emisions [Metric tons]	Total non-Ag emissions [Metric tons]	Total fertilizer emissions [Metric tons]
2016	2,100	7,990	2,733,538	4,759,808	0.01	273,354	475,981	0.01	820,061	1,427,942	0.0075	216	0.125	559	0.2	17,507	29,534	47,041
2025	2,091	7,996	2,545,395	3,034,402	0.01	254,540	303,440	0.01	763,619	910,321	0.0075	195	0.125	500	0.2	16,287	18,828	35,115
2030	2,131	8,176	2,639,806	3,148,316	0.01	263,981	314,832	0.01	791,942	944,495	0.0075	198	0.125	508	0.2	16,881	19,535	36,415
2035	2,172	8,359	2,737,717	3,266,506	0.01	273,772	326,651	0.01	821,315	979,952	0.0075	200	0.125	516	0.2	17,496	20,268	37,764
2045	2,255	8,738	2,944,571	3,516,362	0.01	294,457	351,636	0.01	883,371	1,054,909	0.0075	206	0.125	532	0.2	18,796	21,818	40,614
2050	2,298	8,935	3,053,786	3,648,369	0.01	305,379	364,837	0.01	916,136	1,094,511	0.0075	208	0.125	540	0.2	19,481	22,637	42,119

Output Summary

Calendar Year	Total GHG Emissions
2016	47,041
2017	58,446
2018	20,574
2019	24,431
2020	33,862
2021	34,109
2022	34,358
2023	34,608
2024	34,861
2025	35,115
2026	35,371
2027	35,630
2028	35,890
2029	36,152
2030	36,415
2031	36,681
2032	36,949
2033	37,219
2034	37,490
2035	37,764
2036	38,040
2037	38,318
2038	38,597
2039	38,879
2040	39,163
2041	39,449
2042	39,737
2043	40,027
2044	40,319
2045	40,614
2046	40,911

2047	41,209
2048	41,510
2049	41,813
2050	42,119

References

Reference name, link and access date

1 San Diego County Crop report, download 12/15/2020

2 Fertilizer tonnage report by year, download 01/04/2021

3 N2O EMISSIONS FROM MANAGED SOILS, AND CO2 EMISSIONS FROM LIME AND UREA APPLICATION, download 06/12/2020

4 International Fertilizer Association Fertilizer Converter

Appendix D
Updated Energy Calculations

Updated Energy Calculations - Proposed Amendment

	2016	2025	2035	2050
Gas, Daily	3,656.17	2,754.51	2,239.68	2,155.65
ratio	346.71	346.72	346.71	346.70
Gas, Annual	1,267.61	955.05	776.52	747.36
Diesel, Daily	411.28	422.88	429.36	441.58
ratio	322.20	323.14	322.68	322.20
Diesel, Annual	132.51	136.65	138.55	142.27
BTU, Gas	152.5	114.9	93.4	89.9
BTU, Diesel	18.2	18.8	19.0	19.5
Rail, MMT CO2e	0.11	0.17	0.19	0.2
Diesel, Rail	10.8	16.7	18.6	19.6

Category	**2016 (Baseline)**		**2025**		**2035**		**2050**	
	Energy Use	**Trillion BTU**	**Energy Use**	**Trillion BTU**	**Energy Use**	**Trillion BTU**	**Energy Use**	**Trillion BTU**
Regional Growth and Land Use Change	--	123	--	123	--	126	--	129
Electricity (GWh)	18,842	64	17,475	60	18,078	62	18,191	62
Natural Gas (million therms)	585	58	629	63	648	65	671	67
Transportation Network Improvements and Programs	--	172	--	136	--	115	--	112
Vehicles, Gasoline (million gallons)	1,268	152	955	115	777	93	747	90
Vehicles, Diesel (million gallons)	133	18	137	19	139	19	142	20
Rail, Diesel (million gallons)	11	1	17	2	19	3	20	3
Total Construction (million gallons)	20	3	24	3	29	4	34	5
Total Energy Use	--	298	--	262	--	245	--	246
Per Capita Energy Use (metric million BTU/person)	91		75		68		66	
Total Energy Use, Percent Change 2016 to Plan Year	**--**		**-12%**		**-18%**		**-17%**	
Per Capita Energy Use, Percent Change 2016 to Plan Year	**--**		**-17%**		**-25%**		**-27%**	

Energy Calculations - Approved Plan

Category	2016 (Baseline)		2025		2035		2050	
	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU
Regional Growth and Land Use Change	--	123	--	122	--	126	--	129
Electricity (GWh)	18,842	64	17,475	60	18,078	62	18,191	62
Natural Gas (million therms)	585	59	629	63	648	65	671	67
Transportation Network Improvements and Programs	--	167	--	132	--	111	--	109
Vehicles, Gasoline (million gallons)	1,234	148	932	112	760	90	723	87
Vehicles, Diesel (million gallons)	122	17	130	18	132	18	143	20
Rail, Diesel (million gallons)	11	1	16	2	18	3	19	3
Total Construction (million gallons)	20	3	24	3	29	4	34	5
Total Energy Use	--	292	--	258	--	241	--	243
Per Capita Energy Use (metric million BTU/person)	89		74		67		65	
Total Energy Use, Percent Change 2016 to Plan Year	**--**		**-12%**		**-17%**		**-17%**	
Per Capita Energy Use, Percent Change 2016 to Plan Year	**--**		**-16%**		**-25%**		**-27%**	

Proposed Amendment Change from Approved Plan

Category	2016 (Baseline)		2025		2035		2050	
	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU	Energy Use	Trillion BTU
Regional Growth and Land Use Change	--	0	--	1	--	0	--	0
Electricity (GWh)	0	0	0	0	0	0	0	0
Natural Gas (million therms)	0	-1	0	0	0	0	0	0
Transportation Network Improvements and Programs	--	5	--	4	--	4	--	3
Vehicles, Gasoline (million gallons)	34	4	23	3	17	3	24	3
Vehicles, Diesel (million gallons)	11	1	7	1	7	1	-1	0
Rail, Diesel (million gallons)	0	0	1	0	1	0	1	0
Total Construction (million gallons)	0	0	0	0	0	0	0	0
Total Energy Use	--	6	--	4	--	4	--	3
Per Capita Energy Use (metric million BTU/person)	2		1		1		1	
Total Energy Use, Percent Change 2016 to Plan Year	**--**		**0%**		**-1%**		**0%**	
Per Capita Energy Use, Percent Change 2016 to Plan Year	**--**		**-1%**		**0%**		**0%**	

Appendix E

Alternatives Data

Table E-1: Performance Measures for Alternatives Considered in Detail in this SEIR

			Base Year2016	Proposed Amendment			Alternative 1			Alternative 2			Alternative 3			Alternative 4			Alternative 5		
				Plan Network Horizon Years			No Project (The Approved Plan)			2019 Transportation Network with New Value Pricing and User Fee Policies			All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies			Progressive Pricing & No Regional RUC			All Growth in Mobility Hubs, Progressive Pricing, & No Regional RUC		
				2025	2035	2050	2025	2035	2050	2025	2035	2050	2025	2035	2050	2025	2035	2050	2025	2035	2050
		Total Households	1241147	1345519	1455207	1502460	1345519	1455207	1502460	1345519	1455207	1502460	1345519	1455207	1502460	1345519	1455207	1502460	1345519	1455207	1502460
		Total Households within Mobility Hubs	561198	654290	761656	804165	654290	761656	804165	633656	716938	751674	651672	759198	805045	654290	761656	804165	651672	759198	805045
		% Households within Mobility Hubs	45%	49%	52%	54%	49%	52%	54%	47%	49%	50%	48%	52%	54%	49%	52%	54%	48%	52%	54%
		Total Population	3309509	3470849	3620349	3746077	3470849	3620349	3746077	3470849	3620349	3746077	3470849	3620349	3746077	3470849	3620349	3746077	3470849	3620349	3746077
		Total Population within Mobility Hubs	1453913	1658456	1875802	1988731	1658456	1875802	1988731	1599481	1764918	1862808	1639787	1847204	1972588	1658456	1875802	1988731	1639787	1847204	1972588
		% Population within Mobility Hubs	44%	48%	52%	53%	48%	52%	53%	46%	49%	50%	47%	51%	53%	48%	52%	53%	47%	51%	53%
		Total Employment	1646419	1762701	1922412	2087208	1762701	1922412	2087208	1788971	1935866	2094346	1762480	1921492	2086315	1762701	1922412	2087208	1762480	1921492	2086315
		Total Employment within Mobility Hubs	1113785	1212961	1346465	1484616	1212961	1346465	1484616	1214583	1313061	1418851	1213008	1347990	1487188	1212961	1346465	1484616	1213008	1347990	1487188
		% Employment within Mobility Hubs	68%	69%	70%	71%	69%	70%	71%	68%	68%	68%	69%	70%	71%	69%	70%	71%	69%	70%	71%
SM-1	**Mode share**																				
	Work Trips (peak period)	Bike & walk	3.4%	5.6%	6.4%	8.1%	5.6%	6.5%	8.2%	3.9%	4.5%	5.0%	6.1%	6.7%	8.3%	6.4%	6.8%	8.6%	6.5%	6.8%	8.7%
		Carpool	13.4%	15.8%	15.2%	16.1%	15.8%	15.0%	16.0%	12.9%	12.4%	12.4%	17.2%	16.0%	16.8%	18.0%	16.9%	18.0%	18.3%	17.1%	18.1%
		Drive alone	79.5%	72.2%	66.9%	62.7%	72.2%	66.6%	62.4%	78.1%	76.6%	75.3%	69.8%	62.0%	57.3%	68.0%	60.4%	54.9%	67.6%	60.3%	54.6%
		Other (TNC, MicroMobility, Taxi, School bus)	0.3%	0.5%	0.5%	0.6%	0.5%	0.5%	0.6%	0.3%	0.4%	0.4%	0.5%	0.6%	0.7%	0.6%	0.6%	0.7%	0.6%	0.6%	0.8%
		Transit	3.4%	5.9%	11.1%	12.5%	5.9%	11.3%	12.8%	4.7%	6.1%	7.0%	6.4%	14.8%	16.8%	7.0%	15.2%	17.7%	7.0%	15.2%	17.8%
	Work Trips (all day)	Bike & walk	3.7%	6.0%	6.9%	8.6%	6.0%	7.0%	8.7%	4.3%	4.9%	5.3%	6.6%	7.1%	8.8%	6.9%	7.3%	9.2%	7.0%	7.3%	9.3%
		Carpool	13.0%	15.4%	14.7%	15.7%	15.4%	14.6%	15.6%	12.5%	12.0%	11.9%	16.7%	15.5%	16.5%	17.5%	16.4%	17.6%	17.8%	16.6%	17.8%
		Drive alone	79.6%	72.2%	66.8%	62.5%	72.2%	66.4%	62.1%	78.2%	76.7%	75.4%	69.7%	61.7%	56.9%	67.9%	60.2%	54.6%	67.6%	60.1%	54.2%
		Other (TNC, MicroMobility, Taxi, School bus)	0.3%	0.5%	0.5%	0.6%	0.5%	0.5%	0.6%	0.3%	0.4%	0.4%	0.6%	0.6%	0.7%	0.6%	0.6%	0.8%	0.6%	0.6%	0.8%
		Transit	3.4%	5.9%	11.1%	12.6%	5.9%	11.4%	12.9%	4.7%	6.1%	7.0%	6.5%	15.0%	17.0%	7.0%	15.4%	17.9%	7.0%	15.3%	17.9%
	All Trips	Bike & walk	7.8%	9.8%	11.7%	13.4%	9.8%	11.8%	13.5%	8.9%	10.0%	10.5%	10.2%	12.0%	14.0%	10.5%	12.4%	14.4%	10.5%	12.2%	14.5%
		Carpool	44.2%	43.5%	40.6%	40.5%	43.5%	40.5%	40.3%	42.3%	39.8%	39.2%	44.1%	40.9%	40.5%	44.4%	41.2%	40.9%	44.6%	41.4%	40.9%
		Drive alone	44.7%	42.2%	41.1%	38.9%	42.2%	40.9%	38.9%	44.9%	45.8%	45.5%	41.0%	38.9%	36.5%	40.2%	38.0%	35.3%	40.0%	38.0%	35.2%
		Other (TNC, MicroMobility, Taxi, School bus)	1.7%	2.1%	2.1%	2.2%	2.1%	2.1%	2.3%	1.8%	1.7%	1.7%	2.1%	2.2%	2.4%	2.2%	2.3%	2.5%	2.2%	2.2%	2.5%
		Transit	1.6%	2.4%	4.5%	5.0%	2.4%	4.7%	5.1%	2.1%	2.7%	3.0%	2.6%	6.1%	6.7%	2.8%	6.2%	6.9%	2.8%	6.1%	6.9%
SM-2	**Number/percent of people within 0.5 miles of a commuter rail, light rail, or next gen Rapid (Tier 1/Tier 2/Tier 3) transit stop**																				
	Commuter Rail (Tier 1)	Number	15,196	29,601	119,876	262,471	29,601	119,876	262,471	22,736	43,377	45,734	33,125	113,330	260,018	29,601	119,876	262,471	33,125	113,330	260,018
		Percent	0.5%	0.9%	3.4%	7.1%	0.9%	3.4%	7.1%	0.7%	1.2%	1.2%	1.0%	3.2%	7.0%	0.9%	3.4%	7.1%	1.0%	3.2%	7.0%
	Light Rail (Tier 2)	Number	141,814	232,212	322,632	463,122	232,212	322,632	463,122	261,700	460,289	638,376	226,859	310,533	464,347	232,212	322,632	463,122	226,859	310,533	464,347
		Percent	4.3%	6.8%	9.0%	12.5%	6.8%	9.0%	12.5%	7.6%	12.9%	17.3%	6.6%	8.7%	12.6%	6.8%	9.0%	12.5%	6.6%	8.7%	12.6%
	Next Gen Rapid (Tier 3)	Number	187,571	486,067	1,089,142	1,199,095	486,067	1,089,142	1,199,095	517,300	819,933	1,051,562	483,719	1,078,322	1,209,232	486,067	1,089,142	1,199,095	483,719	1,078,322	1,209,232
		Percent	5.7%	14.2%	30.5%	32.4%	14.2%	30.5%	32.4%	15.1%	22.9%	28.4%	14.1%	30.2%	32.7%	14.2%	30.5%	32.4%	14.1%	30.2%	32.7%
	access to any of the tiers (1-3)	Number	297,954	602,446	1,173,585	1,293,654	602,446	1,173,585	1,293,654	639,284	946,384	1,193,168	592,613	1,161,098	1,308,740	602,446	1,173,585	1,293,654	592,613	1,161,098	1,308,740
		Percent	9.1%	17.6%	32.8%	35.0%	17.6%	32.8%	35.0%	18.7%	26.5%	32.3%	17.3%	32.5%	35.4%	17.6%	32.8%	35.0%	17.3%	32.5%	35.4%
SM-3	**Number/percent of jobs within 0.5 miles of a commuter rail, light rail, or next gen Rapid (Tier 1/Tier 2/Tier 3) transit stop**																				
	Commuter Rail (Tier 1)	Number	34,972	57,816	135,518	232,588	57,816	135,518	232,588	38,696	74,643	78,683	55,314	129,811	227,974	57,816	135,518	232,588	55,314	129,811	227,974
		Percent	2.1%	3.3%	7.1%	11.1%	3.3%	7.1%	11.1%	2.2%	3.9%	3.8%	3.1%	6.8%	10.9%	3.3%	7.1%	11.1%	3.1%	6.8%	10.9%
	Light Rail (Tier 2)	Number	199,041	247,376	289,270	370,838	247,376	289,270	370,838	273,170	378,472	506,613	247,397	291,287	379,723	247,376	289,270	370,838	247,397	291,287	379,723
		Percent	12.1%	14.0%	15.0%	17.8%	14.0%	15.0%	17.8%	15.3%	19.6%	24.2%	14.0%	15.2%	18.2%	14.0%	15.0%	17.8%	14.0%	15.2%	18.2%
	Next Gen Rapid (Tier 3)	Number	213,610	391,999	814,628	923,202	391,999	814,628	923,202	415,312	642,914	852,370	389,834	815,746	928,996	391,999	814,628	923,202	389,834	815,746	928,996
		Percent	13.0%	22.2%	42.4%	44.2%	22.2%	42.4%	44.2%	23.2%	33.2%	40.7%	22.1%	42.5%	44.5%	22.2%	42.4%	44.2%	22.1%	42.5%	44.5%
	access to any of the tiers (1-3)	Number	358,797	520,228	887,095	1,007,181	520,228	887,095	1,007,181	547,523	755,429	969,397	518,650	887,476	1,011,774	520,228	887,095	1,007,181	518,650	887,476	1,011,774
		Percent	21.8%	29.5%	46.1%	48.3%	29.5%	46.1%	48.3%	30.6%	39.0%	46.3%	29.4%	46.2%	48.5%	29.5%	46.1%	48.3%	29.4%	46.2%	48.5%
SM-4	**Number/percent of people within 0.25 miles of a bike facility (class I and II, cycletrack or bike boulevard)**																				
		Number	2,119,378	2,511,682	2,747,020	3,015,415	2,511,682	2,747,020	3,015,415	2,253,982	2,468,292	2,607,657	2,510,699	2,737,649	3,017,279	2,511,682	2,747,020	3,015,415	2,510,699	2,737,649	3,017,279
		Percent	64.9%	73.4%	76.9%	81.5%	73.4%	76.9%	81.5%	65.8%	69.1%	70.5%	73.3%	76.6%	81.6%	73.4%	76.9%	81.5%	73.3%	76.6%	81.6%
SM-5	**Daily transit boardings**																				
	Region	Commuter Rail (Tier 1)	3,818	8,893	58,220	191,708	8,893	59,906	196,793	8,372	10,167	9,898	9,941	95,068	302,517	10,465	100,041	315,848	10,836	98,356	314,175
		Light Rail (Tier 2)	130,119	203,505	339,071	349,022	203,505	346,212	355,767	185,088	273,999	351,077	214,890	435,050	443,082	230,944	448,113	458,404	229,771	439,402	460,238
		Next Gen Rapid (Tier 3)	30,724	104,118	371,965	395,484	104,118	383,456	405,773	104,348	178,192	205,673	110,910	500,712	523,710	118,872	509,259	547,609	118,467	507,306	543,934
		Local Bus and Other	214,855	294,512	421,887	436,325	294,512	432,345	446,240	250,148	280,532	280,712	314,768	544,751	557,206	337,056	552,460	576,644	334,290	550,817	577,056
		All transit boardings	379,517	611,028	1,191,144	1,372,538	611,028	1,221,918	1,404,572	547,955	742,891	847,360	650,509	1,575,582	1,826,515	697,337	1,609,873	1,898,505	693,365	1,595,881	1,895,403
	Mohub	Commuter Rail (Tier 1)	3,346	7,741	53,796	190,341	7,741	55,297	195,307	7,308	9,995	9,736	8,617	87,674	300,106	9,039	92,384	313,562	9,269	90,644	311,851
		Light Rail (Tier 2)	126,016	199,733	331,795	338,252	199,733	338,834	344,789	180,643	267,355	337,445	210,906	425,097	428,423	226,863	437,969	443,103	225,375	429,271	444,809
		Next Gen Rapid (Tier 3)	29,333	98,564	322,489	337,532	98,564	332,401	346,626	97,153	158,859	174,843	105,191	435,520	447,072	112,506	443,232	468,343	112,141	440,894	464,492
		Local Bus and other	171,945	234,928	330,877	342,471	234,928	338,299	349,399	194,032	215,407	212,554	251,541	425,413	434,533	269,660	434,515	452,865	268,178	431,229	451,606
		All transit boardings	330,639	540,966	1,038,957	1,208,596	540,966	1,064,831	1,236,121	479,136	651,615	734,578	576,255	1,373,704	1,610,133	618,067	1,408,100	1,677,872	614,963	1,392,038	1,672,758
SM-6	**Physical activity**																				
		Total time engaged in transportation related physical activity per capita	7.50	9.53	11.66	13.04	9.53	11.77	13.13	8.47	9.52	10.01	9.88	12.71	14.41	10.22	12.98	14.80	10.24	12.94	14.98
		Percent of the population engaged in 20 min or more of transportation related physical activity	11.4%	14.6%	18.3%	20.3%	14.6%	18.5%	20.4%	13.1%	14.8%	15.6%	15.1%	20.1%	22.6%	15.6%	20.6%	23.2%	15.6%	20.5%	23.4%
SM-7	**Average truck/commercial vehicle travel times to and around regional gateways and distribution hubs (minutes)**																				
			16.31	16.06	16.03	16.21	16.06	15.97	16.20	16.73	17.16	17.54	15.98	15.92	16.22	15.95	16.12	16.46	15.93	16.05	16.46
SM-8	**Average Particulate Matter (PM2.5)**																				
		Exposure per person	5.11	5.10	5.36	5.50	5.10	5.30	5.44	4.98	5.43	5.60	4.94	5.10	5.30	4.97	5.12	5.20	4.88	5.10	5.26
SM-9-a	**Truck travel time index**																				
		Highway (SHS)	1.11	1.10	1.19	1.19	1.10	1.14	1.18	1.11	1.11	1.11	1.09	1.13	1.17	1.09	1.15	1.21	1.09	1.15	1.21
		Arterial	1.27	1.22	1.21	1.20	1.22	1.20	1.20	1.28	1.28	1.27	1.22	1.20	1.19	1.23	1.20	1.20	1.23	1.20	1.20
		Highway (SHS) + Arterial	1.17	1.14	1.17	1.19	1.14	1.16	1.19	1.17	1.17	1.16	1.14	1.15	1.18	1.14	1.17	1.21	1.14	1.17	1.21
SM-9-b	**Heavy Duty Truck delay by facility type (average daily)**																				
	All day - Heavy Heavy Duty	Highway (SHS)	1,632	1,799	3,213	4,800	1,799	3,081	4,693	1,992	2,570	3,020	1,687	2,831	4,365	1,673	3,309	5,498	1,666	3,254	5,447
		Arterial	5,921	5,197	5,586	5,868	5,197	5,545	5,857	6,549	7,455	7,821	5,109	5,347	5,730	5,092	5,525	5,804	5,079	5,401	5,731
	AM and PM peak - Heavy Heavy Duty	Highway (SHS)	1,286	1,374	2,024	2,900	1,374	1,948	2,833	1,523	1,817	2,009	1,270	1,777	2,609	1,265	2,080	3,140	1,258	2,056	3,108
		Arterial	2,728	2,376	2,517	2,607	2,376	2,461	2,581	2,964	3,345	3,477	2,297	2,360	2,482	2,307	2,441	2,512	2,296	2,391	2,487
	All day - Medium Heavy Duty	Highway (SHS)	648	674	1,209	1,717	674	1,151	1,671	766	940	1,066	636	1,053	1,553	632	1,232	1,932	624	1,228	1,926
		Arterial	3,350	2,853	2,993	3,121	2,853	2,958	3,092	3,647	4,030	4,136	2,834	2,861	2,975	2,864	2,937	3,074	2,811	2,940	3,020
	AM and PM peak - Medium Heavy Duty	Highway (SHS)	489	491	711	979	491	682	952	563	638	680	457	617	881	455	724	1,047	449	721	1,046
		Arterial	1,400	1,166	1,202	1,235	1,166	1,188	1,215	1,483	1,627	1,640	1,147	1,132	1,163	1,162	1,167	1,193	1,136	1,160	1,175
	All day - Light Heavy Duty	Highway (SHS)	1,489	1,547	2,765	3,837	1,547	2,639	3,733	1,747	2,133	2,418	1,460	2,421	3,480	1,451	2,850	4,328	1,433	2,831	4,317
		Arterial	8,336	7,156	7,517	7,914	7,156	7,446	7,854	9,109	10,104	10,530	7,063	7,221	7,568	7,122	7,377	7,759	7,017	7,384	7,672
	AM and PM peak - Light Heavy Duty	Highway (SHS)	1,084	1,084	1,529	2,079	1,084	1,473	2,019	1,236	1,388	1,480	1,011	1,334	1,874	1,005	1,571	2,228	994	1,562	2,225
		Arterial	3,275	2,756	2,834	2,941	2,756	2,807	2,896	3,488	3,839	3,921	2,696	2,682	2,774	2,723	2,749	2,824	2,676	2,742	2,797
	All day - All Heavy Duty (HHD + MHD + LHD)	Highway (SHS)	3,770	4,021	7,187	10,354	4,021	6,870	10,098	4,505	5,643	6,504	3,783	6,304	9,398	3,756	7,391	11,758	3,724	7,313	11,691
		Arterial	17,608	15,206	16,095	16,902	15,206	15,949	16,803	19,305	21,589	22,488	15,005	15,429	16,274	15,078	15,840	16,637	14,907	15,725	16,423
	AM and PM peak - All Heavy Duty (HHD + MHD + LHD)	Highway (SHS)	2,859	2,949	4,264	5,957	2,949	4,103	5,804	3,321	3,844	4,169	2,738	3,728	5,364	2,725	4,374	6,415	2,702	4,339	6,380
		Arterial	7,403	6,298	6,553	6,784	6,298	6,456	6,692	7,934	8,811	9,037	6,140	6,174	6,419	6,192	6,358	6,529	6,109	6,293	6,459
SM-10*	**Transportation system use costs**																				
		Percent of Income Consumed by Out-of-Pocket Transportation	7.7%	10.0%	9.5%	10.0%	10.0%	10.0%	10.4%	8.1%	7.5%	7.1%	10.6%	9.7%	10.0%	11.1%	9.4%	9.6%	11.1%	9.4%	9.6%
		Change in Percent of Income Consumed by Out-of-Pocket Transportation Costs		2.3%	1.9%	2.3%	2.3%	2.4%	2.7%	0.4%	-0.2%	-0.6%	3.0%	2.0%	2.3%	3.4%	1.7%	1.9%	3.4%	1.8%	2.0%
M-4	**Vehicle Miles Traveled (VMT)**																				
		All vehicle classes regionwide	83,727,671	84,939,833	87,131,224	89,846,864	84,939,833	85,868,724	88,735,779	87,015,664	92,834,253	97,946,649	83,942,659	83,466,190	86,058,732	83,232,561	84,272,930	86,570,584	83,070,472	84,370,706	86,368,988
		SB743 Resident VMT per capita (home-based)	25.64	24.81	24.38	24.29	24.81	24.03	23.99	25.4	26.0	26.5	24.5	23.4	23.3	24.3	23.6	23.4	24.3	23.6	23.3

Table E-2: SB 375 GHG Reductions for Alternatives Considered in Detail in this SEIR

	Proposed Amendment		Alternative 1- No Build		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	2035	2050	2035	2050	2035	2050	2035	2050	2035	2050	2035	2050
Database												
Population	3,620,349	3,746,077	3,620,349	3,746,077	3,620,349	3,746,077	3,620,349	3,746,077	3,620,349	3,746,077	3,620,349	3,746,077
SB 375 VMT	81,418,476	83,534,235	80,166,669	82,425,843	86,984,709	91,449,541	77,789,947	79,762,537	78,582,233	80,296,989	78,697,179	80,101,780
SB 375 VMT / Person	22.5	22.3	22.1	22.0	24.0	24.4	21.5	21.3	21.7	21.4	21.7	21.4
External to External VMT	983,813	1,097,144	983,292	1,095,697	981,395	1,097,946	982,383	1,094,889	983,974	1,093,346	984,095	1,093,078
External to External VMT Reduction	1.2%	1.3%	1.2%	1.3%	1.1%	1.2%	1.3%	1.4%	1.3%	1.4%	1.3%	1.4%
SB 375 Emissions (tons)	39,235	40,144	38,691	39,643	42,619	44,886	37,506	38,323	37,754	38,343	37,813	38,254
SB 375 Emissions without E-E VMT / Person (lbs)	21.41	21.15	21.11	20.88	23.28	23.68	20.46	20.18	20.60	20.19	20.63	20.15
Per Capita Reduction for 2005	**17.6%**	**18.6%**	**18.8%**	**19.7%**	**10.5%**	**8.9%**	**21.3%**	**22.4%**	**20.8%**	**22.3%**	**20.7%**	**22.5%**
Off-Model Calculators VMT Reduction												
Vanpool	339,251	382,471	339,415	380,166	329,954	369,014	337,903	380,044	356,033	423,362	357,846	420,847
Carshare	178,275	N/A	178,275	N/A	168,523	N/A	176,272	N/A	178,275	N/A	176,272	N/A
Carpool	12,056	11,861	11,750	11,615	13,844	14,521	10,977	10,771	11,049	10,727	11,030	10,675
TDM Ordinance	377,634	598,800	371,436	589,125	436,804	720,561	337,631	530,182	331,427	508,212	330,743	499,834
Total VMT reduction	907,216	993,132	900,876	980,906	949,125	1,104,096	862,783	920,997	876,784	942,301	875,891	931,356
SB 375 VMT / Person Reduction	0.25	0.27	0.25	0.26	0.26	0.29	0.24	0.25	0.24	0.25	0.24	0.25
Off-Model Calculators - Daily Total GHG Reduction (tons)												
Vanpool	157.7	176.8	158.0	175.9	156.0	174.4	157.1	175.6	165.0	194.4	165.8	193.3
Carshare	82.5	N/A	N/A	82.6	79.3	N/A	81.6	N/A	82.2	N/A	81.3	N/A
Carpool	5.8	5.7	5.6	5.5	6.7	7.1	5.3	5.1	5.3	5.1	5.3	5.1
TDM Ordinance	179.1	282.4	176.5	278.1	206.5	340.8	160.3	250.1	156.7	238.1	156.4	234.3
EV Charging Program	1003.0	826.0	1006.1	832.3	1000.0	777.0	1028.0	846.0	1021.0	844.0	1020.0	845.0
SB 375 Emissions Total Reduction (tons)	1428.0	1290.8	1346.2	1374.5	1448.5	1299.3	1432.2	1276.8	1430.2	1281.6	1428.8	1277.6
SB 375 Emissions Reduction/ Person (lbs)	0.79	0.69	0.74	0.73	0.80	0.69	0.79	0.68	0.79	0.68	0.79	0.68
Off-Model GHG Reduction per capita	3.03%	2.65%	2.86%	2.82%	3.08%	2.67%	3.04%	2.62%	3.04%	2.63%	3.04%	2.62%
Per Capita Reduction for 2005 with Off-Model Calc	**20.7%**	**21.3%**	**21.7%**	**22.5%**	**13.5%**	**11.6%**	**24.4%**	**25.0%**	**23.8%**	**25.0%**	**23.7%**	**25.1%**
ARB Adjustment for EMFAC 2007 - 2014	-1.7%	-1.6%	-1.7%	-1.6%	-1.7%	-1.6%	-1.7%	-1.6%	-1.7%	-1.6%	-1.7%	-1.6%
Final Per Capita Reduction for 2005	**19.0%**	**19.7%**	**20.0%**	**20.9%**	**11.8%**	**10.0%**	**22.7%**	**23.4%**	**22.1%**	**23.4%**	**22.0%**	**23.5%**

Note: *The "Per Capita Reduction of 2005" does not include induced demand.

Table E-3: EMFAC 2017 Onroad Output Summary for Alternatives Considered in Detail in this SEIR

Scenario	Annual CO2 Total	Annual PM 2.5 Total	Annual PM 10 Total	Annual Gasoline	Annual Diesel	Summer ROG Total	Summer NOx Total	Winter CO Total
	Tons/Day	Tons/Day	Tons/Day	Thousands Gallons/Day	Thousands Gallons/Day	Tons/Day	Tons/Day	Tons/Day
2016	38,515.84	2.42	5.14	3,656.17	411.28	22.18	37.41	185.24
Proposed Amendment-2025	30,265.79	2.03	4.8	2,754.51	422.88	11.96	15.53	98.99
Proposed Amendment-2035	25,465.18	2.02	4.88	2,239.68	429.36	8.19	11.92	82.65
Proposed Amendment-2050	24,813.66	2.08	5.04	2,155.65	441.58	6.64	11.84	79.07
Alternative 1 No Build-2025	30,265.79	2.03	4.8	2,754.51	422.88	11.96	15.53	98.99
Alternative 1 No Build-2035	25,181.43	2	4.81	2,209.05	429.58	8.08	11.88	81.67
Alternative 1 No Build-2050	24,578.33	2.05	4.99	2,129.29	442.60	6.56	11.82	78.28
Alternative 2-2025	31,152.00	2.08	4.91	2,847.42	424.10	12.34	15.8	101.6
Alternative 2-2035	27,206.95	2.15	5.18	2,415.97	436.49	8.81	12.46	86.49
Alternative 2-2050	27,113.08	2.25	5.46	2,385.10	455.32	7.33	12.47	85.12
Alternative 3-2025	29,943.81	2.01	4.75	2,720.61	422.36	11.81	15.45	97.77
Alternative 3-2035	24,571.96	1.95	4.69	2,145.47	428.14	7.84	11.74	79.57
Alternative 3-2050	23,953.74	2	4.86	2,063.01	442.09	6.35	11.71	76.16
Alternative 4-2025	29,728.65	2	4.71	2,696.80	422.99	11.7	15.41	96.95
Alternative 4-2035	24,720.64	1.96	4.73	2,160.43	429.00	7.9	11.82	80.32
Alternative 4-2050	23,951.78	2.01	4.88	2,065.82	439.58	6.37	11.72	76.67
Alternative 5-2025	29,661.70	1.99	4.7	2,690.96	421.88	11.68	15.37	96.76
Alternative 5-2035	24,726.12	1.96	4.74	2,163.50	426.86	7.91	11.76	80.38
Alternative 5-2050	23,900.86	2	4.87	2,061.37	438.72	6.36	11.69	76.5

Appendix F

Responses to Comments on the Draft SEIR

Appendix F.1

Responses to Comments on the Draft SEIR

APPENDIX F.1
RESPONSE TO COMMENTS ON THE DRAFT SEIR

The Draft Supplemental Environmental Impact Report (SEIR) for the Amendment to the 2021 Regional Plan (proposed Amendment) was distributed for public review on July 13, 2023, for a 47-day public review period that ended August 28, 2023. The Draft SEIR and all appendices were available for review online at www.sandag.org; at San Diego Association of Governments (SANDAG) offices located at 401 B Street, Suite 800, San Diego, California 92101; and at the San Diego Central Library located at 330 Park Boulevard, San Diego, California 92101. The Central Library facilitates inter-library transfers upon request by a member of the public in order to provide access at local libraries. On a case-by-case basis, the San Diego Central Library can also digitize documents and transfer them to other libraries. No such requests were made of SANDAG with respect to providing access to the Draft SEIR during the public comment period.

A total of 21 comment letters, web comments, or other written documents such as emails (hereinafter collectively referred to as "comment letters") were received before the close of the public review period. Table F-1 provides a list of all comments received, including the name of the public agency, organization, or individual that submitted the letter and the date of the letter. Each comment letter also has been assigned an identification number in Table F-1.

In this appendix, each comment letter is reproduced in its entirety and is aligned side-by-side with the response(s) to the letter. Where commenters provided multiple comments, each comment is identified with a bracket and an identifying number in the margin of the comment letter. All comment letters received on the Draft SEIR were evaluated for significant environmental issues, and written responses to comments on environmental issues were prepared. In addition to comments related to environmental issues, several of the comment letters submitted on the Draft SEIR also include individual comments on the content of the Amendment itself that are not related to the adequacy of the Draft SEIR. All comments will be provided to the SANDAG Board of Directors for their consideration. For ease of reference, responses to comments on the proposed Amendment are included as Appendix F.2 to the Final SEIR.

Table F-1
List of Comment Letters on the Draft SEIR for the Proposed Amendment

Identification Number	Public Agency, Organization, or Individual	Date of Letter
1	Diane Ake	7/22/2023
2	Mike Bullock	8/28/2023
3	Carrie Chambers	7/22/2023
4	City of Carlsbad	8/28/2023
5	County of San Diego	8/28/2023
6	Charlotte Kingston	7/22/2023
7	Moses Lonetto	7/23/2023
8	Beatrice Miller	7/23/2023
9	Richard Moranville	7/22/2023
10	Neygom@gmail.com	7/22/2023
11	North Park Planning Committee	8/5/2023
12	Greg Payne	7/22/2023
13	Christine Sprecco	7/22/2023

Identification Number	Public Agency, Organization, or Individual	Date of Letter
14	Barry Treahy	7/22/2023
15	Bruce Truax	7/22/2023
16	Don Wood	7/22/2023
Comments Received via Website		
17	Mike Bullock	8/28/2023
18	Michael Hampson	7/14/2023
19	Michael LaDouceur	7/31/2023
20	Harry Nunns	8/6/2023
21	Daniel Parker	8/11/2023

COMMENT LETTERS AND RESPONSES

COMMENT LETTER 1: DIANE AKE

Comment Letter 1

From: Diane Ake
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 9:14:40 AM

You don't often get email from dianeake@hotmail.com. Learn why this is important

CAUTION: This email originated from outside of SANDAG. Do not click links or open attachments unless you are expecting the content.

1-1 Please remove the road usage tax.

RESPONSE TO COMMENT 1-1

This comment expresses opposition to the road usage charge. The proposed Amendment removes the regional road user charge from the approved Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

COMMENT LETTER 2: MIKE BULLOCK

Comment Letter 2

Attachments: NOP_and_ScopingLetter12_9_2022.pdf; BullockToSANDAG_RE_ScopingTheSEIR_for RUC_RemovalRfromThe2021RTP.doc; Ref1_AdoptedBikePedRUC_Resolution 22-01 3-14-22.pdf; Ref2 _RoadUseChargeLetter.pdf; Ref3_MBullock-Plat-FP-EA-796315-Deriving_Climate_Stabilizing30March20-R3.docx; Ref4_AG_LetterToSANDAG_2021.PDF; Ref5_ 2020LDV_ClimateStabilizingVrsCARB_AWMA - Copy.pdf; Ref6_2020PlatformClimate-TransV2.doc; Ref7_DividendAccount2020v2.doc; Ref8_BullockEUEC2021_ParkingOscCivicCenter.pptx; Ref9 _DividendAccountParkingRFI3.docx; Ref10_ACE CEO Wants to Provide the Solution - Copy.pdf; Ref5_ 2022-scopingPlan-apeendix-e.pdf

From: mike_bullock@earthlink.net <mike_bullock@earthlink.net>
Sent: Monday, August 28, 2023 4:53:06 PM
To: RegionalPlanAmendment <RegionalPlanAmendment@sandag.org>
Cc: Kirsten Uchitel <Kirsten.Uchitel@sandag.org>; Hasan Ikhrata <Hasan.Ikhrata@sandag.org>
Subject: Draft SEIR

CAUTION: This email originated from outside of SANDAG. Do not click links or open attachments unless you are expecting the content.

Kirsten Uchitel, Associate Regional Planner SANDAG
401 B Street, Suite 800 San Diego,
CA 92101
Kirsten.Uchitel@sandag.org

Via Email: RegionalPlanAmendment@sandag.org

Subject: Draft SEIR

I appreciate the opportunity to comment on the subject. However, it appears to me that SANDAG has ignored the comments in my email below, with its 12 attached files. I have attached those same files for this email, because many of my comments regarding the NOP apply to the Draft SEIR.

2-1 Since the day SANDAG took their ill-advised vote to weaken their original RTP2021, which was easily approved by CARB, using the SB 375 driving reduction criterion (a 19% reduction in driving with respect to 2005 levels, by 2035), things have happened that make it obvious that the vote was counter to what is good governance. The original RTP2021, which was approved by SANDAG, was already far below what is required to meet the basic decency criterium of having an RTP which does not significantly reduce the chances of human survival. But now things are much worse. There are two primary reasons things have gotten worse:

2-2
1. The CARB Scoping Plan, that was adopted in December 2022 and is the official plan to achieve SB 32, requires a road use charge, the very thing SANDAG voted to remove, as well as many other mitigation measures that are not in either the original RTP2021 (that is effect now) or the degraded RTP2021 that has the road use charge removed.
2. Countless extreme weather events show clearly that the Secretary General of the UN is correct when he said that we are dangerously close to the point of no return. This is the opposite of climate stabilization, which is what CA's climate mandate of SB 32 is trying to achieve.

2-3 SANDAG's RTP2011 resulted in a lawsuit that was joined by the state of CA (AG Harris). One critically important issue was SANDAG's incorrect position that it could ignore S-3-05, the Governor's

1

RESPONSE TO COMMENT 2-1

Initially, please note that SANDAG's Board has not voted to "weaken the original RTP 2021." This decision on whether to approve removal of the road usage charge from the approved Plan will be made only after the SANDAG Board considers the information in this SEIR and makes the appropriate CEQA findings. The comment incorrectly states that SB 375 includes a driving reduction criterion of 19 percent below 2005 levels by 2035. GHG emissions reduction targets established for SANDAG by CARB in 2018 under SB 375 are to reduce per capita CO_2 emissions 15 percent below 2005 levels by 2020, and to 19 percent below 2005 levels by 2035.

As discussed under Impact GHG-2 (Conflict with the SANDAG Region's Achievement of SB 375 GHG Emissions Reduction Target for 2035) in Section 4.3.4 of Chapter 4.3, *Greenhouse Gas Emissions*, of this Draft SEIR, implementation of the proposed Amendment would reduce per capita CO2 emissions from passenger cars and light-duty trucks to 18.6 percent below 2005 levels by 2035. CARB's Final SCS Program and Evaluation Guidelines provide: "Metropolitan planning organizations (MPOs) that rely on a combination of modeled and off-model methods to estimate per capita GHG emission reductions from its RTP/SCS should round to the nearest integer percent" (Final SCS Program and Evaluation Guidelines, Appendices, at p. 28). Therefore, after rounding to 19 percent, implementation of regional growth and land use change and transportation network improvements and programs would not conflict with SB 375 GHG emission reduction targets.

RESPONSE TO COMMENT 2-2

This comment incorrectly states that the 2022 CARB Scoping Plan requires a road user charge and other mitigation measures not included in either the approved Plan or the proposed Amendment.

Transportation Sustainability is listed as a Key Sector in Chapter 4 of the 2022 Scoping Plan, and reducing VMT is recognized as a key element to reducing the overall transportation energy demand.

Appendix E (Sustainable and Equitable Communities) identifies a series of policies that, if implemented, could help achieve the recommended VMT reduction trajectory.

One of the objectives under Strategy Area 1: Plan and Invest in a Sustainable Transportation System includes the implementation of a state mileage-based fee program as an alternative to the gas tax. Under the 2022 Scoping Plan, mileage-based fee pilots in the State are to be completed by 2025. The proposed Amendment would remove the regional road usage charge from the approved Plan but would not impact any state pilot programs.

As analyzed in Section 4.3.4 of Chapter 4.3, *Greenhouse Gas Emissions*, of the Draft SEIR, Impact GHG-5 (Be inconsistent with the State's ability to achieve the 2030 reduction target of SB 32, the accelerated 2030 reduction target of the 2022 Scoping Plan, and long-term reduction goals of Executive Orders S-3-05, B-55-18, and AB 1279) would result in new more severe and significant impacts in comparison to the approved Plan PEIR for years 2030, 2045, and 2050. Mitigation measures would help reduce regional GHG emissions by reducing VMT, increasing use of zero-emission fuels, sequestering carbon from the atmosphere, and other measures; they would reduce inconsistency of the proposed Amendment's GHG emissions with the State's ability to achieve the SB 32, 2022 Scoping Plan, EO B-55-18, EO S-3-05, and AB 1279 GHG reduction goals. However, full implementation of the changes required to achieve these goals is beyond SANDAG's and local agencies' current jurisdiction and authority. As such, they were identified as significant and unavoidable. While the proposed Amendment results in significant impacts related to VMT and GHG, anticipated reductions in per capita VMT and GHG, along with proposed mitigation measures, would reduce inconsistency of the proposed Amendment with the State's ability to achieve VMT and GHG goals, and puts SANDAG on a trajectory that more closely aligns with regulatory targets. Reducing GHG emissions and achieving state goals related to carbon neutrality requires actions at all levels of government. SANDAG looks to support and encourage local jurisdictions, state agencies, and other partners to reduce emissions beyond what is included in the proposed Amendment.

RESPONSE TO COMMENT 2-3

This comment inaccurately describes the California Supreme Court's decision with respect to consideration of the Governor's Executive Order S-3-05 in SANDAG's 2011 RTP. The California Supreme Court held that "SANDAG, in analyzing greenhouse gas impacts at the time of the EIR, did not abuse its discretion by declining to adopt the Executive Order as a measure of significance or to discuss the Executive Order more than it did" (Cleveland National Forest Foundation v. San Diego Assn. of Governments (2017) 3 Cal.5th 497, 518).

The Governor's Office of Planning and Research (OPR) published *the CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review* technical advisory on June 19, 2008, which offers technical guidance on addressing climate change and GHG emissions in CEQA planning. The OPR's technical advisory does not include climate stabilization as a requirement for projects under CEQA. The Attorney General's comments submitted on the DEIR for the SANDAG 2050 RTP/SCS do not constitute official legal policy. Climate stabilization is not an environmental topic in Appendix G of the CEQA Statute and Guidelines nor a requirement for a Project under CEQA.

As shown in Table ES-1 of the Executive Summary of this Draft SEIR, the proposed Amendment would result in significant and unavoidable impacts to Air Quality, GHG Emissions, Noise and Vibration, and Transportation. Should the SANDAG Board chose to certify the Draft SEIR and adopt the proposed Amendment, it will also adopt a Statement of Overriding Considerations discussing specific reasons why the agency found that the "benefits of the project outweigh the significant effects on the environment."

As analyzed in Section 4.3.4 of Chapter 4.3, *Greenhouse Gas Emissions*, of the Draft SEIR, Impact GHG-5 (Be inconsistent with the State's ability to achieve the 2030 reduction target of SB 32, the accelerated 2030 reduction target of the 2022 Scoping Plan, and long-term reduction goals of Executive Orders S-3-05, B-55-18, and AB 1279) would result in new more severe and significant impacts in comparison to the approved Plan PEIR for years 2030, 2045, and 2050.

Mitigation measures would help reduce regional GHG emissions by reducing VMT, increasing use of zero-emission fuels, sequestering carbon from the atmosphere, and other measures; they would reduce inconsistency of the proposed Amendment's GHG emissions with the State's ability to achieve the SB 32, 2022 Scoping Plan, EO B-55-18, EO S-3-05, and AB 1279 GHG reduction goals, and puts SANDAG on a trajectory that more closely aligns with regulatory targets. However, full implementation of the changes required to achieve these goals is beyond SANDAG's and local agencies' current jurisdiction and authority. As such, they were identified as significant and unavoidable. SANDAG looks to support and encourage local jurisdictions, state agencies, and other partners to reduce emissions beyond what is included in the proposed Amendment.

The comment further states that the regional transportation plan (RTP) should reduce driving by 25 percent below 2019 levels by 2030. The 2022 CARB Scoping Plan includes the Scoping Plan Scenario, a series of actions that are expected to reduce GHG emissions. One of the primary actions is to reduce vehicle miles traveled (VMT) per capita by 25 percent below 2019 levels by 2030, and 30 percent below 2019 levels by 2045. Note that CARB's VMT reduction targets and strategies of the 2022 Scoping Plan are not regulatory requirements but would inform future planning processes. CARB does not have the authority to set regulatory limits on VMT; the authority to set regulatory limits on VMT largely lies with state, regional, and local transportation, land use, and housing agencies.

As discussed under Impact TRA-2 (Conflict or be inconsistent with CEQA Guidelines Section 15064.3 by not achieving the substantial VMT reductions needed to help achieve statewide GHG reduction goals) in Section 4.5.4 of Chapter 4.5, Transportation, of this Draft SEIR, implementation of the proposed Amendment, under Year 2030 conditions, would result in a 6.09 percent decrease in the region's VMT per capita, as compared to Starting Year – Year 2019 conditions, and a 10.29 percent decrease below 2019 levels by 2045. This is less than the 25 percent VMT per capita reduction below 2019 levels by 2030 goal and less than the 30 percent reduction below 2019 levels by 2045 goal and is a substantially more severe significant impact in

comparison to the approved Plan PEIR. The GHG emissions mitigation measures identified in the approved Plan PEIR would still be applicable to the proposed Amendment.

As stated in Section 4.5.4 of Chapter 4.5, *Transportation*, of this Draft SEIR, mitigation measure TRA-2: Achieve Further VMT Reductions for Transportation and Development Projects includes minor updates resulting in further reductions in project level VMT compared to approved Plan PEIR.

Nonetheless, the regional VMT per capita is more than 1.1 percent higher than the threshold to meet, or keep pace with, the State's GHG reduction goals under each horizon year. Additionally, the identified VMT reductions associated with the proposed mitigation measures would not significantly reduce the daily VMT generated within the San Diego region to a point where it would no longer be considered substantial. Therefore, this impact would remain significant and unavoidable under the proposed Amendment. The State has indicated that additional State policy actions and funding would be required to close the VMT gap between what the MPOs could achieve through implementation of their SCSs, and reductions needed to meet State goals. In addition, transportation sponsors other than SANDAG, such as Caltrans, must evaluate and potentially mitigate any induced VMT that may be associated with the implementation of enhancements to the freeway and State Highway system.

Executive Order of 2005 that established 3 climate mandates for CA. The AG disagreed with SANDAG, stating that S-3-05 was an official CA policy and an attempt to stabilize the climate, and that climate stabilization was an objective of CEQA. The AG won on this point. Today, SB 32 is a CA climate mandate. The official plan to achieve SB 32 is the CARB Scoping Plan, adopted in December of 2022. No CEQA document, like the Draft (or Final) SEIR for the modified (degraded) RTP2021, can ignore SB 32 or fail to comply with the CARB Scoping Plan. Failing to achieve SB 32 (which is equivalent to complying with the CARB Scoping Plan) is equivalent to climate destabilization, which would push the impact of the modified RTP far over the significance threshold, with no good reason, since the mitigation measures in the CARB Scoping Plan are enforceable and feasible. The modified RTP2021 (a project that requires a CEQA process) needs to comply with Appendix E of the CARB Scoping Plan. Therefore, it must reduce driving by 25% with respect to 2019 levels, by 2030.

2-3 cont.

To do this 25% driving reduction it must

- increase transit service levels (as specified in the CARB Scoping Plan's Appendix E),
- have a Road Use Charge, and
- have priced parking; in fact, priced parking must become widespread.

You may claim that you can't force price parking. However, I have specified how this could be done and you could write a Requirements Document to support an RFP process to select a vendor to design, install, and operate the system for SANDAG employees.

2-4

I have presented the car parking system, which is the best way to manage parking, at many conferences, so it has been peer reviewed. A solid majority of employees would like the system because those that drove to work every day would break even and those that drove to work less than every day would earn extra money. In my comment letter to you regarding the NOP (the first attached file), I included a reference showing one potential vendor (the CEO of ACE Parking) who would submit a proposal. A vendor would be anxious to manage parking everywhere. The system increases economic equity and choice while it reduces driving.

Here is a summary of the characteristics of how parking should be managed, everywhere (the exception is where it is appropriate to assign parking; there is an optimum way to do this to reward less driving):

To steer developers, governments, and others to compliance with the Scoping Plan, we should proceed in this way, after asserting the legal requirements:

2-5

1. We should recommend managed parking, point out that so-called "free parking" is not managed parking and specify a "managed parking" system to have these characteristics:
2. Parking should be managed so that it earns money for those for whom the parking is built or for those who are losing money because the parking is being provided. Opening an account, for easy deposit, would be encouraged. Employees would get an "add-in payment", if that is needed so they break even.
3. All parking is shared. It is available to everyone with a license plate, so they can be billed. Opening an account would be encouraged, for the easy flow of money.
4. Parking is value priced, with the exception being on-street, when the occupancy is lower than an agreed-upon threshold, like, for example, 50%.
5. Parking pricing includes a congestion pricing algorithm to keep the occupancy rate from exceeding an agreed-upon value.
6. Parking is fully automated, so there is no more to do than for so-called "free" parking.
7. Data collection to support the earnings calculations is also fully automated, such as how long employees are at a work site.
8. The entire system is provided (designed, installed, and operated) by a vendor, selected in an RFP process.

2

RESPONSE TO COMMENT 2-4

This comment proposes changes to SANDAG's parking management system to achieve further VMT reduction under the proposed Amendment.

SANDAG recognizes that effective parking management policies contribute to the region's ability to meet the SB 375 GHG emissions reduction target by applying parking pricing and reduced parking supply assumptions, which are included in the travel demand model for the approved Plan (see *Appendix D: Sustainable Communities Strategy Documentation and Related Information of the approved Plan*).

SANDAG developed a Parking Strategies for Smart Growth guide as part of their Planning Tools for the San Diego Region, which contains parking strategies that SANDAG is recommended to pursue to reduce parking demand. SANDAG also developed a regional parking management toolbox that provides jurisdictions within the San Diego region with a framework for evaluating, implementing, and managing parking management strategies that support their economic development, sustainability, and mobility goals.

The proposed Amendment would remove the regional road usage charge from the approved Plan and would not amend any other parking or curb management strategies listed in *Appendix B: Implementation Actions of the approved Plan*.

As discussed in Chapter 2 of the approved Plan, through the San Diego region's Transit Demand Management (TDM) program, formerly known as iCommute, SANDAG offers complimentary assistance to employers to create policies to influence employee commuting choices, such as commuter benefits, financial incentives, and parking management strategies. The approved Plan envisions a regional TDM policy that requires employers and developers to provide transportation benefits and on-site amenities that encourage people to use sustainable transportation choices.

While the authority to implement parking and curb policies remains with local jurisdictions, SANDAG plays a unique role of informing these policies by sharing resources and best practices and serving as the

regional Mobility Data Clearinghouse. See Response to Comment 2-11 related to the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

RESPONSE TO COMMENT 2-5

This comment proposes recommendations for regional parking management policies to achieve further VMT reduction under the proposed Amendment. These recommendations have been noted and will be forwarded to the Board for further consideration. See Response to Comment 2-4 regarding parking management strategies.

2-5 cont.

9. The vendor would be skilled a monetizing unused parking and monetizing data.
10. Privacy would be protected, as it should be specified for a Road Use Charge.
11. The vendor would be skilled a providing solar canopies, charging stations, and buying and selling electricity.

2-6

I have explained this to the CEO of ACE. He wants to supply the solution. That is documented in the 12th attached file.

I have presented this at many technical conferences, so it is peer-reviewed. The next Conference is here: . https://web.cvent.com/event/413d9419-4773-496c-8591-8879904f60bc/websitePage:ce1aee6f-c63f-4a65-a485-f1627b3da134 (Far right, top side; the guy with the coat and tie.) I may tweak my abstract. It is easy to do. I may change the name to "Managed Parking", a name I got from Toll Brothers. Toll Brothers has not ruled out "Managing" (as they say) the parking at the Oceanside Transit Center. We would have a better chance at getting them to move forward if there were more supporting organizations and individuals. The Oceanside and the North County Transit District, that runs the trains and buses, has not said much. It is difficult to get people to see that "free" is not always "free" and that some complexity is warranted.

2-7

Here, "Reference 5" is the 13th attached file:

Please include the following. TOD needs car-parking reform.

For the "AdoptedSD_CentralCommitteeParking" file, make this change:

THEREFORE, BE IT RESOLVED, that that the San Diego County YIMBY ~~Democratic Party~~ Club supports ~~researching~~ a car-parking system in which the parking is valued-priced, shared; convenient to drivers, provides earnings to those losing money because the parking is being provided, protects privacy by requiring a search warrant to get parking location information, and protects the economic interests of low-income drivers.

"Researching" guarantees that it won't happen. The final file shows that parking vendors could do this.

It is clear from CARB's Scoping Plan work that we must reduce driving and we must price parking.

It is Reference 5 for this email.

2-8

On Page 4 of Reference 5 the truth is stated about our need to reduce VMT:

2.1 Zero-emission vehicles are not enough to solve the climate crisis.

Contrary to popular belief, zero-emission vehicles (ZEV) alone are not enough to solve the climate crisis. The 2022 Scoping Plan illustrates that despite cleaner vehicles and low-carbon fuels, the path to carbon neutrality by 2045 also depends on reducing per capita VMT (the total passenger vehicle miles driven by an average person in California on any given day). To meet the carbon neutrality goal, the Scoping Plan proposes reducing VMT from 24.6 miles per day in 2019 to 18.4 miles by 2030 (a 25 percent reduction) and to 17.2 miles per day by 2045 (a 30 percent reduction).

3

RESPONSE TO COMMENT 2-6

This comment proposes recommendations for regional parking management policies to achieve further VMT reduction under the proposed Amendment. See Response to Comment 2-4 regarding parking management strategies.

RESPONSE TO COMMENT 2-7

This comment proposes recommendations for regional parking management policies to achieve further VMT reduction under the proposed Amendment. See Response to Comment 2-4 regarding parking management strategies.

RESPONSE TO COMMENT 2-8

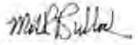
This comment discusses the VMT reduction proposals in the 2022 CARB Scoping Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required. See Response to Comment 2-3 regarding VMT analysis in the Draft SEIR for the proposed Amendment compared to the approved Plan PEIR and discussion of how revised Mitigation Measure TRA-2 in the Draft SEIR would decrease project-related VMT.

Also:

To achieve this vision, the State should lead efforts to:
1.Authorize and implement roadway pricing strategies and reallocate revenues to equitably improve transit, bicycling, and other sustainable transportation choices. Pricing strategies take many forms and can include fees for miles driven,cordon fees for operating vehicles in designated areas, parking fees, fees on congestion impact of ride-hailing services, and dynamic fees on highway lanes and other strategic roads to manage congestion.
2-9 Authorizing transportation pricing strategies is essential to promote more efficient use of cars and to further transit and active transportation improvements. Pricing strategies present an opportunity to fund the transportation system in a more equitable and fiscally sustainable way than current funding sources, promote more efficient functioning of existing infrastructure, and fund new transportation options, especially for those who do not own a vehicle or do not drive. Some recent analyses indicate California will not meet its climate goals without implementing equitable roadway pricing strategies as these strategies are projected to achieve up to 27 to 37 percent of the needed per capita VMT reduction.35The four largest MPOs have included multiple pricing strategies . . .

TOD works best if we also stop being unfair to those who own less cars and/or drive less.

Highest regards,



Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054
760 421 9482

Former California Democratic Party Delegate, 76th Assembly District (author of 2 adopted resolutions and 5 Platform changes)
2-10 Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee (author of 5 adopted resolutions)

Final title before leaving Aerospace: ***Senior Staff Systems Engineer***

Air and Waste Management Association published and presented papers:
Author, ***The Development of California Light-Duty Vehicle (LDV) Requirements to Support Climate Stabilization: Fleet-Emission Rates & Per-Capita Driving***
Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***
Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

Quotes from the Secretary General of the UN:

2-11
1. We have a Code Red Climate Emergency
2. We are solidly on a path to an unlivable planet.
3. We are driving towards Climate Hell with our foot on the accelerator.
4. We are dangerously close to the point of no return.

Please either make the modified RTP2021 compliant with the CARB Scoping Plan or abandon this effort and make sure that RTP2025 complies with the CARB Scoping Plan.

4

RESPONSE TO COMMENT 2-9

This comment provides recommendations for the State related to transportation pricing strategies. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

RESPONSE TO COMMENT 2-10

Thank you for your comment. The commenter's biographical information does not pertain to the proposed Amendment or adequacy of the SEIR. No further response is required.

RESPONSE TO COMMENT 2-11

This comment requests SANDAG to make either the proposed Amendment and Draft SEIR or the 2025 Regional Plan compliant with the 2022 CARB Scoping Plan. See Response to Comment 2-2 regarding the proposed Amendment and the 2022 CARB Scoping Plan.

Goals, policies, and mitigation measures for the 2025 Regional Plan have not yet been determined. SANDAG is currently conducting community workshops to educate the public on the ongoing short-term transportation projects and programs and solicit public comments on these efforts. See the 2025 Regional Plan Public Involvement Plan: A Guide for Public & Stakeholder Engagement for the 2025 Regional Plan for more information.

Please do not go back to the days when your violated CEQA.

2-11 cont. **Regards,**

Mike Bullock
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760 421 9462

Former California Democratic Party Delegate, 76th Assembly District (author of 2 adopted resolutions and 5 Platform changes)
Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee (author of 5 adopted resolutions)

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Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***
Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

Quotes from the Secretary General of the UN:

5. We have a Code Red Climate Emergency
6. We are solidly on a path to an unlivable planet
7. We are driving towards Climate Hell with our foot on the accelerator
8. We are dangerously close to the point of no return

From: mike_bullock@earthlink.net <mike_bullock@earthlink.net>
Sent: Monday, January 9, 2023 2:09 PM
To: 'Kirsten.Uchitel@sandag.org' <Kirsten.Uchitel@sandag.org>
Cc: 'Ikhrata, Hasan' <Hasan.Ikhrata@sandag.org>; 'Mike Bullock' <mike_bullock@earthlink.net>
Subject: Scoping the SEIR for Removing the RUC from the 2021 RTP

Kirsten Uchitel, Associate Regional Planner SANDAG
401 B Street, Suite 800 San Diego,
CA 92101
2-12 Kirsten.Uchitel@sandag.org

Via E-mail: Kirsten.Uchitel@sandag.org
Subject: Scoping the SEIR for Removing the RUC from the 2021 RTP AND the NOP letter from SANDAG dated December 9, 2022.
Associate Regional Planner Uchitel,
I appreciate the opportunity to comment on the subject and the ***Notice of Preparation of Supplement to the Environmental Impact Report for the 2021 Regional Plan and Public Scoping Meeting Notice*** letter, dated December 9th, 2022. I have attached the letter, for the convenience of any reader of this email. It is the first attached file.
Please find attached my comment letter. It is the second attached file.

5

RESPONSE TO COMMENT 2-12

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. Please note that Response to Comments 2-12 through 2-90 apply to the proposed Amendment or to the previously approved Plan or its PEIR, not to the adequacy of the Draft SEIR, but responses are nevertheless provided. Please refer to subsequent individual responses to comments below for detailed responses. Also, see Response to Comment 2-11 related to the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

I have also attached all 10 of the letter's references. They are in order and named to show their reference number.
Thank you for your leadership in performing your critical work. Thank you for reading this material and for providing the comments and response. Please let me know if you would like to meet to discuss this letter or related topics.

Highest regards,

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054
760 421 9482

2-12 cont.

Former California Democratic Party Delegate, 76th Assembly District (author of 2 adopted resolutions and 5 Platform changes)
Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee (author of 5 adopted resolutions)

Final title before leaving Aerospace: ***Senior Staff Systems Engineer***

Air and Waste Management Association published and presented papers:
Author, ***The Development of California Light-Duty Vehicle (LDV) Requirements to Support Climate Stabilization: Fleet-Emission Rates & Per-Capita Driving***
Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***
Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

Quotes from the Secretary General of the UN:

1. We have a Code Red Climate Emergency
2. We are solidly on a path to an unlivable planet
3. We are driving towards Climate Hell with our foot on the accelerator
4. We are dangerously close to the point of no return

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054

January 10, 2023

Kirsten Uchitel, Associate Regional
Planner SANDAG
401 B Street,
Suite 800
San Diego,
CA 92101
Kirsten.Uchitel@sandag.org

Via E-mail: Kirsten.Uchitel@sandag.org
Subject: Scoping the SEIR for Removing the RUC from the 2021 RTP AND the NOP letter from SANDAG dated December 9, 2022.

SANDAG,

I appreciate the opportunity to comment on this important subject.

Introductory Comments

Removing the RUC from the 2021 RTP is a major change. As will be shown in this letter, there are many indications that it would be ill-advised. If the SEIR exposes this truth, the SANDAG Board could relent and the SANDAG staff could get on with the work of producing the 2025 RTP, with an improved RUC and implementing the 2021 RTP. The state RUC should be

2-13

- a replacement for the state gas tax,
- means based,
- designed to protect privacy,
- value-priced, with a dynamic congestion pricing algorithm to ensure free flow on at least some lanes, and
- implemented as soon as possible, in recognition of our 2030 climate stabilization requirement to significantly reduce per-capita driving (to be shown.)

The 2025 RTP could add in additional charging if needed in coordination with the state. Reference 1 has more information on why we need a RUC. It also describes many of the needed RUC characteristics. Reference 2 shows the strong support from the environmental community for a RUC.

2-14

RESPONSE TO COMMENT 2-13

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. No further response is required. Please refer to subsequent individual responses to comments below for detailed responses. Also, see Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

RESPONSE TO COMMENT 2-14

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. The commenter's attached references are provided in Appendix F.3. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

2-15 As will be shown, doing a legal SEIR will require that SANDAG learn how to do an RTP that achieves the first-occurring climate stabilization requirement. Learning that will help SANDAG understand that the 5 Big Moves (the 2021 RTP) can be a framework allowing the changes we so desperately need. SANDAG will learn what is important (supporting climate stabilization at a livable level) and how it can be done.

Comments on the Subject (NOP) Letter

Project Description

2-16 SANDAG has not taken the physical reality of our climate emergency seriously and has not considered the fact, from the cumulative-effect standpoint (what would happen if all the RTPs did exactly what SANDAG's RTP does), that its work could be, and helping to cause our Earth's climate to destabilize. Climate destabilization is a process that, from a practical, human-survival standpoint, is unbounded in its harm to life on our planet. Human survival requires climate stabilization. That fact is relevant to your work because light-duty vehicles, or LDVs is the category that emits the most GHG, in our County, in our state, and in our nation. This information is not provided in the Project Description section.

2-17 Not taking the physical reality of our climate crisis seriously is shown in the letter's ***Project Description*** paragraph because it suggests to the reader (mostly by omission) that all that is important about this project is meeting the SB 375 targets, without even hinting to the reader that failing to reduce emissions from light-duty vehicles (LDVs) enough, in time, would have a potentially disastrous impact on our physical world and the prospect of human survival. That unmentioned impact, climate destabilization, is an "Environmental Impact" and there is no justification for ignoring it. How soon and by how much we must reduce our emissions to avoid climate destabilization is a question that can only be answered by climate scientists. Therefore, SANDAG has the responsibility to find and use the most accurate, fact-based climate stabilization requirements. Note the use of the word "requirement" instead of "target". Systems engineers and other serious problem-solvers write "Requirements Documents." They do not write "Targets Documents". "Targets" specified to ensure human survival should be renamed "requirements", by SANDAG.

2-18 Page 6 of Reference 3 shows that the first-occurring climate stabilization requirement is for the year of 2030. The second one occurs in 2045 and it is generally thought to be net-zero emissions. However, what happens in 2045 won't matter if our failure to achieve the 2030 requirement sets off climate-destabilization.

2-19 There is no reason to think that the CARB-provided, SB 375 targets support climate stabilization. The current state mandate for 2030 is 40% below our 1990 emission level. However, the state attempted to change this to 65%. That attempt failed in the State Senate by several votes. Reference 3 contains a calculation, based on a unambiguous statement in a reference document signed by our best climate scientists, that shows that the real value is 80%. What is SANDAG's determination

RESPONSE TO COMMENT 2-15

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-16

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR.

GHG impacts related to light duty vehicles (LDV) are addressed in Impact GHG-1 in Section 4.3.4 of Chapter 4.3, *Greenhouse Gas Emissions*, of this Draft SEIR. Cumulative impacts are addressed in Chapter 5 of the Draft SEIR. The proposed Amendment's incremental contributions to cumulative noise and vibration and air quality impacts in years 2025, 2035, and 2050 would remain cumulatively considerable post-mitigation. Cumulative GHG emissions impacts in years 2030, 2045, and 2050 would remain cumulatively post-mitigation. Cumulative energy impacts would not be significant. Cumulative transportation impacts for years 2025, 2030, 2035, 2045, and 2050 would remain cumulatively considerable post-mitigation.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-17

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR.

See Response to Comment 2-1 regarding SANDAG's obligations and purpose under SB 375. The term "target" is used in SB 375 and is therefore used in the proposed Amendment and SEIR.

As stated in *the CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review* technical advisory, CARB acknowledges that transportation accounts for approximately 40 percent of GHG emissions, with light-duty vehicles (LDVs) accounting for 30 percent of overall GHG emissions. GHG emissions from LDVs under the proposed Amendment are addressed under Impact GHG-1 in Section 4.3.4 of Chapter 4.3, *Greenhouse Gas*

Emissions, of this Draft SEIR. As addressed in Table 4.3-5, 4.3-6, and 4.3-7, under the proposed Amendment, GHG emissions from passenger cars and LDVs would increase compared to the approved Plan for years 2025, 2035, and 2050.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-18

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the climate stabilization requirements for years 2030 and 2045.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-19

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses climate stabilization in reference to SB 375.

See Response to Comment 2-1 regarding GHG emission reduction mandates under SB 375. See Response to Comment 2-3 regarding the new more severe and significant impacts in comparison to the approved Plan PEIR under Impact GHG-5. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

2-19 cont. regarding the 2030 requirement? No one knows and that makes SANDAG's work in violation of CEQA law. Recall that the articles in the paper on the COP-25, COP-26, and COP-27 discussions refer to commitments to reduce GHG emissions in 2030. SB 375 is obsolete since its target year is 2035.

SANDAG has been ignoring the critical need to achieve climate stabilization for many years. They should have realized that climate stabilization is important when the State of California sued them in 2011. In Reference 4, the AG of California (Harris) states in Footnote 21:

2-20 ***The DEIR therefore does not find the RTP/SCS's failure to meet the Executive Order's goals to be a significant impact. This position fails to recognize that Executive Order S-3-05 is an official policy of the State of California, established by a gubernatorial order in 2005, and designed to meet the environmental objective that is relevant under CEQA (climate stabilization). SANDAG thus cannot simply ignore it.***

2-21 What is relevant here is the point I have been making and that SANDAG has been ignoring: ***The environmental object that is relevant under CEQA is climate stabilization.*** And furthermore, SANDAG thus cannot legally continue to ignore it. In case some reader gains comfort from the fact that S-3-05 was designed, back in 2005, to support climate stabilization, It should be noted that S-3-05 is hopelessly out of date. GHG emission reductions that were hoped for back in 2005 have not taken place and our knowledge about anthropogenic climate change has improved. The S-3-05 requirement for 2050 we now know must now be achieved by the industrialized world by 2030.

2-22 How do we achieve climate stabilization? We avoid climate destabilization. And how do we do that? We achieve the climate-stabilization requirements: the one for 2030 and the one for 2045. As a practical matter, SANDAG only needs to focus on the 2030 requirement because the 2045 requirement will be relatively easy if we achieve the 2030 requirement.

EIR Scope

It says that a lead agency, like SANDAG, may prepare a Supplemental EIR when some conditions from CEQA Guidelines (Section 15162) require it, but only if ("and"):

2-23 ***only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation***

The problem here is that SANDAG has kept itself and everyone else in the dark about where the 2021 RTP LDV emissions fall, relative to the 2030 climate-stabilization requirement. Therefore, as far as anyone relying on the current EIR knows, it may be

RESPONSE TO COMMENT 2-20

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses climate stabilization in reference to EO S-3-05.

See Response to Comment 2-3 regarding the new more severe and significant impacts in comparison to the approved Plan PEIR under Impact GHG-5, as well as climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-21

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR.

This comment discusses climate stabilization in reference to EO S-3-05. See Response to Comment 2-1 regarding GHG emission reduction mandates under SB 375. See Response to Comment 2-3 regarding the new more severe and significant impacts in comparison to the approved Plan PEIR under Impact GHG-5, as well as climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-22

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the 2030 and 2045 climate stabilization targets. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-23

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses GHG emissions from LDVs relative to the 2030 climate stabilization requirement. See Response to Comment 2-17 regarding GHG emissions impacts related to LDVs. See response to Comment 2-3 regarding the new more severe and significant impacts in comparison to the approved Plan PEIR under Impact GHG-5, as well as climate stabilization and climate change requirements under the CEQA process.

2-23 cont. that removing the RUC causes the LDV emissions to move from less than the 2030 climate-stabilization requirement to more than the 2030 climate-stabilization requirement. If that is true, the cumulative effect principle means that the outcome would go from acceptable (climate stabilization), with the RUC, to catastrophic (destabilization), without the RUC. That would mean that what may have seemed like a minor change to the RTP would cause an enormous and catastrophic change in the environmental outcome. Later in this letter there are many reasons provided to conclude that removing the RUC is a very large and a very environmentally harmful change.

2-24 There is also the matter of illegality. The previous EIR ignored any mention of the environmental impact of climate destabilization. No one sued SANDAG over this omission. Does this mean that the previous EIR was legal? I assume that there is a time limit on when a suit can be filed and that the time limit has expired. Therefore, one might be required to act as if the previous EIR was legal. However, the previous EIR is getting changed. Does this mean that the illegal behavior (the behavior of ignoring climate destabilization) that resulted in the FEIR of the project with the RUC is acceptable in the SEIR for the project without the RUC? It is not, based on the words above. Illegal behavior that resulted in the original project cannot be allowed in the changed project, because of the word "adequately". Again, here are the key words from above with the highlight added:

> ***only minor additions or changes would be necessary to make the previous EIR <u>adequately</u> apply to the project in the changed situation***)

2-25 Since the environmental impact of destabilization must be considered, an SEIR is not appropriate unless it does an analysis of the project with and without the RUC, considering their impact on climate destabilization. No EIR or SEIR is adequate if it ignores the environmental impact of destabilizing the earth's climate. No one should think that SANDAG's geography is too small to matter to a global outcome. The principle of "cumulative effects" disallows that form of escapism. Like it or not, the SEIR scope must include a full analysis of the changed RTP's impact on climate stabilization.

2-26 Any sort of EIR must consider "Environmental Impacts" that are not trivial. Climate destabilization is tremendously impactful. An issue of *Scientific American* said that it would cause a "devastating collapse of the human population". One can reasonably assume that the direct cause of this collapse would be a loss of habitat, resulting in mass starvation, and that many species would suffer the same fate. This is not a trivial environmental impact.

2-27 Given all this, there is almost a comical aspect of the list of potential impacts and calling them "environmental resources", on Page 2. There are 19 of them listed, from

RESPONSE TO COMMENT 2-24

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the adequacy and legality of the prior EIR in regard to climate stabilization. See Response to Comment 2-1 GHG emission reduction mandates under SB 375. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-25

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the adequacy and legality of the EIR in regard to climate stabilization. The Draft SEIR analyzes whether the removal of the regional road usage charge would result in new or more severe significant impacts than disclosed in the approved Plan PEIR. As shown in Table ES-1 of the Executive Summary of this Draft SEIR, the proposed Amendment would result in new more severe significant and unavoidable impacts to Air Quality, GHG Emissions, Noise and Vibration, and Transportation. Should the SANDAG Board chose to certify the Draft SEIR and adopt the proposed Amendment, it will also adopt a Statement of Overriding Considerations discussing specific reasons why the agency found that the "benefits of the project outweigh the significant effects on the environment."

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-26

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses climate stabilization. See Response to Comment 2-27 regarding environmental topics of analysis under CEQA for this Draft SEIR. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-27

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses potential impacts to environmental resources.

Under SB 375, SANDAG is required to develop a regional transportation plan/sustainable communities strategy (RTP/SCS) which demonstrates goals, policies, and strategies that SANDAG will undertake to meet the GHG emissions reduction targets established by CARB. SANDAG is required to evaluate and address the environmental impacts of the RTP/SCS in an Environmental Impact Report (EIR) as part of the CEQA process. Appendix G: Environmental Checklist Form of the CEQA Statute and Guidelines includes a checklist of 19 environmental topics that must be evaluated in the EIR. This Draft SEIR evaluates the environmental factors impacted by the removal of the regional road usage charge from the approved Plan: Air Quality, GHG Emissions, Energy, Noise and Vibration, and Transportation. The approved Plan PEIR evaluated the environmental impacts related to the remaining 14 topics, whose impact determination remain unchanged under the proposed Amendment.

See Response to Comment 2-1 regarding GHG emission reduction mandates under SB 375. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

2-27 cont. "Aesthetics and Visual Resources" to "Wildfire". The eighth one down is "Greenhouse Gas Emissions." That is an odd "environmental resource." More to the point, the listing hides the unique and disastrous outcome of increasing GHG. No other of the "resources" on the list will cause human extinction, except, for some of them, because they will themselves result in more GHG. GHG is a killer, because our current atmospheric CO2 level is 420 PPM, whereas before the industrial revolution started in was at around 280 PPM. We are in very dangerous territory.

2-28 This section is another example of how SANDAG is covering up the physical reality of our climate emergency and has apparently not considered the fact, from the cumulative-effect standpoint (what would happen if all the RTPs did exactly what SANDAG's RTP does), that its work could be helping to cause our Earth's climate to destabilize, a process that, from a practical, human-survival standpoint, is unbounded in terms of how bad it would get. Human survival requires climate stabilization.

2-29 **More Facts About Why SANDAG Must Stop Ignoring Climate Destabilization**

Here are some quotes from the Secretary General of the UN about our climate crisis:

1.) We have a Code Red Climate Emergency
2.) We are solidly on a path to an unlivable planet
3.) We are driving towards Climate Hell with our foot on the accelerator
4.) We are dangerously close to the point of no return

The "point of no return" refers to a point where a climate destabilizing process gets so large in magnitude that we have no way to stop it. We are "solidly on a path" to having that happen. The only way to get off that path is to achieve the 2030 climate-stabilization requirement. SANDAG needs to do the right thing, from both a moral and a legal standpoint.

2-30 **Scope: The SEIR Must Correctly Assess the 2021 RTP with the RUC Removed**

To adequately evaluate the change (RUC removal), climate destabilization must be considered for both the 2021 RTP with the RUC and for the 2021 RTP without the RUC. Pretending that climate destabilization can be ignored is never adequate and is never legal under CEQA. As clearly stated by the California AG back in 2011, repeated from above:

The environmental object that is relevant under CEQA is climate stabilization.

2-31 This brings up the question of how SANDAG could evaluate the climate stabilization impacts of the 2021 RTP with and without the RUC.

Comments on SANDAG's NOP of a SEIR for the RTP 2021 5 of 29

RESPONSE TO COMMENT 2-28

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses incorporating climate stabilization into cumulative impacts analysis. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-16 regarding a discussion of the cumulative effects of the Draft SEIR.

RESPONSE TO COMMENT 2-29

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment provides quotes from the Secretary General of the United Nations.

RESPONSE TO COMMENT 2-30

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-31

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses Light Duty Vehicles (LDVs) and proposes a path to climate stabilization through enforceable measures for LDVs. The Draft SEIR includes minor updates to mitigation measure TRA-2 which would cause a decrease in VMT compared to the approved Plan PEIR. As discussed in Impact GHG-1 in Section 4.3.4 of Chapter 4.3, *Greenhouse Gas Emissions*, of this Draft SEIR, the proposed Amendment would result in increased GHG emissions for passenger cars and LDVs compared to the approved Plan PEIR. However, the total annual regional emissions would be below the 2016 baseline for years 2025, 2035, and 2050. Therefore, although the proposed Amendment increases the GHG emissions within the San Diego region for each of the horizon years, the conclusion for the Draft SEIR would be unchanged from what was identified in the approved Plan PEIR and would remain less than significant.

See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

2-31. cont.

Here's how. To result in climate stabilization, an RTP must conform to a set of enforceable measures that would cause cars and light-duty trucks (LDVs) to achieve the 2030 climate-stabilization requirement. The only way to check such conformity is to have a plan that contains a set of enforceable measures that causes LDVs to achieve the 2030 climate-stabilization requirement and to have the derivation of the plan. The derivation would show the relationships between the measures and the resulting GHG emission level. The plan would also show the derivations of the relationships. No such plan is unique. Using the derivations and the relationships, any proposed RTP could be evaluated to see if it would reduce emissions enough to achieve the 2030 requirement. A plan could also be adjusted to achieve the 2030 requirement. The adjustments could take the form of adding mitigation measures or adjusting the plan's existing measures to increase their emission reductions.

2-32

But there is a problem. SANDAG has no such plan and does not know of a set of derivation that would make it relatively easy to evaluate plans for their climate stabilization impact.

If CARB has such a plan and set of derivations, they are not sharing it. They make authoritative statements asserting that electrification of LDVs cannot happen fast enough and that therefore we also need significant reductions in our per-capita driving. However, they do not share their work that makes that conclusion.

2-33

I have done the derivation and created a plan that would cause LDVs to achieve the 2030 requirement. It is Reference 3. It is peer reviewed and has been presented at many Air and Waste Management Association Conferences. For example, the following words were emailed to me from the AWMA:

> *On behalf of the Air & Waste Management Association (A&WMA) Technical Council, we are pleased to confirm that your abstract submission #796315, entitled "Deriving a Climate-Stabilizing Solution Set of Fleet-Efficiency and Driving-Level Enforceable Measures for Light-Duty Vehicles in California", has received a favorable review, and is accepted as a platform for presentation at A&WMA's 113th Annual Conference and Exhibition (ACE). The conference will be held June 29-July 2, 2020, in San Francisco, California. Your assigned session is entitled "Transportation Policies for Climate Change" and is preliminarily scheduled for Tuesday, 6/30/2020 between 1:30 pm-3:10 pm.*

Using the derivations, it would not be too difficult for you to evaluate the 2021 plan, both with and without the RUC. It would also show you how the 2025 RTP could be constructed to achieve the 2030 climate-stabilization requirement.

2-34

Documenting that the 2021 RTP EIR Did Not Consider the Impact of Climate Stabilization

Incorrect Primary Task

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RESPONSE TO COMMENT 2-32

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. See Response to Comment 2-1 regarding GHG emission reduction mandates under SB 375. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

RESPONSE TO COMMENT 2-33

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG.

RESPONSE TO COMMENT 2-34

This comment suggests a falsehood in Chapter 1 of the previously approved Plan. This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. As such, no further response is required.

2-34 cont. Chapter 1 introduces the 5 "Big Moves," an approach which seems to reflect a recognition that we need fundamental change. However, before the strategies are identified, a falsehood is suggested. The falsehood it suggests is that the primary task is to enhance mobility while achieving "state and federal requirements", regarding climate change and air pollution.

It says, regarding the 5 Big Moves (emphasis added in bold type):

> *These interdependent strategies are designed to address the greatest transportation and mobility challenges that we face: safety and traffic congestion, social inequities, and* ***state and federal requirements to reduce greenhouse gas (GHG) emissions and air pollution****.*

2-35 That statement shows a fundamental misunderstanding of the climate emergency that we face. By far, our greatest "mobility challenge" is to design and adopt a regional transportation plan (RTP) that will guarantee that the GHG emissions from *cars and light-duty trucks* (the "Light-Duty Vehicle" or "LDV" category called out in SB 375) will meet the climate-stabilizing requirements provided by climate science. The first climate-stabilizing requirement is for LDVs to emit GHG at no more than 80% below the level they emitted in 1990, by no later than the end of 2030 (Reference 3). If we meet the 2030 requirement, the later requirement will be relatively easy. The later requirement is to have LDVs and all other GHG emitters emit no more than what can be offset by carbon sequestration (AKA "net zero). This is the "net zero" emission level of 2045. Often, governments only speak of the "net zero" requirement of 2045 (or 2050, the older value), without mentioning the more-difficult 2030 requirement.

Primary Challenges Misstated

Figure 1 is from Section 1 of the EIR of the 2021 RTP (with the RUC). It is said to show our "three primary challenges"

Our *Code Red Climate emergency* is mankind's primary challenge. It means that our *Region's* primary challenge is to do its part to ensure that the emission of GHG from our LDVs in 2030 support climate stabilization. Their emissions must be 80% lower than they were in 1990.

2-36 Reference 3 shows how that can be done. We will need to significantly reduce VMT, as proven in Reference 3 and as will be shown in Table 1. When that is done, there will be no congestion and, given that fact, it is not correct to assert that *Congestion* is a primary challenge. *Social Equity* is a goal, like "*Democracy*" or "*Equal Opportunity*" that we must always move towards, as fast as we can. However, when "*Social Equity*" is discussed in the context of our Anthropogenic climate change problem, the harm of living close to pollution caused by our reliance on fossil fuels is often mentioned. That harm will be reduced and, in some cases (refineries will be closed) eliminated, if we meet our climate-change challenge. The largest "*Social Inequity*" would be climate destabilization because it would cause a "devastating collapse of the human population" to quote from the June 2008 issue of *Scientific American's* article, *Ethics and Economics of Climate Change*. Many reliable sources write that human extinction will be an outcome of climate change failure, which is the path we are on now. This will be the ultimate *inequity* if it happens and make no mistake, it will probably happen.

Climate destabilization, as described in Reference 3, will end most life forms (not microbiology perhaps, however) and almost certainly our own species. This environmental impact must be fully explained in a legal EIR or SEIR. The EIR for the 2021 RTP has no such discussion or explanation.

Figure 1 **The DEIR's Erroneous Claim of "Three Primary Challenges", for our Region**

2-36 cont.

Need to Reimagine

2-37 Chapter 1's Page 7 statement that there is an "urgent need to reimagine our regional transportation system" is correct.

Reimagine Example Left Out

2-38 That is one of the places (Chapter 1's Page 7) where SANDAG should state that we must stop widening freeways. Instead of widening freeways, as called for in the current, fatally flawed, version of the *Transnet* sales tax, we should be reducing the size of our freeways. The well-understood principal of *Induced Traffic Demand* informs us that adding more lanes will not reduce congestion, but it will increase VMT. *Induced Traffic Demand* also informs us that removing lanes will not increase congestion, but it will decrease VMT. As shown in Reference 3 and Table 1 of this letter, we must reduce VMT. The *Transnet Ordinance* can be changed in an emergency. We have an emergency.

Vision, Goals, Strategies, and Actions Are Useless if Our Earth's Climate is Destabilized

2-39 Page 13 starts a discussion which seems to be written for some other planet or for some other time on our planet. Climate destabilization would lead to a collapse of our human population and eventual extinction. Therefore, Page 13's

- *Vision, Goals, Strategies, and Actions*

must be replaced with

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RESPONSE TO COMMENT 2-35

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the 5 Big Moves in Chapter 1 of the approved Plan. The 5 Big Moves are the key strategies to achieving the goals of the approved Plan. As discussed in *Appendix G: Public Involvement Program* of the approved Plan, the 5 Big Moves were developed by SANDAG and refined through the public participation process.

See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

RESPONSE TO COMMENT 2-36

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the "three primary challenges" in Chapter 1 of the approved Plan. As discussed in *Appendix G: Public Involvement Program* of the approved Plan, primary goals and strategies of the approved Plan were developed by SANDAG and refined throughout the public participation process.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-37

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment on Figure 1, Section 1 of the approved Plan PEIR has been noted.

RESPONSE TO COMMENT 2-38

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment suggests reducing the size of freeways.

See *Appendix A: Transportation Projects, Programs, and Phasing* of the approved Plan for further information on transportation network modification under the approved Plan and the proposed Amendment.

See Response to Comment 2-3 regarding VMT reductions under the proposed Amendment compared to the approved Plan. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

RESPONSE TO COMMENT 2-39

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the vision, goals, strategies, and actions of the approved Plan.

As discussed in *Appendix G: Public Involvement Program* of the approved Plan, primary goals and strategies of the approved Plan were developed by SANDAG and refined throughout the public participation process.

See Response to Comment 2-3 regarding VMT reductions under the proposed Amendment compared to the approved Plan, as well as climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

- *A Requirement, Vision, Goals, Strategies, and Actions*,

The *Requirement* is to ensure that our transportation system supports the climate-stabilization requirement of 2030, as shown in Figure 4 of this letter. Reference 3 shows how this can be done, for LDVs. Most of the fleet-efficiency requirements are shown in Table 1 of this letter. (All of the needed fleet-efficiency requirements are described in Reference 3.) Table 1 also shows the driving reduction that is computed in Reference 3. It is a 32% reduction in per-capita VMT, with respect to year 2005. It's expressed using the SB 375 conventions for expressing driving reductions. Even though SB 375 states that it is about a *GHG* reduction, it is really about a *VMT* reduction, because SB 375 clearly states that the Metropolitan Planning Organizations (MPOs, like SANDAG) can take no credit for GHG reductions accomplished by the state. The state has the fleet-efficiency responsibility. The Metropolitan Planning Organizations (MPOs, like SANDAG) have the responsibility to reduce driving. Therefore, the SB 375 reductions in LDV GHG must be produced by SANDAG measures to reduce LDV VMT. In other words, SANDAG's responsibility is to reduce driving.

2-39 cont.

The Fatal Flaw of Not Saying What's Important

On Page 13 of Chapter 1 of our 2021 RTP, it says, "The 2021 Regional Plan reduces per capita GHG emissions from cars and light duty trucks by 20% below 2005 by 2035". The document does not say whether-or-not this is enough to support climate stabilization. Tragically, it is *not* enough to support climate stabilization. The 2030 climate-stabilization requirement is derived in Reference 3 and is shown in Figure 4 of this letter.

2-40

Similarly, Chapter 1 lists key goals, policies, and Executive Orders that were considered. They are shown here in Figure 2.

The problem is that the document is supposed to be sufficient to support an EIR, which is to say it must report on the environmental impacts of what is being done. The environmental impacts are what will happen in the physical world, not in the legislative or judicial world. To figure out what will happen in the physical world, the resulting emissions need to be compared to what the climate scientist are telling us we must accomplish if we want to stabilize the climate at a livable level.

2-41

That information is nowhere to be found in the current 2021 RTP or its DEIR. That is clearly illegal because the decision makers and the public need to understand what will happen to our planet if all transportation planning followed the path described by SANDAG as in the "cumulative effects" consideration.

The "cumulative impacts" consideration means that no one can get by using an argument that a discretionary project being considered is "too small to matter".

Figure 2 is an admission of guilt (climate-stabilization failure) because it is described as containing SANDAG's "key goals". No climate-stabilization requirement is listed. SANDAG might be, technically, within CEQA law for the 2045 to 2050 requirement of zero net emissions because this happens to be covered by the EO B-55-18 executive order. However, SANDAG needs to state that zero net emissions by 2045 is our second climate-stabilizing target and that is covered by EO B-55-18. Where SANDAG

2-42

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RESPONSE TO COMMENT 2-40

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the goals and policies of the previously approved Plan in relation to climate stabilization.

CARB has not developed either a 2030 target or any post-2035 targets for GHG emissions reduction for the SANDAG region. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

RESPONSE TO COMMENT 2-41

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the adequacy and legality of the previously approved Plan and its PEIR in regard to climate stabilization. See Response to Comment 2-27 regarding environmental topics of analysis under CEQA. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-16 regarding cumulative impacts of the proposed Amendment.

RESPONSE TO COMMENT 2-42

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the adequacy and legality of the previously approved Plan and PEIR. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

clearly is in violation of CEQA law is that it does not state that the industrialized world's first climate-stabilization requirement (target), which is for 2030, is to emit GHG at no more than 80% below what we emitted in 1990, as is derived in Reference 3 and shown on Slides 10 and 11 of Reference 5. SANDAG needs to redo its RTP using a Plan like that shown in Reference 3, besides doing a revised EIR for the 2021 RTP and an SEIR for the 2021 SEIR with the RUC removed.

Figure 2 SANDAG's Admission of Climate-Stabilization Failure Because These Do NOT Cover Achieving the Industrial World's 2030 Climate-Stabilizing Target.

2-42 cont.

Achieving the industrialized world's 2030 Climate-Stabilizing Requirement would obviously be a "Key policy" and accomplishment for SANDAG. Figure 2 and the stated organization of the DEIR means that there is no need for me to read further to know that SANDAG has made no effort to consider what it would take for the RTP to conform to achieving the 2030, climate-stabilizing requirement. Page 13 of Chapter 1 of the 2021 RTP presents the RTP's Visions and Goals. There is nothing there about stabilizing the climate at a livable level. That is shown in Figure 2, which is taken from Chapter 1 of the RTP.

2-43

Also, Chapter 2 is defined by what is written on Page 15 of Chapter 1. It says there that Chapter 2, the Transportation Plan's Regional Sustainable Community Strategy

2-44

(SCS, which is required by SB 375), describes "the land use strategies, and programs that will achieve our Vision and Goals."

2-44 cont. Chapter 1 of the 2021 RTP describes SANDAG's "Vision and Goals". None of them include achieving the 2030 climate-stabilizing requirement, or "target".

Figure 3 SANDAG's Admission of Climate-Stabilization Failure, Because These Statements, From Page 19 of the RTP's Chapter 2, Show that the SCS Does Not Come Close to Achieving the Industrial World's 2030 Climate-Stabilizing Target.

2-45

The title of this letter's Figure 3 is true because Reference 3 shows that even with an extremely aggressive schedule of fleet electrification (such as 70% of new car sales be for electric cars, by 2024, as shown in Table 1 of this letter), the per-capita driving reduction needs to be 32% by 2030, which is far larger than the 20% by 2035 documented in Figure 3. Because SANDAG cannot take credit for fleet efficiency improvements, the phrase "GHG Emissions", used in Figure 3, is actually "VMT".

2-46 The 2021 RTP's Chapter 3 covers financing. The 30 appendices provide the details and background of how the "Vision and Goals", which do not include the 2030 climate-stabilizing requirement, are achieved.

How to Design an RTP that Contributes to Climate Stabilization

RTPs that achieve the 2030 requirement must be built using the mathematical relationships that that connect the fleet efficiency in year 2030 and the per-capita driving in 2030 with the 2030 climate-stabilization requirement. The math must also account for the percent of our electricity that is renewable, in 2030.

2-47 Therefore, the math must derive the following two items:

- So-called, "fleet efficiency" (CO2 emitted per mile of all the LDVs on the road, for a given year), given the percent of electricity that is from renewables) and
- per-capita driving

that will, taken together, achieve the "80% below 1990 level by 2030" requirement.

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RESPONSE TO COMMENT 2-43

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the adequacy of the previously approved Plan and PEIR in regard to climate stabilization. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-44

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the adequacy of the previously approved Plan's Vision and Goals without a 2030 climate stabilization target. As discussed in *Appendix G: Public Involvement Program* of the approved Plan, primary goals and strategies of the approved Plan were developed by SANDAG and refined throughout the public participation process.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-45

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment provides edit suggestions related to climate stabilization to Chapter 2 of the previously approved Plan.

See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-46

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. The

comment has been noted. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-47

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment provides recommendations to connect the per-capita driving in 2030 with the 2030 climate stabilization requirement. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

The peer-reviewed Reference 3 does this. It shows 4 cases of fleet-efficiency requirements and the per-capita driving that could be allowed, given the 2030, climate-stabilization requirement stated above.

For the benefit of readers that don't want to look at Reference 3, here is Table 1, showing the primary results of 4 cases:

Table 1 4 Cases that Support the 2030 Climate-Stabilizing Requirement

Note: Purple denotes difficult; red, impossible.	Case Designations			
	Balanced_1	Balanced_2	2005 Driving	Mary Nichols
% Renewable Electricity	85.0%	90.0%	90.0%	90.00%
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	20.0%	15.0%	82.0%	12.35%
% ZEVs, Year 2022	35.0%	25.0%	97.0%	14.76%
% ZEVs, Year 2023	55.0%	45.0%	99.0%	17.18%
% ZEVs, Year 2024	80.0%	70.0%	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	32.0%	32.0%	0%	50.5%

2-48

We are falling behind in our sales of ZEVs. The plan needs to be updated to reflect on that failure. The problem with having no plan is that we will almost certainly fail since it is always politically easier to do less. Without understanding the consequences, doing less will be selected. The only difference between the "Balanced_1" case and the "Balanced_2" case is that the percentage of electricity that is from renewables goes from 85% to 90%. That improvement allows the per-cent of new cars that are ZEVs to increase at a less-difficult pace.

2-49

The "2005 Driving" case is done to prove that it is not feasible. It proves that we must reduce driving. CARB now says the same thing, but they do not show how they reached that conclusion.

The Mary Nichols case is based on published statements made by the retired CARB Chair. CARB may not understand the need for the more difficult 2030 requirement of

2-50

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RESPONSE TO COMMENT 2-48

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment provides potential RTP scenarios and their potential impact on percent reduction in per capita driving. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

RESPONSE TO COMMENT 2-49

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses electric vehicle sale forecasts. As discussed in Chapter 2 of the approved Plan, electric vehicle infrastructure, such as public charging facilities for electric vehicles and hydrogen-fueled vehicles, are a component of the Complete Corridors strategy help support California's overall shift to electric vehicles. As shown in *Appendix B: Implementation Actions* of the approved Plan, the SANDAG region is forecasted to have 311,000 electric vehicles on the road by 2025, and 771,000 electric vehicles by 2030. The proposed Amendment would remove the road user charge from the approved Plan and would not make any other changes to the transportation network. The electric vehicle forecast for the SANDAG region may be updated as part of the ongoing process to develop the 2025 Regional Plan (See Response to Comment 2-11).

RESPONSE TO COMMENT 2-50

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding VMT reductions under the proposed Amendment compared to the approved Plan. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

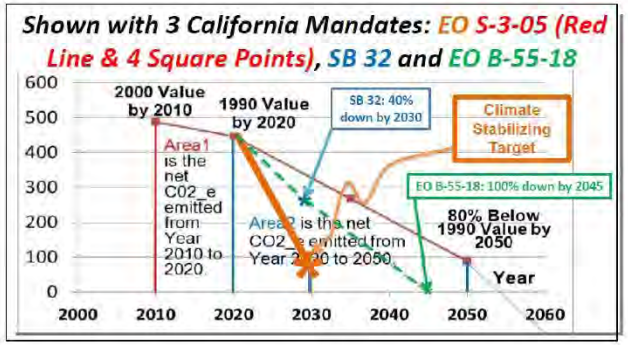
2-50 cont.

80% below 1990 by 2030. Therefore, former-Chair Nichols probably did not understand that her fleet-electrification schedule would need per-capita driving to drop 50.5%, which would be very difficult. CARB and the state of California officials working on this problem may have been thinking that if we achieve the net-zero requirement by 2045, the earth's climate will not destabilize. In any case, SANDAG cannot go along with such misinformation.

The derivation of the 2030 climate-stabilizing requirement (target) is shown on Page 6 of Reference 3. Reference 5 is used to present Reference 3. The derivation of the 2030 climate-stabilizing requirement (target) is shown on Slides 11 and 12 of Reference 5. That result is shown here in Figure 4, where it can be contrasted with the inadequate state mandates.

Figure 4 The 2030 Climate Stabilization Target Compared to State Mandates

2-51



2-52

It should be noted that Reference 3 is exactly what the most important environmental-advocacy organization in California, the California Democratic Party (the CDP, AKA the CADEM), has in its Platform. The Party Platform is their official policy. This can be seen in Reference 6, where it says, "*Demand a state plan specifying how cars and light-duty trucks can meet climate-stabilizing targets by defining enforceable measures to achieve necessary fleet efficiency and per-capita driving limits.*"

SANDAG has no such Plan. Given our climate emergency, any project that needs an EIR, that has to do with driving, needs such a Plan. If any discretionary project that has to do with driving needs an EIR, such as the RTPs being considered here (with and without a RUC and perhaps a third which can be shown to achieve the 2030

RESPONSE TO COMMENT 2-51

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment displays a figure showing the 2030 climate stabilization target compared to state mandates.

See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding the VMT reductions under the proposed Amendment compared to the approved Plan, as well as the new more severe and significant impacts in comparison to the approved Plan PEIR for years 2030, 2045, and 2050 under Impact GHG-5. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-52

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses climate stabilization. See Response to Comment 2-1 regarding GHG emission reduction mandates under SB 375and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-17 regarding GHG emissions impacts related to LDVs.

2-52 cont. requirement) cannot be shown to conform to such a Plan, then it must be assumed to be contributing to climate destabilization.

Critical Information for Any Regional Transportation Plan (RTP)

2-53 Many of the fatal errors of Chapter 1, and the 2021 RTP/EIR in general, can be attributed to the RTP not accounting for the parameters of humanity's Code Red Climate Emergency, as if those parameters play no role in writing an EIR for the 2021 Regional Transportation Plan, with or without the RUC.

At the front of any 2021 RTP's EIR, the information shown in Figures 4 through 7 should be included and accounted for.

Figure 4 shows the climate-stabilizing target for 2030. Figure 5 shows the rise of the world's atmospheric CO2 over the last 50 years.

2-54 Figure 6 shows both the

- atmospheric temperature (averaged over a year and averaged over the earth, derived from an isotope analysis) and
- atmospheric CO2 (from air bubbles in ice-core samples),

over 800,000 years. It could be noted that our species is only around 300,000 years old.

2-55 Figure 6 shows that when climate deniers say that climate is always changing and so therefore climate change is natural, they are correct, except for one important fact. There is nothing natural about the outrageous, recent run-up of atmospheric CO2, to over 420 PPM, in such a short time shown on the far-right side of Figure 6. The slope is so steep that it appears to be an instantaneous spike, on the far-right side of Figure 6.

2-56 Figure 7 shows just 1% (which is 1,000 years) of the distance on Figure 6, from current time to the first 100,000 years into the past. For Figure 7, the conventions have been switched: the red line is the earth's atmospheric CO2 and temperature is the blue line. Figure 7 shows that the CO2 spike is the result of our combustion of fossil fuels because its beginning coincides with the start of our industrial revolution. Figure 7 covers the time of the development of our civilization. It shows that everything was normal until about 150 years ago, which is the start of our industrial revolution, when we started to burn fossil fuels. By doing extensive calculations, we know how much CO2 we have produced from the combustion of fossil fuels. Then, by directly measuring the atmospheric CO2 and the acidity of the oceans, we know where that CO2 currently resides. We also know that atmospheric CO2 traps heat. There is no doubt that we have an Anthropogenic Global Warming (AGW) catastrophe in the making. We are living in a spike of CO2. Neither the magnitude nor the slope have occurred in millions of years. Achieving climate-stabilizing requirements (targets) is our only hope.

2-57 It should also be clearly stated that LDVs, by far, emit more GHG than any other category of emission. Electricity emits the 2nd most. However, there is a good chance that we can achieve the 2030 climate-stabilization requirement that is derived in Reference 3 and 5 (shown in Figure 4) for the category of electricity. Unfortunately,

RESPONSE TO COMMENT 2-53

This comment states that Chapter 1 of the previously approved Plan and its PEIR do not account for the Code Red Climate Emergency parameters. This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. As such, no further response is required.

RESPONSE TO COMMENT 2-54

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment suggests four figures (Figures 4 through 7 in the attached references provided in Appendix F.3) to include in the Draft SEIR: a comparison of the 2030 climate stabilization target to state mandates, the atmospheric CO2 levels over recent decades, atmospheric CO2 and mean temperature over the last 800,000 years, and atmospheric CO2 and mean temperature over the last 1,000 years. The approved Plan PEIR included information on atmospheric CO2 from pre-industrial concentrations to current concentrations as well as predicted annual average temperature increases in Section 4.8, *Greenhouse Gas Emissions*. Appendix C, Climate Change Projections, Impacts, and Adaptation, of the approved Plan PEIR describes how climate may change in the San Diego region in the future due to the effects of global warming, and how those changes could affect each of the resource areas discussed in the approved Plan PEIR. Individual sections of the approved Plan PEIR and this SEIR evaluate whether the approved Plan and proposed Amendment, respectively, would exacerbate a climate change impact. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-55

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses Figure 6 included in the Comment Letter's attached references provided in Appendix F.3. See Response to Comment 2-54 for more information regarding Figures 4 through 7.

RESPONSE TO COMMENT 2-56

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses Figure 7 included in the Comment Letter's attached references provided in Appendix F.3. See Response to Comment 2-54 for more information regarding Figures 4 through 7.

RESPONSE TO COMMENT 2-57

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the role of LDVs in reducing GHG emissions. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

2-57 cont. that cannot be said for LDVs. The implementation of the plan specified in Reference 3, or some other similar plan, is our only hope, for LDVs.

Figure 5 Atmospheric CO2, Increasing Over Recent Decades

2-58

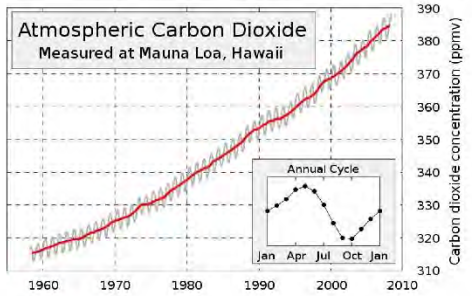
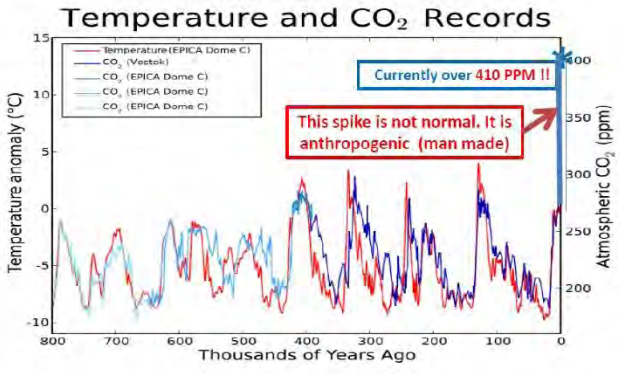


Figure 6 Atmospheric CO2 and Mean Temperature, from 800,000 Years Ago, with Current CO2 Spike

2-59



RESPONSE TO COMMENT 2-58

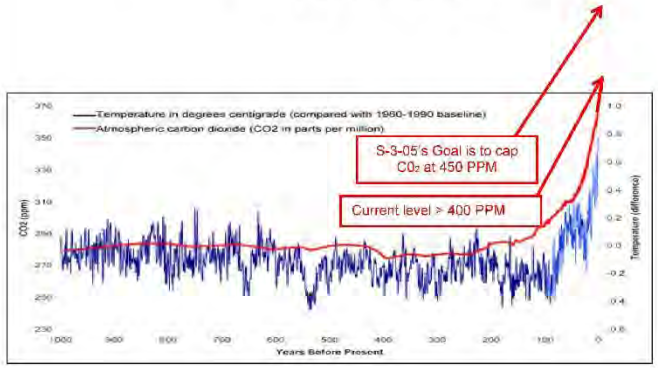
This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses Figure 5: Atmospheric CO2, Increasing Over Recent Decades included in the Comment Letter's attached references provided in Appendix F.3. See Response to Comment 2-54 for more information regarding Figures 4 through 7.

RESPONSE TO COMMENT 2-59

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses Figure 6: Atmospheric CO2 and Mean Temperature, from 800,000 years ago, with Current CO2 Spike, included in the Comment Letter's attached references provided in Appendix F.3. See Response to Comment 2-54 for more information regarding Figures 4 through 7.

2-60

Figure 7 **Atmospheric CO2 and Mean Temperature, Over the Last 1,000 Years**



Measures to Reduce 2030 Driving

2-61 The 2030 climate-stabilizing requirement that is shown above in Figure 4 and is described repeatedly in this letter can be achieved by LDVs. To do that requires using a set of aggressive, fleet-efficiency mitigation measures, that are defined in Reference 3, and a set of driving-reduction mitigation measures, that are identified in Table 2 and described in Reference 3.

The first line of Table 2, "Legislated (SB 375) Plans to Reduce Driving" reflects an assumption that the RTPs in California, which are often required to achieve around 19% by 2035, will achieve 12% by 2030.

2-62 The second line of Table 2 is a well-done RUC. SANDAG's 2025 RTP should include a state RUC that replaces the state gas tax, is means based, and has the other characteristics that are shown in Reference 1.

2-63 The third line of Table 2 is a measure that SANDAG could implement for its own employees, using a third-party vendor that will then work hard to earn the trust of SANDAG employees, so that the vendor can cite that trust and use it to sell the car-parking system to other employers that want to do the best they can for their employees and want to be recognized for their commitment to sustainability. The car parking system would unbundle the cost of parking with a fully automated car parking system that provides earnings to those that are losing money because the parking is being provided or to those for whom the parking is built. The same car parking system

RESPONSE TO COMMENT 2-60

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses Figure 7: Atmospheric CO2 and Mean Temperature, Over the Last 1,000 Years, included in the Comment Letter's attached references provided in Appendix F.3. See Response to Comment 2-54 for more information regarding Figures 4 through 7.

RESPONSE TO COMMENT 2-61

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses the role of LDVs in reducing GHG emissions. As discussed in Response to Comment 2-3, GHG emissions mitigation measures identified in the approved Plan PEIR would still be applicable to the proposed Amendment. Mitigation Measure TRA-2 includes minor updates resulting in further reductions in project level VMT compared to the approved Plan PEIR. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-17 regarding GHG emissions impacts related to LDVs.

RESPONSE TO COMMENT 2-62

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment suggests that a state road usage charge should be added to the 2025 Regional Plan. The proposed state road usage charge is entirely separate from the regional road usage charge. The Amendment removes the regional road usage charge from the approved Plan but has no impact on the proposed state road usage charge, which is outside of SANDAG's authority. See Response to Comment 2-11 regarding the ongoing collaborative development of the goals, policies, and mitigation measures for the 2025 Regional Plan.

RESPONSE TO COMMENT 2-63

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment offers suggestions for the parking management system, including the use of a third-party vendor to run a parking system for SANDAG employees which unbundles the cost of parking. SANDAG does not currently implement this type of parking system for SANDAG employees. See Response to Comment 2-4 regarding regional parking management policies.

works for all types of parking, although the algorithms that compute earning differ by type, such as on-street, and the various categories of off-street such as employee parking, parking at apartments, parking at shopping centers, parking at mixed use developments, parking at transit station, parking at big box stores and grocery stores, and so on. The parking system is fully described in References 7 and 8.

Table 2 Enforceable Measures to Reduce 2030 Per Capita Driving By 32% With Respect to 2005 Per Capita Driving

2-63 cont.

California designs and implements this

Local governments do this with a 3rd party vendor

Driving-Reduction Requirments	Per-Cent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Value-Priced Parking (Unbundling the Cost)	8%	0.92
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
Pay-to-Graduate Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		**0.68**
% Reduction		**32%**

2-64 Reference 7 defines Table 2's 3rd line's Value-Priced, car-parking system for all types of parking and even includes a congestion-pricing algorithm. Reference 8 describes the system with an emphasis on employee car parking and how the system could earn extra money for all employees. Reference 9 is a Draft *Requirements Document* that would support an RFP process to identify the best 3rd party vendor to design, install, and operate the car-parking system. The selected 3rd party vendor would also be good at financing, building, and operating solar canopies; selling electricity to energy districts; and financing, building, and operating charging stations. These tasks need to be added to Reference 9. SANDAG and other MPOs need to lobby California to identify a vendor to design and implement such a system, ASAP. SANDAG and our municipal governments could have a vendor do this for their employees. The technology is ready. The Executive Director of ACE Parking has reviewed the parking system described in References 7 and 8. Reference 10 documents that he interested in providing this solution.

Consideration of the EIR for the 2021 RTP

2-65 If the SEIR is going to be "adequate", it must correct the errors in the EIR that it is building on, before considering the change. This section presents some of the problems with the EIR for the 2021 RTP.

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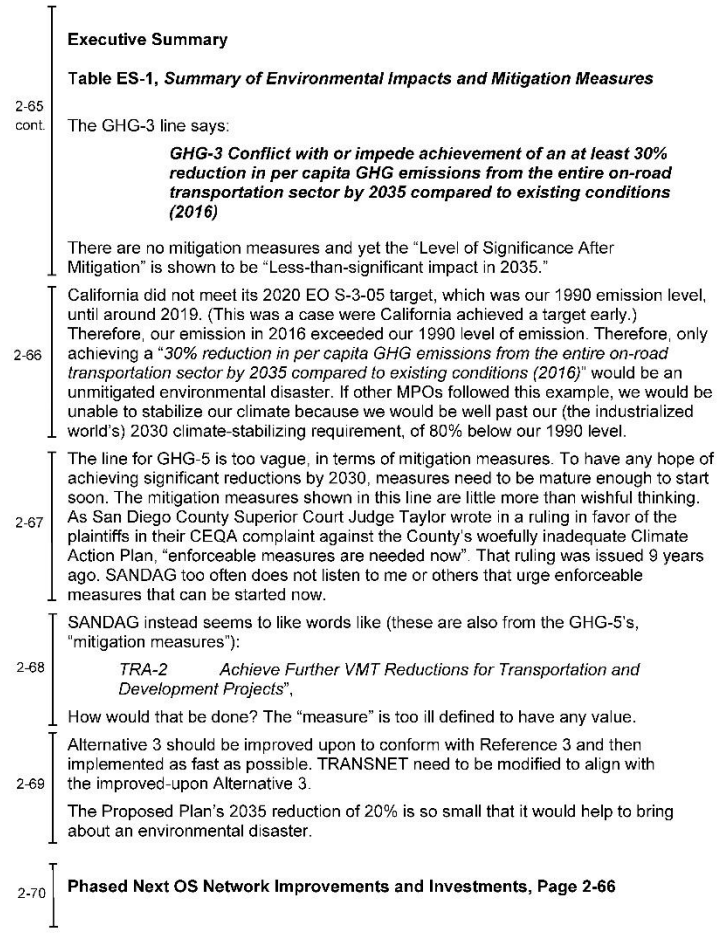
RESPONSE TO COMMENT 2-64

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment offers suggestions for the parking management system, including a value-priced car parking system which includes a congestion-pricing algorithm. SANDAG does not currently employ a third-party vendor to implement such a system. See Response to Comment 2-4 regarding regional parking management policies.

RESPONSE TO COMMENT 2-65

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to the approved Plan PEIR. As discussed under Impact GHG-3 in Section 4.3.4 of Chapter 4.3, *Greenhouse Gas Emissions*, of this Draft SEIR, the approved Plan PEIR identified that Impact GHG-3 in the year 2035 would be less than significant. As shown in Table 4.3-9, by 2035, the proposed Amendment would reduce GHG emissions by 43 percent compared to the 2016 baseline, exceeding the SANDAG Board Resolution target of a 30 percent reduction by 2035. Therefore, implementation of the proposed Amendment would not conflict with or impede achievement of at least 30 percent reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016).



Executive Summary

Table ES-1, *Summary of Environmental Impacts and Mitigation Measures*

2-65 cont. The GHG-3 line says:

> ***GHG-3 Conflict with or impede achievement of an at least 30% reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016)***

There are no mitigation measures and yet the "Level of Significance After Mitigation" is shown to be "Less-than-significant impact in 2035."

2-66 California did not meet its 2020 EO S-3-05 target, which was our 1990 emission level, until around 2019. (This was a case were California achieved a target early.) Therefore, our emission in 2016 exceeded our 1990 level of emission. Therefore, only achieving a "*30% reduction in per capita GHG emissions from the entire on-road transportation sector by 2035 compared to existing conditions (2016)*" would be an unmitigated environmental disaster. If other MPOs followed this example, we would be unable to stabilize our climate because we would be well past our (the industrialized world's) 2030 climate-stabilizing requirement, of 80% below our 1990 level.

2-67 The line for GHG-5 is too vague, in terms of mitigation measures. To have any hope of achieving significant reductions by 2030, measures need to be mature enough to start soon. The mitigation measures shown in this line are little more than wishful thinking. As San Diego County Superior Court Judge Taylor wrote in a ruling in favor of the plaintiffs in their CEQA complaint against the County's woefully inadequate Climate Action Plan, "enforceable measures are needed now". That ruling was issued 9 years ago. SANDAG too often does not listen to me or others that urge enforceable measures that can be started now.

2-68 SANDAG instead seems to like words like (these are also from the GHG-5's, "mitigation measures"):

> *TRA-2 Achieve Further VMT Reductions for Transportation and Development Projects*",

How would that be done? The "measure" is too ill defined to have any value.

2-69 Alternative 3 should be improved upon to conform with Reference 3 and then implemented as fast as possible. TRANSNET need to be modified to align with the improved-upon Alternative 3.

The Proposed Plan's 2035 reduction of 20% is so small that it would help to bring about an environmental disaster.

2-70 **Phased Next OS Network Improvements and Investments, Page 2-66**

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RESPONSE TO COMMENT 2-66

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment discusses CARB's GHG emission reduction targets and EO S-3-05. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding the new more severe and significant impacts in comparison to the approved Plan PEIR for years 2030, 2045, and 2050 under Impact GHG-5, and climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-67

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to the approved Plan PEIR. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding the new more severe and significant impacts in comparison to the approved Plan PEIR for years 2030, 2045, and 2050 under Impact GHG-5, as well as the changes to Mitigation Measure TRA-2 to reduce VMT under the proposed Amendment.

RESPONSE TO COMMENT 2-68

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Mitigation Measure TRA-2 under the approved Plan PEIR. See Response to Comment 2-3 regarding the changes to Mitigation Measure TRA-2 to reduce VMT under the proposed Amendment.

RESPONSE TO COMMENT 2-69

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Alternative 3: All Growth in Mobility Hubs and More Progressive Value Pricing and User Fee Policies as proposed under the approved Plan PEIR. Alternative 3 was determined to be the environmentally superior alternative under the approved Plan PEIR but

was not adopted by the SANDAG Board of Directors for the reasons stated in the Statement of Overriding Considerations and Findings adopted in December 2021.

RESPONSE TO COMMENT 2-70

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment offers suggestions for the parking management system in regard to climate stabilization. See Response to Comment 2-4 regarding regional parking management policies.

Considering our 2030 climate-stabilization target and the derivations of Reference 3, the car-parking system described in References 7 through 9 needs to have numerous successful implementations and be well on the way to being widely implemented by 2025. The words "dynamic curb management", for 2035, is not encouraging. The car-parking system proposed by this letter and since 2010 by this author certainly includes dynamic curb management. However, SANDAG needs to reach out to get help on this important aspect of the Next OS. I hope we can meet soon.

2-70 cont.

Likewise, on Pages 2-66 to 2-67 and on Page 2-71 to 2-72, there are hopeful signs that SANDAG could help to foster the changes we need. I would love to meet to discuss these topics.

Climate Change Destabilization Could Include our Weather

Page 3-1 has a description of our current climate and how climate change could change our weather. It needs a statement that destabilization of climate systems (such as the melting of our permafrost or unleashing large amounts of methane from beneath our artic region, or burning up an enormous expanse of forests, including our Amazon rain forest) could cause much larger variations if these destabilizing systems accelerate and set off other climate-destabilizing systems. The freeze experienced by Texas and measurement of 120 Degrees in Canada show that, when it comes to climate, we are already in uncharted territory. The description of San Diego County's "current climate" needs a statement that, given the fact that our atmospheric CO2 is at 420 PPM, when it should be at 280 PPM, we really don't know what might be possible, in terms of current weather.

2-71

Mitigation Measures for *Existing* Development

On Page 4-3, it says, "The EIR includes three broad types of mitigation measures: (1) plan- and policy-level mitigation measures assigned to SANDAG; (2) mitigation measures for transportation network improvements and programs, assigned to SANDAG and other transportation project sponsors; and (3) mitigation measures for development projects implementing regional growth and land use changes, which local jurisdictions implement."

2-72

This will be too little too late, and it is an arbitrary decision to do what is easiest. It does not make sense, given the fact of our Code Red Climate Emergency, as explained in this letter. For example, TDM (Transportation Demand Management) Ordinances need to apply to *existing* developments. SANDAG should provide no help to municipal governments that fail to have a powerful TDM plan for their own employees, to set an example, for other employers. The TDM would include the car-parking system described in Reference 7 through 9. SANDAG should do this for their own employees, ASAP, using Reference 9 to start the generation of a Systems Definition document to support an RFP process to identify a good 3rd party vendor.

4.8's Paragraph on "Global Climate Change"

2-73

This paragraph needs to quantify what we have done to our earth's atmospheric level of CO2_e. We should be at 280 PPM. We are at 420 PPM. This letter's Figures 5, 6,

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RESPONSE TO COMMENT 2-71

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. The approved Plan PEIR included information on atmospheric CO2 from pre-industrial concentrations to current concentrations as well as predicted annual average temperature increases in Section 4.8, *Greenhouse Gas Emissions*. Appendix C, Climate Change Projections, Impacts, and Adaptation, of the approved Plan PEIR describes how climate may change in the San Diego region in the future due to the effects of global warming, and how those changes could affect each of the resource areas discussed in the approved Plan PEIR.

Individual sections of the approved Plan PEIR and this SEIR evaluate whether the approved Plan and proposed Amendment, respectively, would exacerbate a climate change impact. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-72

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to page 4-3 of the approved Plan PEIR. The commenter is requesting mitigation measures (i.e., Transportation Demand Management (TDM) Ordinances) apply to existing developments. Please note that CEQA addresses the significant impacts of proposed projects not existing development. SANDAG's Sustainable Transportation Services program, formerly known as iCommute, is the TDM program for the San Diego region. Response to Comment 2-3 regarding the changes to Mitigation Measure TRA-2 to reduce VMT under the proposed Amendment. See Response to Comment 2-4 regarding regional parking management policies.

RESPONSE TO COMMENT 2-73

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Section 4.8 of the approved Plan PEIR. The approved Plan PEIR included information on atmospheric CO2 from pre-industrial concentrations to current concentrations as well as

predicted annual average temperature increases in Section 4.8, *Greenhouse Gas Emissions*. Appendix C, Climate Change Projections, Impacts, and Adaptation, of the approved Plan PEIR describes how climate may change in the San Diego region in the future due to the effects of global warming, and how those changes could affect each of the resource areas discussed in the approved Plan PEIR. Individual sections of the approved Plan PEIR and this SEIR evaluate whether the approved Plan and proposed Amendment, respectively, would exacerbate a climate change impact. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-54 for more information regarding Figures 4 through 7.

and 7 should be included. The text should make it clear that we are living in a dangerous CO2 spike.

2-73 cont.

The paragraph should make the difference between climate change (before the spike) and Anthropogenic climate change (within the spike) clear to the reader.

2-74 Thank you for including the 280 PPM and 413 PPM (in 2020) levels in the paragraph on Carbon Dioxide. This needs to be elevated to the first paragraph with the plots. The plot of 800,000 years, showing how outrageous it is that we have created the spike of CO2, needs to be shown.

2-75 The discussion at the top of Page 4.8-6 should introduce the reader to the concept of "destabilization" or going over a "climate tipping point" or a "climate cliff." It is a lie by omission to not state that we are in line to experience a devastating collapse of the human population, leading to extinction. Our Code Red Climate Emergency should not be hidden. We are in great danger. Some say climate change is an existential threat. In fact, it is a near certainty that anthropogenic climate change will end our existence. Theoretically we could still stabilize the climate at a livable level. We should not give up. However, given what is needed by 2030, along with the public's general disinterest in the details, it is highly unlikely we will avoid climate destabilization, and this will lead to our demise.

Section 4.8: Greenhouse Gas Emissions

4.8.4 Significance

CEQA's Appendix G asks as follows:

2-76

VII. GREENHOUSE GAS EMISSIONS. Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Considering cumulative effects of the proposed RTP, the answer is yes, especially for LDVs. The next question about conflicting with an applicable plan does not matter, given the result of the "letter a" criterion.

Section XVII also applies because it explicitly mentions cumulative impacts and asks:

> c) *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

2-77 Nothing short of a full exchange of nuclear weapons could be worse for people than climate destabilization.

From OPR's Reference 9 with emphasis added:

> Each public agency that serves as a CEQA lead agency should develop its own approach to performing a climate change analysis for projects that generate greenhouse gas emissions. A consistent approach should be applied for the analysis of projects, and the analysis must keep pace

RESPONSE TO COMMENT 2-74

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Section 4.8 of the approved Plan PEIR. The approved Plan PEIR included information on atmospheric CO2 from pre-industrial concentrations to current concentrations as well as predicted annual average temperature increases in Section 4.8, *Greenhouse Gas Emissions*. Appendix C, Climate Change Projections, Impacts, and Adaptation, of the approved Plan PEIR describes how climate may change in the San Diego region in the future due to the effects of global warming, and how those changes could affect each of the resource areas discussed in the approved Plan PEIR. Individual sections of the approved Plan PEIR and this SEIR evaluate whether the approved Plan and proposed Amendment, respectively, would exacerbate a climate change impact. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-75

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Section 4.8 of the approved Plan PEIR. The approved Plan PEIR included information on atmospheric CO2 from pre-industrial concentrations to current concentrations as well as predicted annual average temperature increases in Section 4.8, *Greenhouse Gas Emissions*. Appendix C, Climate Change Projections, Impacts, and Adaptation, of the approved Plan PEIR describes how climate may change in the San Diego region in the future due to the effects of global warming, and how those changes could affect each of the resource areas discussed in the approved Plan PEIR. Individual sections of the approved Plan PEIR and this SEIR evaluate whether the approved Plan and proposed Amendment, respectively, would exacerbate a climate change impact. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-76

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to CEQA Appendix G Threshold VII a) *Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.* See Response to Comment 2-16 regarding cumulative impacts of the proposed Amendment. See Response to Comment 2-17 regarding GHG emissions impacts related to LDVs.

RESPONSE TO COMMENT 2-77

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to CEQA Appendix G Threshold XVII c) *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly.* See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-16 regarding cumulative impacts of the proposed Amendment. See Response to Comment 2-17 regarding GHG Emissions impacts related to LDVs.

2-77 cont.

with scientific knowledge and regulatory schemes. (*Cleveland National Forest Foundation v. San Diego Assn. of Governments*, *supra*, 3 Cal.5th at 519.) For these projects, compliance with CEQA entails three basic steps: identify and quantify the greenhouse gas emissions; determine the significance of those emissions **in the context of climate change**; and if the impact is found to be significant, identify alternatives and/or mitigation measures that will reduce the impact below significance.

"In the context of climate change" means that the climate science must be applied to the situation. From that, to be legal, a project that will have significant impacts on driving, including its feasible (technologically possible and cost effective) mitigation measures, must conform to a plan showing how LDVs can achieve our climate-stabilizing targets, especially our 2030 target because it occurs so soon. This again shows the importance of Reference 3 or some other such Plan.

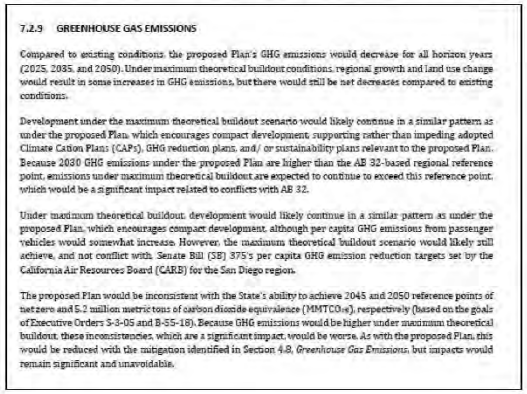
2-78 Thank you for Tables 4.8-7 and 4.8-8 showing the importance of reducing VMT.

2-79 Table 4.8-9 is key. However, its results are insufficient to support climate stabilization. Reference 3 shows we need a 32% value by 2030, which is 5 years sooner than 2035.

Figure 8 shows that the DEIR does not consider what the climate scientists are telling us, which is what we must achieve to stabilize the climate at a livable level. The state mandates shown are not enough to achieve our 2030 climate-stabilizing requirement, which is to emit at a level that is no more than 80% below our 1990 emission level.

Figure 8 SANDAG's DEIR Section on GHG Does Not Consider Achieving the Industrial World's 2030 Climate-Stabilizing Target.

2-80



7.2.9 GREENHOUSE GAS EMISSIONS

Compared to existing conditions, the proposed Plan's GHG emissions would decrease for all horizon years (2025, 2035, and 2050). Under maximum theoretical buildout conditions, regional growth and land use change would result in some increases in GHG emissions, but there would still be net decreases compared to existing conditions.

Development under the maximum theoretical buildout scenario would likely continue in a similar pattern as under the proposed Plan, which encourages compact development, supporting rather than impeding adopted Climate Action Plans (CAPs), GHG reduction plans, and/ or sustainability plans relevant to the proposed Plan. Because 2050 GHG emissions under the proposed Plan are higher than the AB 32-based regional reference point, emissions under maximum theoretical buildout are expected to continue to exceed this reference point, which would be a significant impact related to conflicts with AB 32.

Under maximum theoretical buildout, development would likely continue in a similar pattern as under the proposed Plan, which encourages compact development, although per capita GHG emissions from passenger vehicles would somewhat increase. However, the maximum theoretical buildout scenario would likely still achieve, and not conflict with, Senate Bill (SB) 375's per capita GHG emission reduction targets set by the California Air Resources Board (CARB) for the San Diego region.

The proposed Plan would be inconsistent with the State's ability to achieve 2045 and 2050 reference points of net zero and 5.2 million metric tons of carbon dioxide equivalence ($MMTCO_2e$), respectively (based on the goals of Executive Orders S-3-05 and B-55-18). Because GHG emissions would be higher under maximum theoretical buildout, these inconsistencies, which are a significant impact, would be worse. As with the proposed Plan, this would be reduced with the mitigation identified in Section 4.8, *Greenhouse Gas Emissions*, but impacts would remain significant and unavoidable.

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RESPONSE TO COMMENT 2-78

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Tables 4.8-7 and 4.8-8 of the approved Plan PEIR.

RESPONSE TO COMMENT 2-79

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Table 4.8-9 of the approved Plan PEIR. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-80

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Section 7.2.9 of the approved Plan PEIR. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

2-81 The second paragraph states that the 2030 emissions under the proposed Plan are higher than the AB 32-based regional reference point. Figure 4 of this letter shows that this means the 2030 value is worse than the SB 32 value (40% down from the 1990 value) which is much more emission than the climate-stabilizing value of 80% down.

CARB Scoping Plan Comments Regarding the Need to Reduce VMT More Than Specified in SB 375 and The Need for a RUC

The following statements are from the recently completed CARB Scoping Plan https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf . They show that it is very ill-advised to remove the RUC from the 2021 RTP because, as shown in Reference 3, it is critical that we reduce VMT.

Footnotes have been deleted; highlights and notes have been added

Vehicle Miles Traveled

Transforming the transportation sector goes beyond phasing out combustion technology and producing cleaner fuels. Managing total demand for transportation energy by reducing the miles people need to drive, daily, is also critical as the state aims for a sustainable transportation sector in a carbon neutral economy. Though GHG emissions are declining due to cleaner vehicles and fuels, rising VMT can offset the effective benefits of adopted regulations. Even under full implementation of Executive Order N-79-20 and CARB's Advanced Clean Cars II Regulations, with 100 percent ZEV sales in the light-duty vehicle sector by 2035, a significant portion of passenger vehicles will still rely on ICE technology, as demonstrated in Figure 4-2 above. Accordingly, VMT reductions will play an indispensable role [Bullock's note: Reference 3 shows that the per-capita reduction in VMT, with respect to 2005, the SB 375 reference year, is 32%! Note that our population in 2030 will be considerably more than it was in 2005. We have wasted a lot of money on freeway expansion and have more lanes than we had back in 2005.] in reducing overall transportation energy demand and achieving the state's climate, air quality, and equity goals. [Bullock's note: I wonder if climate stabilization plays a role in setting these "goals". In other words, is human survival valued by CARB?] After a significant pandemic-induced reduction in VMT during 2020, passenger VMT has steadily climbed back up and is now closing in on pre-pandemic levels. Driving alone with no passengers remains the primary mode of travel in California, amounting to 75 percent of the mode share for daily commute trips. Conversely, the transit industry, which was significantly impacted during the lockdown months, and has struggled to recover; ridership only averages two-thirds of pre-pandemic levels, and service levels also lag behind. Sustained VMT reductions have been difficult to achieve for much of the past

2-82

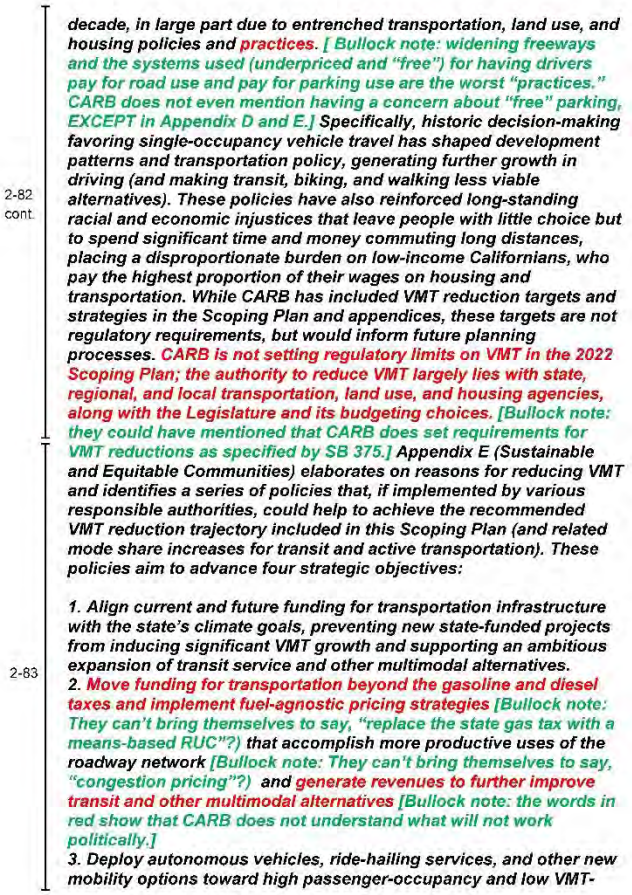
Comments on SANDAG's NOP of a SEIR for the RTP 2021 22 of 29

RESPONSE TO COMMENT 2-81

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Section 7.2.9 of the approved Plan PEIR. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process.

RESPONSE TO COMMENT 2-82

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to the 2022 CARB Scoping Plan. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-2 regarding mileage-based fee pilots under the 2022 CARB Scoping Plan. See Response to Comment 2-3 in regard to mitigation measures to reduce regional GHG emissions by reducing VMT under this Draft SEIR.



decade, in large part due to entrenched transportation, land use, and housing policies and practices. [Bullock note: widening freeways and the systems used (underpriced and "free") for having drivers pay for road use and pay for parking use are the worst "practices." CARB does not even mention having a concern about "free" parking, EXCEPT in Appendix D and E.] Specifically, historic decision-making favoring single-occupancy vehicle travel has shaped development patterns and transportation policy, generating further growth in driving (and making transit, biking, and walking less viable alternatives). These policies have also reinforced long-standing racial and economic injustices that leave people with little choice but to spend significant time and money commuting long distances, placing a disproportionate burden on low-income Californians, who pay the highest proportion of their wages on housing and transportation. While CARB has included VMT reduction targets and strategies in the Scoping Plan and appendices, these targets are not regulatory requirements, but would inform future planning processes. CARB is not setting regulatory limits on VMT in the 2022 Scoping Plan; the authority to reduce VMT largely lies with state, regional, and local transportation, land use, and housing agencies, along with the Legislature and its budgeting choices. [Bullock note: they could have mentioned that CARB does set requirements for VMT reductions as specified by SB 375.] Appendix E (Sustainable and Equitable Communities) elaborates on reasons for reducing VMT and identifies a series of policies that, if implemented by various responsible authorities, could help to achieve the recommended VMT reduction trajectory included in this Scoping Plan (and related mode share increases for transit and active transportation). These policies aim to advance four strategic objectives:

1. Align current and future funding for transportation infrastructure with the state's climate goals, preventing new state-funded projects from inducing significant VMT growth and supporting an ambitious expansion of transit service and other multimodal alternatives.
2. Move funding for transportation beyond the gasoline and diesel taxes and implement fuel-agnostic pricing strategies [Bullock note: They can't bring themselves to say, "replace the state gas tax with a means-based RUC"?) that accomplish more productive uses of the roadway network [Bullock note: They can't bring themselves to say, "congestion pricing"?) and generate revenues to further improve transit and other multimodal alternatives [Bullock note: the words in red show that CARB does not understand what will not work politically.]
3. Deploy autonomous vehicles, ride-hailing services, and other new mobility options toward high passenger-occupancy and low VMT-

2-82 cont.

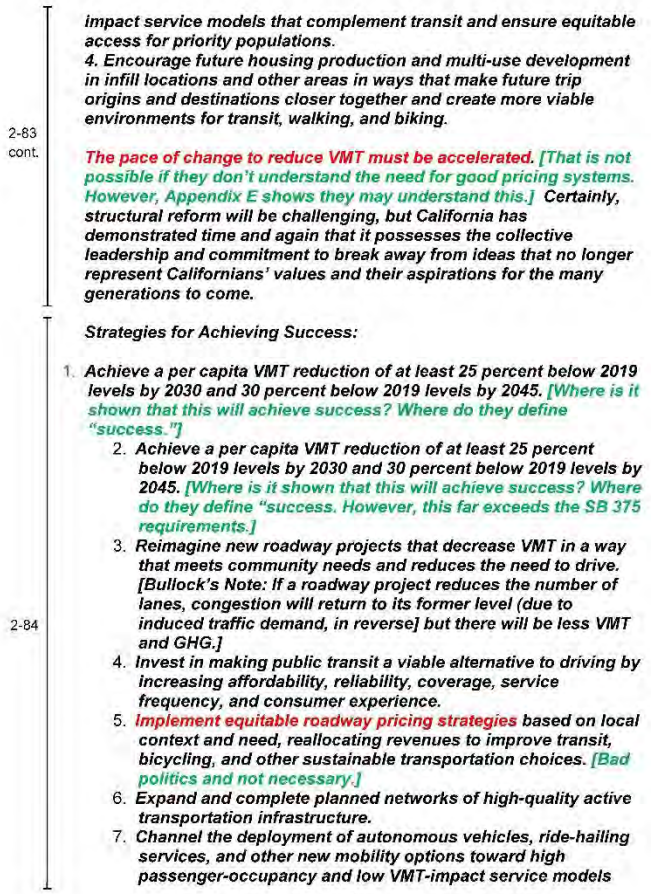
2-83

Comments on SANDAG's NOP of a SEIR for the RTP 2021 23 of 29

RESPONSE TO COMMENT 2-83

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to the 2022 CARB Scoping Plan. Under the 2022 CARB Scoping Plan, mileage-based fee pilots in the State are to be completed by 2025. The proposed state road usage charge is entirely separate from the regional road usage charge.

The Amendment removes the regional road usage charge from the approved Plan but has no impact on the proposed state road usage charge, which is outside of SANDAG's authority. The approved Plan assumes the San Diego region will receive future revenues resulting from a state-administered road usage charge, which is still in the pilot program phase. Discussion of the state-administered road usage charge remains unchanged from the approved Plan. The proposed Amendment assumes a state road usage charge of 0.7 cents ($2020) starting in 2030 and increasing to 1.2 cents by 2050 to cover the funding gap created as fuel taxes diminish over time due to greater fuel efficiency and a shift to zero emission vehicles. The State has not released a start date for the state road usage charge; however, 2030 is consistent with the assumption made by other California MPOs. See Response to Comment 2-2 regarding mileage-based fee pilots under the 2022 CARB Scoping Plan. See Response to Comment 2-3 regarding mitigation measures to reduce regional GHG emissions by reducing VMT under this Draft SEIR.



impact service models that complement transit and ensure equitable access for priority populations.
4. Encourage future housing production and multi-use development in infill locations and other areas in ways that make future trip origins and destinations closer together and create more viable environments for transit, walking, and biking.

2-83 cont.

The pace of change to reduce VMT must be accelerated.** [That is not possible if they don't understand the need for good pricing systems. However, Appendix E shows they may understand this.] **Certainly, structural reform will be challenging, but California has demonstrated time and again that it possesses the collective leadership and commitment to break away from ideas that no longer represent Californians' values and their aspirations for the many generations to come.

Strategies for Achieving Success:

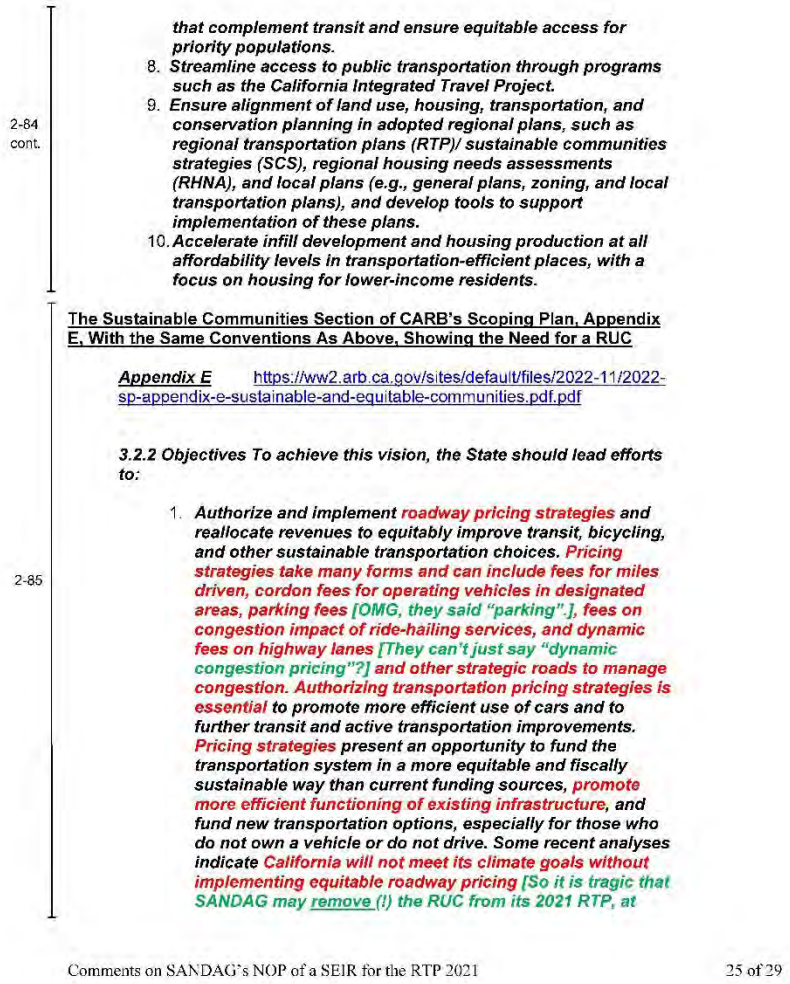
1. ***Achieve a per capita VMT reduction of at least 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045.** [Where is it shown that this will achieve success? Where do they define "success."]*
2. ***Achieve a per capita VMT reduction of at least 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045.** [Where is it shown that this will achieve success? Where do they define "success. However, this far exceeds the SB 375 requirements.]*
3. ***Reimagine new roadway projects that decrease VMT in a way that meets community needs and reduces the need to drive. [Bullock's Note: If a roadway project reduces the number of lanes, congestion will return to its former level (due to induced traffic demand, in reverse] but there will be less VMT and GHG.]***
4. ***Invest in making public transit a viable alternative to driving by increasing affordability, reliability, coverage, service frequency, and consumer experience.***
5. ***Implement equitable roadway pricing strategies based on local context and need, reallocating revenues to improve transit, bicycling, and other sustainable transportation choices.** [Bad politics and not necessary.]*
6. ***Expand and complete planned networks of high-quality active transportation infrastructure.***
7. ***Channel the deployment of autonomous vehicles, ride-hailing services, and other new mobility options toward high passenger-occupancy and low VMT-impact service models***

2-84

Comments on SANDAG's NOP of a SEIR for the RTP 2021 24 of 29

RESPONSE TO COMMENT 2-84

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to the 2022 CARB Scoping Plan. See Response to Comment 2-2 regarding mileage-based fee pilots under the 2022 CARB Scoping Plan. See Response to Comment 2-3 in regard to mitigation measures to reduce regional GHG emissions by reducing VMT under this Draft SEIR.



2-84 cont.

that complement transit and ensure equitable access for priority populations.

8. *Streamline access to public transportation through programs such as the California Integrated Travel Project.*
9. *Ensure alignment of land use, housing, transportation, and conservation planning in adopted regional plans, such as regional transportation plans (RTP)/ sustainable communities strategies (SCS), regional housing needs assessments (RHNA), and local plans (e.g., general plans, zoning, and local transportation plans), and develop tools to support implementation of these plans.*
10. *Accelerate infill development and housing production at all affordability levels in transportation-efficient places, with a focus on housing for lower-income residents.*

The Sustainable Communities Section of CARB's Scoping Plan, Appendix E, With the Same Conventions As Above, Showing the Need for a RUC

Appendix E https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-e-sustainable-and-equitable-communities.pdf.pdf

3.2.2 Objectives To achieve this vision, the State should lead efforts to:

2-85

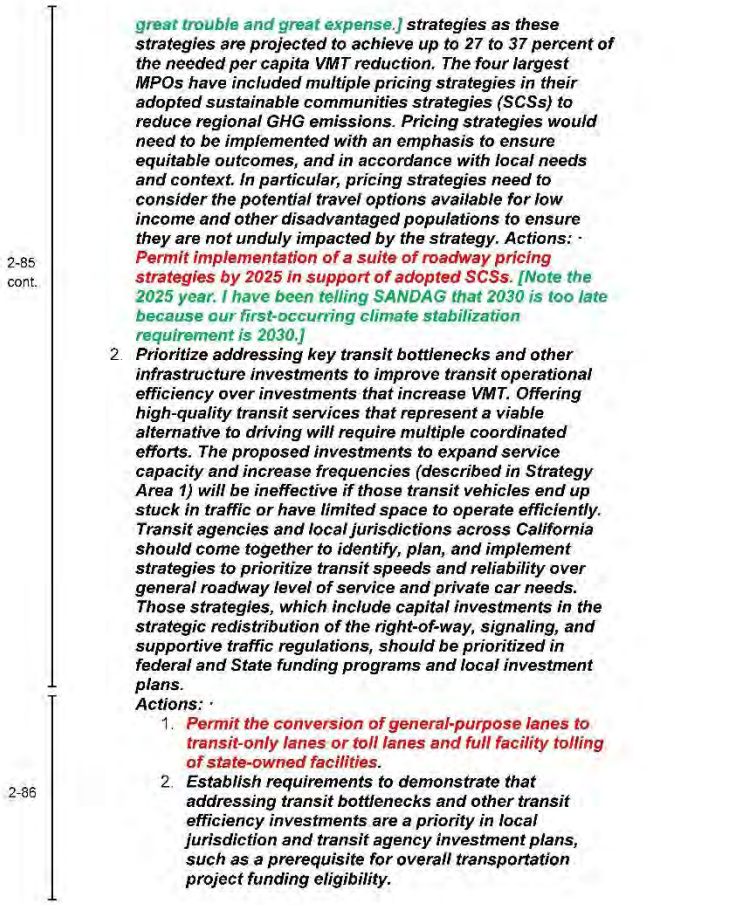
1. ***Authorize and implement roadway pricing strategies and reallocate revenues to equitably improve transit, bicycling, and other sustainable transportation choices. Pricing strategies take many forms and can include fees for miles driven, cordon fees for operating vehicles in designated areas, parking fees [OMG, they said "parking".], fees on congestion impact of ride-hailing services, and dynamic fees on highway lanes [They can't just say "dynamic congestion pricing"?] and other strategic roads to manage congestion. Authorizing transportation pricing strategies is essential to promote more efficient use of cars and to further transit and active transportation improvements. Pricing strategies present an opportunity to fund the transportation system in a more equitable and fiscally sustainable way than current funding sources, promote more efficient functioning of existing infrastructure, and fund new transportation options, especially for those who do not own a vehicle or do not drive. Some recent analyses indicate California will not meet its climate goals without implementing equitable roadway pricing [So it is tragic that SANDAG may remove (!) the RUC from its 2021 RTP, at***

Comments on SANDAG's NOP of a SEIR for the RTP 2021 25 of 29

RESPONSE TO COMMENT 2-85

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Appendix E: Sustainable and Equitable Communities of the 2022 CARB Scoping Plan. The proposed Amendment would remove the regional road usage charge from the approved Plan but would not impact any other parking management strategies included in the approved Plan. See Response to Comment 2-1 regarding SB 375 and CARB GHG emissions targets for 2020 and 2035 for SANDAG. See Response to Comment 2-2 regarding mileage-based fee pilots under the 2022 CARB Scoping Plan.

See Response to Comment 2-3 regarding climate stabilization and climate change requirements under the CEQA process. See Response to Comment 2-4 regarding regional parking management policies.



great trouble and great expense.] ***strategies as these strategies are projected to achieve up to 27 to 37 percent of the needed per capita VMT reduction. The four largest MPOs have included multiple pricing strategies in their adopted sustainable communities strategies (SCSs) to reduce regional GHG emissions. Pricing strategies would need to be implemented with an emphasis to ensure equitable outcomes, and in accordance with local needs and context. In particular, pricing strategies need to consider the potential travel options available for low income and other disadvantaged populations to ensure they are not unduly impacted by the strategy. Actions: ·***

2-85 cont.

Permit implementation of a suite of roadway pricing strategies by 2025 in support of adopted SCSs. [Note the 2025 year. I have been telling SANDAG that 2030 is too late because our first-occurring climate stabilization requirement is 2030.]

2. ***Prioritize addressing key transit bottlenecks and other infrastructure investments to improve transit operational efficiency over investments that increase VMT. Offering high-quality transit services that represent a viable alternative to driving will require multiple coordinated efforts. The proposed investments to expand service capacity and increase frequencies (described in Strategy Area 1) will be ineffective if those transit vehicles end up stuck in traffic or have limited space to operate efficiently. Transit agencies and local jurisdictions across California should come together to identify, plan, and implement strategies to prioritize transit speeds and reliability over general roadway level of service and private car needs. Those strategies, which include capital investments in the strategic redistribution of the right-of-way, signaling, and supportive traffic regulations, should be prioritized in federal and State funding programs and local investment plans.***

Actions: ·

1. ***Permit the conversion of general-purpose lanes to transit-only lanes or toll lanes and full facility tolling of state-owned facilities.***
2. ***Establish requirements to demonstrate that addressing transit bottlenecks and other transit efficiency investments are a priority in local jurisdiction and transit agency investment plans, such as a prerequisite for overall transportation project funding eligibility.***

2-86

Comments on SANDAG's NOP of a SEIR for the RTP 2021 26 of 29

RESPONSE TO COMMENT 2-86

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to Appendix E: Sustainable and Equitable Communities of the 2022 CARB Scoping Plan. The proposed Amendment would remove the regional road usage charge from the approved Plan but would not impact any other parking management strategies included in the approved Plan. See Response to Comment 2-4 regarding regional parking management policies.

3. ***Develop and implement a statewide transportation demand management (TDM) framework with VMT mitigation requirements for large employers and large developments.*** *The goal of TDM is to provide people with information, incentives, and other support programs that help them utilize sustainable transportation options such as transit, ridesharing, bicycling, and walking and rely less on cars. A strategic point of focus for TDM program implementation could be large employers (more than 100 employees), which often incentivize driving alone by offering free parking, gas stipends, and similar perks, and do not offer similar levels of support to employees to take transit, ride their bicycle, or walk. Employer-based TDM strategies are needed to achieve widespread implementation for the State to meet its climate goals, including commute trip reduction programs, ride-sharing programs, on-site bicycle facilities, vanpool and shuttle services, transit fare subsidies, and parking cash-out. [Note: parking cash-out is better than "free"; however, it is a half-baked idea. The system proposed in the San Diego County lawsuit against the County's CAP is a fully thought out system that the CEO of ACE parking would like to provide.] Another strategic point of focus for TDM programs could be large developments, particularly new ones, that through decisions such as their location, design, transportation, parking infrastructure, and their treatment and general interaction with their surrounding environment ingrain high or low VMT travel patterns for decades to come.*

2-86 cont.

Actions:

1. ***End the State's subsidies for employee parking*** *and take additional actions to move away from subsidizing public spaces for car parking more generally while expanding efforts to promote pedestrian, bicycle, and transit travel. As the State of California employs over 200,000 people, it can expand its TDM programs [This is what I have been telling CARB and others, for years.], which currently vary by agency and employee union.*
2. *Build on existing resources to further support the development and enforcement of local TDM ordinances and help begin developing a statewide TDM framework. ["Help begin"? No, we need to do this ASAP. The Climate Clock ticks!]*

2-87 **SANDAG Executive Director's Comments, Regarding RUC Removal**

RESPONSE TO COMMENT 2-87

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment is in regard to SANDAG Executive Director Ikhrata's comments provided *to The Voice of San Diego*. This comment has been noted.

2-87 cont. Executive Director Ikhrata is recognized as an expert in the field of transportation. What follows was provided by *The Voice of San Diego*, an on-line publication.

Morning Report: Ikhrata Says the State Isn't Serious About Climate if It Approves SANDAG Plan Without Driving Fee

SANDAG CEO Hasan Ikhrata said state regulators will tell him a lot when they decide whether a long-term transportation plan for San Diego can comply with California's environmental goals even if it doesn't include a controversial measure he's championed to charge drivers for every mile they drive.

The board of SANDAG has told him to strip the driving fee from the region's transportation plan. That plan would eventually need approval from the state's air resources board, certifying that it meets a requirement to slash greenhouse gas emissions.

2-88 *Ikhrata said if the state approves the plan without the fee, it's an indication that the state's climate change regulations are a fantasy.*

"I will be very happy because that would actually kind of clarify to me that this is not a serious discussion," he said. "I mean, let's face it. If the state wants to go that way, I'm willing to tell my colleagues at the state, 'Thank you. You clarified for me where you really stand.'"

Ikhrata made those comments in a new, long-form podcast interview with Voice of San Diego.

In the interview, he also said that he would probably not be interested in continuing to lead the agency if they adopt such a plan.

He also argued that any board member who claims to support climate change and transit but opposes a driving fee, or a similar alternative, isn't being serious.

"It's wishful thinking to think that you're going to have a plan that changes behavior and reduces greenhouse gas emissions for real, without a pricing mechanism," he said.

Listen to the full interview here.

2-89 **References**

The referenced documents were attached to the email sent with this letter. They are all available from Mike Bullock at mike_bullock@earthlink.net

Comments on SANDAG's NOP of a SEIR for the RTP 2021 28 of 29

RESPONSE TO COMMENT 2-88

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. This comment includes an excerpt from an article in *The Voice of San Diego*: "Morning Report: Ikhrata Says the State Isn't Serious About Climate if It Approves SANDAG Plan Without Driving Fee." This comment has been noted.

RESPONSE TO COMMENT 2-89

SANDAG has reviewed the attached reference documents and responded above to those Draft SEIR comments that cite or use information from these reference documents. No responses to the attachments specifically have been included because they do not contain comments specific to the SEIR and/or proposed Amendment. The attached references have been provided in Appendix F.3 of this SEIR.

In Closing

2-90 Thank you for your leadership in performing your critical work. Thank you for reading this material and for providing the comments and response as required for a comment letter on a DEIR, EIR, or NOP/Scoping letter. Please let me know if you would like to meet to discuss this letter or related topics.

Highest regards,

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054
760 421 9482

Former California Democratic Party Delegate, 76th Assembly District (author of 2 adopted resolutions and 5 Platform changes)
Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee (author of 5 adopted resolutions)

Final title before leaving Aerospace: ***Senior Staff Systems Engineer***

Air and Waste Management Association published and presented papers:
Author, ***The Development of California Light-Duty Vehicle (LDV) Requirements to Support Climate Stabilization: Fleet-Emission Rates & Per-Capita Driving***
Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***
Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

Quotes from the Secretary General of the UN:

1.) We have a Code Red Climate Emergency
2.) We are solidly on a path to an unlivable planet
3.) We are driving towards Climate Hell with our foot on the accelerator
4.) We are dangerously close to the point of no return

RESPONSE TO COMMENT 2-90

This comment letter was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. As such, no further response is required.

COMMENT LETTER 3: CARRIE CHAMBERS

Comment Letter 3

From: Carrie Chambers
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 9:42:30 AM

You don't often get email from carriechambers32@gmail.com. Learn why this is important

CAUTION: This email originated from outside of SANDAG. Do not click links or open attachments unless you are expecting the content.

3-1 I highly oppose the road user charge. It will have a negative financial effect for my family in these already expensive times.

Carrie Chambers

RESPONSE TO COMMENT 3-1

This comment expresses opposition to the road usage charge. The proposed Amendment removes the regional road usage charge from the approved Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

COMMENT LETTER 4: CITY OF CARLSBAD

Comment Letter 4

City of Carlsbad

August 28, 2023

SANAG Regional Plan SEIR
C/O Kirsten Uchitel, Associate Planner
San Diego Association of Governments
401 B Street, Suite 800
San Diego CA 92101
Via: RegionalPlanSEIR@sandag.org

RE: CITY OF CARLSBAD COMMENTS ON DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED AMENDMENT TO THE 2021 REGIONAL PLAN

Dear Ms. Uchitel:

4-1 The City of Carlsbad ("city") appreciates the opportunity to provide comments on the draft Supplemental Environmental Impact Report ("SEIR") for the proposed amendment to the 2021 Regional Plan ("Plan Amendment"). The SEIR is dated July 2023. The Regional Plan ("Plan") is an important plan for the region and will guide the next phase of growth for the member agencies of the San Diego Association of Governments ("SANDAG"), including the city. An effectively designed and implemented regional transportation plan would help ensure improved transportation options for area residents, businesses and other community members, as well as meaningful reductions in greenhouse gas ("GHG") emissions and improved quality of life as we grow our communities.

4-2 The California State Legislature created specific provisions to promote streamlining environmental review for certain types of projects. Determining in a particular situation whether it is appropriate to prepare a subsequent or supplemental EIR is a project-specific consideration, based on many factors. Pursuant to CEQA Guidelines section 15163(b), "[a] supplement to the EIR need only the information necessary to make the previous EIR adequate for the project as revised." CEQA Guidelines section 15163 provides, in pertinent part: "(a) The lead or responsible agency may choose to prepare a supplement to an EIR rather than a subsequent EIR if: (1) Any of the conditions described in Section 15162 would require the preparation of a subsequent EIR, and (2) Only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation. Thus, CEQA Guidelines section 15163 applies when an EIR can be made adequate by additions or changes that respond to a limited set of issues, whereas a subsequent EIR is necessary when the previous EIR must be rewritten from the ground up to make its environmental analysis adequate. For the reasons stated in this letter, a subsequent EIR or new EIR is appropriate. There is no support to proceed under CEQA's supplemental review provisions because the original environmental document does not retain informational value to the ongoing decision-making process. It is only logical that SANDAG start from the beginning under CEQA section 21151 by conducting an initial study to determine whether the project may have substantial effects on the environment. Failure to satisfy this CEQA obligation constitutes a prejudicial abuse of discretion, which is precisely what CEQA seeks to avoid, and it undermines the public's ability to obtain a fully informed evaluation of the project.

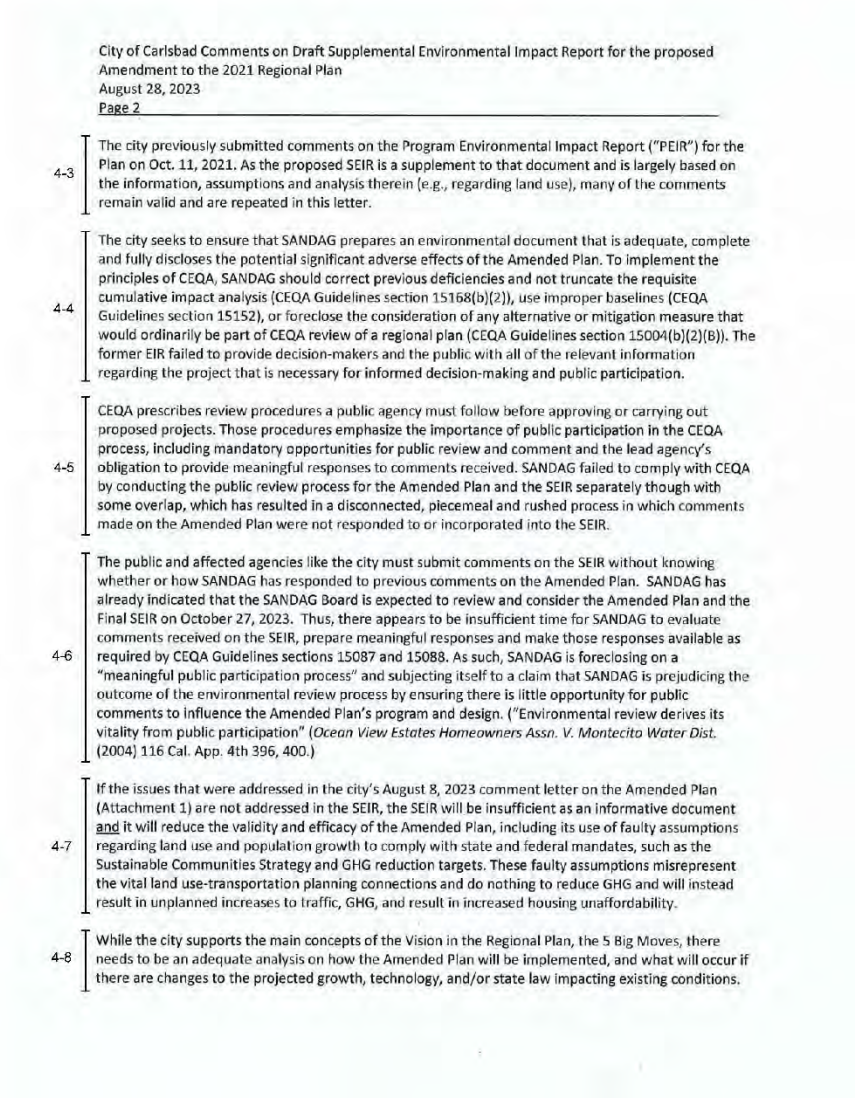
Transportation & Community Development Departments
1635 Faraday Avenue | Carlsbad, CA 92008 | 442-339-2600 t

RESPONSE TO COMMENT 4-1

This comment includes opening remarks and notes the importance of the approved Plan. No further response is required.

RESPONSE TO COMMENT 4-2

The basic purposes of the CEQA are to inform government decision makers and the public about potential significant environmental impacts of projects, identify ways the impacts can be reduced or avoided, prevent significant avoidable environmental damage through alternatives and mitigation, and disclose to the public the reason that decision makers approved a project that may result in unavoidable significant impacts. Under CEQA, a lead agency may choose to prepare a supplement to an EIR when substantial changes are proposed that may result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects, but only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation. Pursuant to CEQA Guidelines Section 15163, a supplement to an EIR "need contain only the information necessary to make the previous EIR adequate for the project as revised." Section 1, Introduction, includes a brief discussion explaining why the impacts on 14 of the 19 Appendix G resource areas would not be significant with the project modifications in the proposed Amendment. The lead agency is required to consider the information in the previous EIR as revised by the supplemental EIR, along with any other relevant information, in making its decisions on the project approval. SANDAG is the lead agency for the proposed Amendment and Draft SEIR.



City of Carlsbad Comments on Draft Supplemental Environmental Impact Report for the proposed Amendment to the 2021 Regional Plan
August 28, 2023
Page 2

4-3 The city previously submitted comments on the Program Environmental Impact Report ("PEIR") for the Plan on Oct. 11, 2021. As the proposed SEIR is a supplement to that document and is largely based on the information, assumptions and analysis therein (e.g., regarding land use), many of the comments remain valid and are repeated in this letter.

4-4 The city seeks to ensure that SANDAG prepares an environmental document that is adequate, complete and fully discloses the potential significant adverse effects of the Amended Plan. To implement the principles of CEQA, SANDAG should correct previous deficiencies and not truncate the requisite cumulative impact analysis (CEQA Guidelines section 15168(b)(2)), use improper baselines (CEQA Guidelines section 15152), or foreclose the consideration of any alternative or mitigation measure that would ordinarily be part of CEQA review of a regional plan (CEQA Guidelines section 15004(b)(2)(B)). The former EIR failed to provide decision-makers and the public with all of the relevant information regarding the project that is necessary for informed decision-making and public participation.

4-5 CEQA prescribes review procedures a public agency must follow before approving or carrying out proposed projects. Those procedures emphasize the importance of public participation in the CEQA process, including mandatory opportunities for public review and comment and the lead agency's obligation to provide meaningful responses to comments received. SANDAG failed to comply with CEQA by conducting the public review process for the Amended Plan and the SEIR separately though with some overlap, which has resulted in a disconnected, piecemeal and rushed process in which comments made on the Amended Plan were not responded to or incorporated into the SEIR.

4-6 The public and affected agencies like the city must submit comments on the SEIR without knowing whether or how SANDAG has responded to previous comments on the Amended Plan. SANDAG has already indicated that the SANDAG Board is expected to review and consider the Amended Plan and the Final SEIR on October 27, 2023. Thus, there appears to be insufficient time for SANDAG to evaluate comments received on the SEIR, prepare meaningful responses and make those responses available as required by CEQA Guidelines sections 15087 and 15088. As such, SANDAG is foreclosing on a "meaningful public participation process" and subjecting itself to a claim that SANDAG is prejudicing the outcome of the environmental review process by ensuring there is little opportunity for public comments to influence the Amended Plan's program and design. ("Environmental review derives its vitality from public participation" (*Ocean View Estates Homeowners Assn. V. Montecito Water Dist.* (2004) 116 Cal. App. 4th 396, 400.)

4-7 If the issues that were addressed in the city's August 8, 2023 comment letter on the Amended Plan (Attachment 1) are not addressed in the SEIR, the SEIR will be insufficient as an informative document and it will reduce the validity and efficacy of the Amended Plan, including its use of faulty assumptions regarding land use and population growth to comply with state and federal mandates, such as the Sustainable Communities Strategy and GHG reduction targets. These faulty assumptions misrepresent the vital land use-transportation planning connections and do nothing to reduce GHG and will instead result in unplanned increases to traffic, GHG, and result in increased housing unaffordability.

4-8 While the city supports the main concepts of the Vision in the Regional Plan, the 5 Big Moves, there needs to be an adequate analysis on how the Amended Plan will be implemented, and what will occur if there are changes to the projected growth, technology, and/or state law impacting existing conditions.

RESPONSE TO COMMENT 4-3

This comment states that many comments from the City's October 11, 2021, letter are repeated in this letter. No further response is required.

RESPONSE TO COMMENT 4-4

This comment addresses the City's comments on the approved Plan and Final PEIR and does not pertain to the proposed Amendment or adequacy of the Draft SEIR.

The Final PEIR informed decisionmakers and the public generally of the significant environmental effects of the approved Plan, identified ways to minimize the significant effects, and described reasonable alternatives to the approved Plan (CEQA Guidelines Section 15121(a)). The Final PEIR properly considered cumulative impacts (CEQA Guidelines Section 15168(b)(2)), identified a baseline (CEQA Guidelines Section 15125), described a range of reasonable alternatives to the approved Plan (CEQA Guidelines Section 15126.6), and described feasible mitigation measures that would minimize significant adverse environmental impacts (CEQA Guidelines Section 15126.4).

RESPONSE TO COMMENT 4-5

The comment mischaracterizes the CEQA requirements for review of the Draft SEIR. There is no CEQA requirement to conduct the public comment period for the Draft SEIR required by CEQA Guidelines Section 15087 simultaneously with the public comment period required by Government Code Section 65080 for the proposed Amendment. There is also no CEQA requirement for comments on the Draft SEIR to be responded to before publishing, or incorporated into, the Draft SEIR. The Draft SEIR properly evaluates the Draft Amendment and preparation of each has run concurrently consistent with CEQA Guidelines Section 15004. SANDAG has evaluated

comments received on significant environmental issues and prepared written responses consistent with CEQA Guidelines Section 15088.

Responses to comments received on the Draft SEIR are included in this Appendix (Appendix F.1 of this SEIR).

RESPONSE TO COMMENT 4-6

This comment mischaracterizes the process for public participation in the Draft and Final EIRs. There is no CEQA requirement to conduct the public comment period for the Draft SEIR required by CEQA Guidelines Section 15087 simultaneously with the public comment period required by Government Code Section 65080 for the proposed Amendment. There is also no CEQA requirement for comments on the Draft Amendment to be responded to before publishing, or incorporated into, the Draft SEIR. The Draft SEIR properly evaluates the Draft Amendment and preparation of each has run concurrently consistent with CEQA Guidelines Section 15004. SANDAG has evaluated comments received on significant environmental issues and prepared written responses consistent with CEQA Guidelines Section 15088. Responses to comments received on the Draft SEIR are included in this Appendix (Appendix F.1 of this SEIR), and responses to comments received on the proposed Amendment are included in Appendix F.2 of this SEIR.

Specific to public outreach conducted by SANDAG, there have been extensive opportunities for meaningful public participation in the proposed Amendment and Draft SEIR. SANDAG initiated the SEIR scoping process on December 9, 2022, through the circulation of an NOP. Receipt of the NOP by the State Clearinghouse at the California Office of Planning and Research on December 9, 2022, initiated a 30-day comment period that ended January 9, 2023. The NOP provided formal notification to all federal, State, and local agencies involved with funding, and to other interested organizations and members of the public, that an SEIR would be prepared for the proposed Amendment. The NOP was intended to encourage interagency communication concerning the proposed Amendment and provide sufficient background information so that agencies, organizations, and individuals could respond to SANDAG with specific comments and questions on the scope and content of this SEIR.

The NOP is provided in full in Appendix A-1. The written comments are provided in full in Appendix A-2.

Consistent with CEQA (PRC Section 21083.9), SANDAG noticed and held a public scoping meeting on December 21, 2022, at SANDAG's office at 401 B Street, San Diego, CA 92101. The purpose was to receive perspective and input from agencies, organizations, and individuals on the scope and content of the environmental information to be addressed in the Draft SEIR. To support the development of the proposed Amendment, SANDAG implemented a public outreach and involvement program consistent with State and federal requirements. Early in the planning process, SANDAG developed a Public Involvement Strategy (Strategy) to guide the public outreach program. The Strategy identifies public engagement techniques to involve the public and collect input for the proposed Amendment, including public meetings, social media, visualizations, and other approaches to outreach.

The Draft SEIR for the proposed Amendment was released to the public on July 13, 2023, and was available for a 47-day public review period, consistent with CEQA which requires a 45-day public review. SANDAG published a public notice for the Draft SEIR public review period in local newspapers on or about July 12, 14, 21, and 28, 2023. SANDAG also filed a Notice of Completion (NOC) with the State Clearinghouse to indicate the availability of the Draft SEIR for public review and comment on July 13, 2013. The Draft SEIR was distributed to the agencies, organizations, and individuals that provided written comments on the NOP, the SANDAG Board of Directors, SANDAG member agencies, and other interested parties and stakeholders. Agencies, organizations, and individuals were invited to provide written comments on the Draft SEIR during the public review period from July 12 to August 28, 2023.

The Draft SEIR and all appendices were available for review online at www.sandag.org, at SANDAG offices located at 401 B Street, Suite 800, San Diego, California 92101, and at the San Diego Central Library located at 330 Park Boulevard, San Diego, California 92101. The Central Library will facilitate inter-library transfers upon request by a member of the public in order to provide access at local libraries.

On a case-by case basis, the San Diego Central Library can also digitize documents and transfer them to other libraries. There will be a further opportunity for public participation on October 13, 2023, at the SANDAG Board of Directors meeting where decision makers will consider certification of the SEIR and adoption of the proposed Amendment.

RESPONSE TO COMMENT 4-7

The City's August 8, 2023, comment letter on the proposed Amendment addressed the approved Plan and does not pertain to the adequacy of the Draft SEIR. At the direction of the SANDAG Board of Directors, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

This comment incorrectly asserts that the previously approved Plan uses faulty land use assumptions. Government Code Section 65080(b)(2)(B) provides that an SCS "use most recent planning assumptions considering local general plans and other factors." It also requires that the SCS "set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board." The SCS projects development that would achieve the State-mandated GHG emissions reduction target when integrated with the transportation investments, programs, and policies in the approved Plan, as amended.

RESPONSE TO COMMENT 4-8

SANDAG is typically required to update the Regional Plan every four years to account for the changes since the last Plan was adopted, including projected growth, technology and/or state law, as mentioned by the commenter. Those assumptions will be updated as needed in developing the 2025 Regional Plan.

With respect to implementation, Appendix B, Implementation Actions, of the approved Plan as revised by Attachment A to the Amendment, Errata to the 2021 Regional Plan, provides SANDAG's strategy for implementing the proposed Amendment.

4-9 The city appreciates SANDAG adding language, as the city requested, that provides additional clarification on land use authority. This language is needed to clarify that land use authority rests with the local jurisdiction. Although this principle should be obvious, the inconsistencies between the Amended Plan and the city's General Plan discussed below suggest that it has been ignored.

4-10 While the proposed amendment is focused on the removal of the regional road usage charge from the 2021 Regional Plan, the Amended Plan also provides updated regional employment figures, revenue assumptions, traffic volumes, etc., all of which are significant changes and/or new information of substantial importance. In addition, the city made the following substantive comments on the adequacy of the PEIR in its Oct. 11, 2021, letter on that document. These comments remain valid and highlight significant concerns that stem largely from faulty land use assumptions contained in the PEIR and 2021 Regional Plan, which the SEIR does not modify.

4-11 1. The PEIR/SEIR fail to disclose the Plan's and Amended Plan's inconsistencies with the Carlsbad General Plan and to analyze the related potential environmental impacts. The Legislature has declared a policy "to protect California's land resource, to ensure its preservation and use in ways which are economically and socially desirable in an attempt to improve the quality of life in California." (Gov. Code § 65030.) To further this policy, each of the state's cities and counties is required to adopt a comprehensive, long-term general plan for the physical development of that city or county. (Gov. Code § 65300.) Accordingly, the city adopted a General Plan in compliance with state law and most recently updated it in 2015. the city's General Plan "sets forth land use compatibility policies applicable to future development in the vicinity." These policies are designed to ensure that future land uses in the surrounding area will be compatible with the realistically foreseeable activity in the city.

4-12 2. Growth projections for the region are based on population, vehicle trends and land use plans developed by the cities and the County of San Diego ("County") as part of their general plans. Many different regional documents rely on the same information to develop water demand projections, air quality performance standards, emission inventories, and emission reductions. The Amended Plan would result in an increase in residential land use resulting in corresponding increases in indirect and cumulative vehicle miles traveled ("VMT"), GHG emissions and air pollutant emissions, as well as inconsistencies with RAQS, SIP, and regional traffic modeling. This was not disclosed in the PEIR and thus influences the analysis in the SEIR. CEQA Guidelines section 15125(a) requires EIRs to contain a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP is published, or if no NOP is published, at the time environmental analysis is commenced, from both a local and regional perspective. Existing general plans, including their Land Use Elements, should have been utilized for this baseline analysis and to derive future population and housing estimates.

In the PEIR, SANDAG should have evaluated and clearly articulated the Plan's potential impacts on land use. Instead, the PEIR states that: "The forecasted development of the proposed Plan is based on the Series 14 Regional Growth Forecast SCS land use pattern, which is, in turn, based on the adopted general plans of the cities and County of San Diego and on the most recent planning assumptions, considering local general plans and other factors, as required by SB 375." This statement is incorrect. Thus, the Amended Plan is inconsistent with the city's General Plan because it proposes residential land uses where such uses are not authorized by the General Plan. The city's

RESPONSE TO COMMENT 4-9

This comment does not pertain to the proposed Amendment or the adequacy of the Draft SEIR. At the direction of the SANDAG Board of Directors, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

The comment inaccurately suggests that the City's General Plan was ignored in developing the previously approved Plan. SANDAG relied upon local general plans and other factors to develop the forecasted development pattern for the region consistent with Government Code Section 65080(b)(2)(B). Consistency of the approved Plan with relevant general plans is analyzed in Section 4.11, *Land Use*, of the Final PEIR. Due to the programmatic nature of the EIR analysis, the Final PEIR did not call out specific policies from local jurisdictions' general plans or other local planning documents. Consistency of individual second-tier projects with these policies would be considered during project-specific CEQA reviews.

RESPONSE TO COMMENT 4-10

The basic purposes of the CEQA are to inform government decision makers and the public about potential significant environmental impacts of projects, identify ways the impacts can be reduced or avoided, prevent significant avoidable environmental damage through alternatives and mitigation, and disclose to the public the reason that decision makers approved a project that may result in unavoidable significant impacts.

Under CEQA, a lead agency may choose to prepare a supplement to an EIR when substantial changes are proposed that may result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects, but only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation. Pursuant to CEQA Guidelines Section 15163, a supplement to an EIR "need contain only the information necessary to make the previous EIR adequate for the project as revised." *Section 1, Introduction*, includes a brief discussion explaining why the impacts on 14 of the 19

Appendix G resource areas would not be significant with the project modifications in the proposed Amendment. The lead agency is required to consider the information in the previous EIR as revised by the supplemental EIR, along with any other relevant information, in making its decisions on the project approval. SANDAG is the lead agency for the proposed Amendment and Draft SEIR.

This comment also refers to the City's comments on the approved Plan. At the direction of the SANDAG Board, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

This comment incorrectly asserts that the previously approved Plan uses faulty land use assumptions. Government Code Section 65080(b)(2)(B) provides that an SCS "use most recent planning assumptions considering local general plans and other factors." It also requires that the SCS "set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board."

The SCS projects development that would achieve the State-mandated GHG emissions reduction target when integrated with the transportation investments, programs, and policies in the approved Plan, as amended.

RESPONSE TO COMMENT 4-11

This comment refers to the City's comments on the previously approved Plan. At the direction of the SANDAG Board, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

Consistency of the approved Plan with relevant general plans and LCPs is analyzed in Section 4.11 of the Draft PEIR. Due to the programmatic nature of the Final PEIR analysis, the Final PEIR does not call out specific policies from local jurisdictions' general plans,

LCPs, or other local planning documents. Consistency of individual second-tier projects with these policies would be considered during project-specific CEQA reviews.

Government Code Section 65080(b)(2)(B) provides that an SCS "use most recent planning assumptions considering local general plans and other factors." It also requires that the SCS "set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board." The SCS projects development that would achieve the State-mandated GHG emissions reduction target when integrated with the transportation investments, programs, and policies in the approved Plan, as amended.

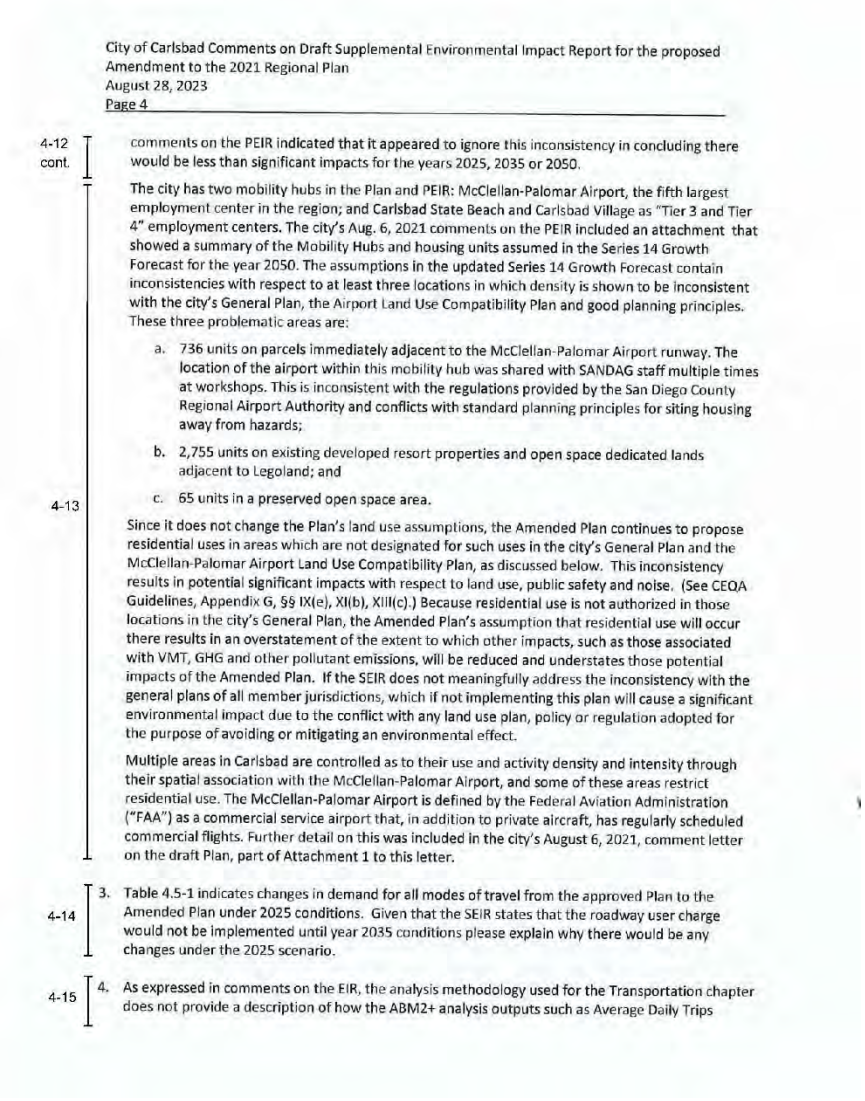
RESPONSE TO COMMENT 4-12

This comment inaccurately asserts that the Draft SEIR does not disclose analysis of VMT, GHG and air pollutant emissions, and inconsistencies with RAQs, SIP, and regional traffic modeling. The Draft SEIR evaluates each and the relevant identified impacts in Sections 4.1 (Air Quality), 4.3 (Greenhouse Gas Emissions), and 4.5 (Transportation), as well as Chapter 5 (Cumulative Impact Analysis), among others.

This comment also refers to the City's comments on the approved Plan. At the direction of the SANDAG Board of Directors, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

The comment inaccurately suggests that the City's General Plan has been ignored in the previously approved Plan. SANDAG relied upon local general plans and other factors to develop the forecasted development pattern for the region consistent with Government Code Section 65080(b)(2)(B). The thresholds for land use analysis in Appendix G of the CEQA Guidelines include an evaluation of whether the project causes a significant environmental impact due to a conflict with a land use plan, policy, or regulation adopted for the purpose of

avoiding or mitigating an environmental effect. A conflict alone does not necessarily result in a significant environmental impact. As stated above, consistency of the approved Plan with relevant general plans is analyzed in Section 4.11 of the Final PEIR. Due to the programmatic nature of the EIR analysis, the Final PEIR does not call out specific policies from local jurisdictions' general plans or other local planning documents. Consistency of individual second-tier projects with these policies would be considered during subsequent project-specific CEQA reviews.



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4-12 cont. comments on the PEIR indicated that it appeared to ignore this inconsistency in concluding there would be less than significant impacts for the years 2025, 2035 or 2050.

The city has two mobility hubs in the Plan and PEIR: McClellan-Palomar Airport, the fifth largest employment center in the region; and Carlsbad State Beach and Carlsbad Village as "Tier 3 and Tier 4" employment centers. The city's Aug. 6, 2021 comments on the PEIR included an attachment that showed a summary of the Mobility Hubs and housing units assumed in the Series 14 Growth Forecast for the year 2050. The assumptions in the updated Series 14 Growth Forecast contain inconsistencies with respect to at least three locations in which density is shown to be inconsistent with the city's General Plan, the Airport Land Use Compatibility Plan and good planning principles. These three problematic areas are:

a. 736 units on parcels immediately adjacent to the McClellan-Palomar Airport runway. The location of the airport within this mobility hub was shared with SANDAG staff multiple times at workshops. This is inconsistent with the regulations provided by the San Diego County Regional Airport Authority and conflicts with standard planning principles for siting housing away from hazards;

b. 2,755 units on existing developed resort properties and open space dedicated lands adjacent to Legoland; and

4-13 c. 65 units in a preserved open space area.

Since it does not change the Plan's land use assumptions, the Amended Plan continues to propose residential uses in areas which are not designated for such uses in the city's General Plan and the McClellan-Palomar Airport Land Use Compatibility Plan, as discussed below. This inconsistency results in potential significant impacts with respect to land use, public safety and noise. (See CEQA Guidelines, Appendix G, §§ IX(e), XI(b), XIII(c).) Because residential use is not authorized in those locations in the city's General Plan, the Amended Plan's assumption that residential use will occur there results in an overstatement of the extent to which other impacts, such as those associated with VMT, GHG and other pollutant emissions, will be reduced and understates those potential impacts of the Amended Plan. If the SEIR does not meaningfully address the inconsistency with the general plans of all member jurisdictions, which if not implementing this plan will cause a significant environmental impact due to the conflict with any land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Multiple areas in Carlsbad are controlled as to their use and activity density and intensity through their spatial association with the McClellan-Palomar Airport, and some of these areas restrict residential use. The McClellan-Palomar Airport is defined by the Federal Aviation Administration ("FAA") as a commercial service airport that, in addition to private aircraft, has regularly scheduled commercial flights. Further detail on this was included in the city's August 6, 2021, comment letter on the draft Plan, part of Attachment 1 to this letter.

4-14 3. Table 4.5-1 indicates changes in demand for all modes of travel from the approved Plan to the Amended Plan under 2025 conditions. Given that the SEIR states that the roadway user charge would not be implemented until year 2035 conditions please explain why there would be any changes under the 2025 scenario.

4-15 4. As expressed in comments on the EIR, the analysis methodology used for the Transportation chapter does not provide a description of how the ABM2+ analysis outputs such as Average Daily Trips

RESPONSE TO COMMENT 4-13

This comment refers to the City's comments on the approved Plan. At the direction of the SANDAG Board of Directors, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

Government Code Section 65080(b)(2)(B) provides that an SCS "use most recent planning assumptions considering local general plans and other factors." It also requires that the SCS "set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the GHG Emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board." The SCS projects development that would achieve the State-mandated GHG emissions reduction target when integrated with the transportation investments, programs, and policies in the approved Plan, as amended.

This comment mischaracterizes the impact of the land use assumptions underlying the previously approved Plan on the VMT, GHG, and air quality resource analyses included in the Final PEIR. The approved Plan focuses growth and development in the Mobility Hub areas. The allocation of housing units to subregional areas represents general areas projected for future growth, not specific parcels, for future housing development or housing unit type. Specifically, outputs are generated at the Master Geographic Reference Area (MGRA)-level for use as inputs to SANDAG's Activity Based Model (ABM). MGRAs are comparable in size to census blocks and cover the entire region. A number of land uses at the parcel level, aggregated up, comprise these general areas and VMT, GHG, and air quality impacts are analyzed at the regional level consistent with the programmatic nature of the Final PEIR.

For Carlsbad, the SCS land use pattern forecasts 6,575 housing units from 2016 to 2050, which is within the total housing unit capacity of the City's general plan as provided to SANDAG (6,992 housing units) and accommodates the City's RHNA allocation of 3,873 housing units

by 2035. The precise zoning at the parcel level is within local jurisdictions' land use authority. As such, future development projects would undergo separate, project-specific environmental review, and any impacts associated with conflicts with land use plans, policies or regulations, including the general plan and any applicable airport land use compatibility plans, would be evaluated and mitigated when the timing, location, and other specifications of a specific project have been defined.

RESPONSE TO COMMENT 4-14

In 2022, anomalous traffic counts and employment at some large employment location sites and Traffic Analysis Zones (TAZs) were identified and corrected, and the Series 14 Regional Growth Forecast was updated to incorporate these corrections. The corrected inputs resulted in slight changes to regional employment figures and more concentrated employment across a handful of sectors at a limited number of employment locations; previously employment had been more dispersed across the region. These corrections resulted in a regional vehicle miles traveled (VMT) increase.

ABM 2+ model runs for the Amendment also reflect corrections made to one of the special market models included in ABM2+, the crossborder model. The crossborder model measures the impact of Mexican resident travel on the San Diego transportation network. In 2022, a software bug was discovered in the crossborder model that affected the number of crossings via Otay Mesa East and resulting traffic volumes on SR 11. The software bug was fixed, improving the accuracy of traffic volumes on SR 11. The fix had minor impacts on regional VMT.

RESPONSE TO COMMENT 4-15

For additional information about modeling procedures, please see Appendix S, *Travel Demand Modeling Tools,* of the approved Plan and Attachment B, *Air Quality Planning and Transportation Conformity*, of the proposed Amendment. A detailed description of the background, data sources, methodologies, and outputs associated with ABM2+ can also be found at https://github.com/SANDAG/ABM/wiki.

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4-15 cont. (ADT), Mode Share, and Vehicle Miles Traveled (VMT) are calculated for each of the travel modes. Without this information, it is difficult to understand how the transportation network improvements impact these analysis metrics for future year conditions and for consideration of potential project mitigations. The document link provided in response to this prior comment in the footnote with descriptions of the ABM2+ model outputs is not currently active.

4-16 5. The SEIR should evaluate the impact of the reduction in total funding resulting from the removal of the road usage charge. This evaluation should encompass the Regional Plan's reduced capacity to execute projects, including but not limited to additional roadways, transit systems, and active transportation. Furthermore, the analysis should address how the curtailment of projects could influence broader shifts in travel modes, vehicle miles traveled (VMT), and resulting GHG emissions.

4-17 6. The alternatives analysis does not describe a range of reasonable alternatives to the project because it does not include an analysis of an alternative that evaluates what will occur if the faulty land use, and therefore transportation, assumptions do not occur. The alternatives are constructed largely to reduce impacts through even more focused growth in Mobility Hubs and through increased value pricing and revenue generation. While it may be true these would reduce impacts, it does not provide policy makers or members of the public a reasonable range of alternatives as required by CEQA. Additionally, due to SB 9, which became effective Jan. 1, 2022, the reduction in population assumed in suburban areas outside of the mobility hubs is both inconsistent with reality and with planning principles required by the California Department of Housing and Community Development to not concentrate all future growth in certain locations.

CEQA and the CEQA Guidelines require that an EIR describe all reasonable alternatives to the project and any feasible mitigation measures (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal. 3d 400, 404). Because the SEIR does not discuss future land use conflicts with applicable general plans (as well as other city land use documents, such as the Local Coastal Program, Habitat Management Plan and McClellan-Palomar Airport Land Use Compatibility Plan), it fails to disclose ways to reduce or eliminate the environmental impacts of the project and to respond to the major environmental issues identified during the planning process (as a project alternative or as a mitigation measure) pursuant to Public Resources Code section 21002 (see *Friends of the Old Trees v. Department of Forestry & Fire Protection* (1997) 52 Cal. App. 4th 1383). The SEIR's analysis of the project alternatives and mitigation measures is incomplete and, therefore, inadequate.

4-18 Section 15126 of the CEQA Guidelines requires that all aspects of a project must be considered when evaluating its impact on the environment, including planning, acquisition, development, and operation. The implementation and challenges to fund the Amended Plan have not been appropriately discussed. One of the project alternatives should accommodate transportation investments that can be reasonably funded within the horizon of the plan under the current ("known") funding mechanisms. Because the SEIR does not discuss a financially constrained alternative, the analysis of the project alternatives and mitigation measures is incomplete, and therefore, inadequate.

RESPONSE TO COMMENT 4-16

The regional road usage charge was not intended to be implemented until 2030, and as such was only a revenue source for the final 20 years of the approved Plan.

Updated revenue assumptions for the Amendment provide sufficient revenues to fund the projects in the approved Plan, including historic levels of infrastructure investment from the federal and state government resulting from the Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law).

RESPONSE TO COMMENT 4-17

CEQA requires the consideration of alternatives to the proposed Amendment and the analysis of impacts associated with those alternatives. By comparing the proposed Amendment to the alternatives, the advantages of each can be weighed and analyzed. Section 15126.6 of the CEQA Guidelines requires that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives." An EIR must discuss alternatives to a project in its entirety and is not required to discuss alternatives to each particular component of a project. Also, an EIR need not evaluate in detail alternatives that would not substantially lessen the proposed project's significant environmental impacts. Finally, CEQA Guidelines Section 15126.6 specifically states that "[a]n EIR need not consider every conceivable alternative to a project."

This comment also inaccurately characterizes the discussion in Laurel *Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal. 3d 376*. The Court does not state that CEQA requires an EIR to describe all reasonable alternatives to the project. Rather, the Court in Laurel Heights stated that "[a]n EIR's discussion of alternatives must contain analysis sufficient to allow informed decision making" (*Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal. 3d 376, 404*). As mentioned

above, CEQA Guidelines Section 15126.6 specifically states that "[a]n EIR need not consider every conceivable alternative to a project."

The Draft SEIR Alternatives were developed as alternate means of achieving most of the basic project objectives for the Final PEIR. Those objectives are found in Chapter 2, Project Description, of the Final PEIR.

The proposed Amendment has the additional objective of removing the regional road usage charge while continuing to meet State and federal planning requirements, regional GHG reduction targets, and federal air quality conformity standards. As discussed in Chapter 6, Alternatives Analysis, of the Draft SEIR, five alternatives were considered in detail:

Alternative 1: No Project (the approved Plan). The No Project Alternative assumes that all of the plans and policies included in the approved Plan would be implemented, including the regional road usage charge, and is further described in Chapter 2, *Project Description,* of the approved Plan Final PEIR.

Alternative 2: 2019 Transportation Network With New Value Pricing and User Fee Policies. Alternative 2 is the same as described in Chapter 6, *Alternatives Analysis*, of the approved Plan Final PEIR.

Alternative 3: All Growth In Mobility Hubs and More Progressive Value Pricing And User Fee Policies. Alternative 3 is the same as described in Chapter 6 of the approved Plan Final PEIR.

Alternative 4: Progressive Pricing and No Regional Road Usage Charge. Alternative 4 consists of the approved Plan transportation network and land use pattern included in the SCS, with more progressive toll pricing and parking costs. Alternative 4 does not include the regional road usage charge.

Alternative 5: All Growth In Mobility Hubs, Progressive Pricing, and No Regional Road Usage Charge. Alternative 5 consists of the approved Plan transportation network, a land use pattern focusing all regional growth in mobility hubs, with more progressive toll pricing and parking costs. Alternative 5 does not include a regional road usage charge.

This comment also restates the City's comments on the approved Plan. At the direction of the SANDAG Board of Directors, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

This comment incorrectly asserts that the Final PEIR uses faulty land use assumptions. Government Code Section 65080(b)(2)(B) provides that an SCS "use most recent planning assumptions considering local general plans and other factors." It also requires that the SCS "set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board." The SCS projects development that would achieve the State-mandated GHG emissions reduction target when integrated with the transportation investments, programs, and policies in the approved Plan, as amended.

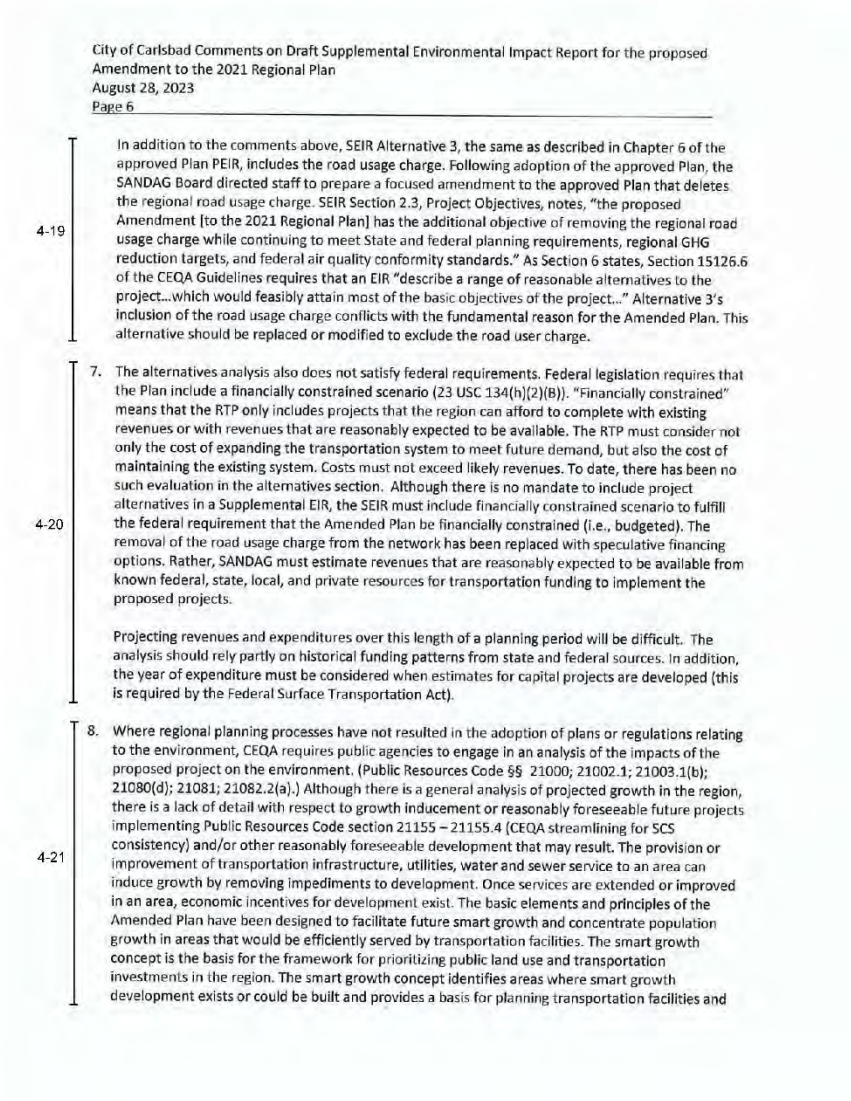
With respect to SB 9, which took effect on January 1, 2022, the Series 14 Regional Growth Forecast incorporates assumptions about ADUs occurring in the local jurisdictions as potential future capacity for housing unit development. ADUs were assumed to be available on 5 percent of all single-family lots in the region that were 5,000 square feet or larger. This equates to about 20,000 additional units of housing unit capacity throughout the region outside of the rural villages in the unincorporated area. The Series 15 Regional Growth Forecast is currently being developed in coordination with local jurisdictions and may include updated assumptions surrounding ADU development.

Consistency of the approved Plan with relevant general plans is analyzed in Section 4.11 of the Final PEIR. Due to the programmatic nature of the PEIR analysis, the Final PEIR does not call out specific policies from local jurisdictions' general plans or other local planning documents. Consistency of individual second-tier projects with these policies would be considered during subsequent project-specific CEQA reviews.

RESPONSE TO COMMENT 4-18

This comment mischaracterizes the requirements for a financially constrained RTP and inaccurately states that the implementation and challenges to fund the proposed Amendment have not been appropriately discussed. Federal and State laws require SANDAG to develop a regional plan built on reasonable assumptions of the revenues that will be available during the period covered by that plan (Government Code Section 65080(b)(4); 23 CFR 450.322(f)(10)(ii)). New funding sources are revenues that do not currently exist or that may require additional steps before the MPO or transit agency can commit such funding to a transportation project. (2017 RTP Guidelines for MPOs). Strategies for ensuring their availability must be identified and future revenues may be projected based on historical trends, including consideration of past legislative or executive actions (2017 RTP Guidelines for MPOs). The level of uncertainty in projects based on historical trends is generally greatest for revenues in the "outer years" (10 years or more) of an RTP. *Appendix V of the approved Plan as revised by Attachment A to the Amendment, Errata to the 2021 Regional Plan*, explains the anticipated revenues to fund implementation of the proposed Amendment. Table V.3 as revised by Attachment A to the Amendment describes the availability assumptions for new revenue sources identified in Appendix V.

As explained in Response to Comment 4-19, the Draft SEIR does evaluate a reasonable range of alternatives that achieve most of the basic project objectives and that are potentially feasible.



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4-19 In addition to the comments above, SEIR Alternative 3, the same as described in Chapter 6 of the approved Plan PEIR, includes the road usage charge. Following adoption of the approved Plan, the SANDAG Board directed staff to prepare a focused amendment to the approved Plan that deletes the regional road usage charge. SEIR Section 2.3, Project Objectives, notes, "the proposed Amendment [to the 2021 Regional Plan] has the additional objective of removing the regional road usage charge while continuing to meet State and federal planning requirements, regional GHG reduction targets, and federal air quality conformity standards." As Section 6 states, Section 15126.6 of the CEQA Guidelines requires that an EIR "describe a range of reasonable alternatives to the project...which would feasibly attain most of the basic objectives of the project..." Alternative 3's inclusion of the road usage charge conflicts with the fundamental reason for the Amended Plan. This alternative should be replaced or modified to exclude the road user charge.

4-20 7. The alternatives analysis also does not satisfy federal requirements. Federal legislation requires that the Plan include a financially constrained scenario (23 USC 134(h)(2)(B)). "Financially constrained" means that the RTP only includes projects that the region can afford to complete with existing revenues or with revenues that are reasonably expected to be available. The RTP must consider not only the cost of expanding the transportation system to meet future demand, but also the cost of maintaining the existing system. Costs must not exceed likely revenues. To date, there has been no such evaluation in the alternatives section. Although there is no mandate to include project alternatives in a Supplemental EIR, the SEIR must include financially constrained scenario to fulfill the federal requirement that the Amended Plan be financially constrained (i.e., budgeted). The removal of the road usage charge from the network has been replaced with speculative financing options. Rather, SANDAG must estimate revenues that are reasonably expected to be available from known federal, state, local, and private resources for transportation funding to implement the proposed projects.

Projecting revenues and expenditures over this length of a planning period will be difficult. The analysis should rely partly on historical funding patterns from state and federal sources. In addition, the year of expenditure must be considered when estimates for capital projects are developed (this is required by the Federal Surface Transportation Act).

4-21 8. Where regional planning processes have not resulted in the adoption of plans or regulations relating to the environment, CEQA requires public agencies to engage in an analysis of the impacts of the proposed project on the environment. (Public Resources Code §§ 21000; 21002.1; 21003.1(b); 21080(d); 21081; 21082.2(a).) Although there is a general analysis of projected growth in the region, there is a lack of detail with respect to growth inducement or reasonably foreseeable future projects implementing Public Resources Code section 21155 – 21155.4 (CEQA streamlining for SCS consistency) and/or other reasonably foreseeable development that may result. The provision or improvement of transportation infrastructure, utilities, water and sewer service to an area can induce growth by removing impediments to development. Once services are extended or improved in an area, economic incentives for development exist. The basic elements and principles of the Amended Plan have been designed to facilitate future smart growth and concentrate population growth in areas that would be efficiently served by transportation facilities. The smart growth concept is the basis for the framework for prioritizing public land use and transportation investments in the region. The smart growth concept identifies areas where smart growth development exists or could be built and provides a basis for planning transportation facilities and

RESPONSE TO COMMENT 4-19

The basic purposes of the CEQA are to inform government decision makers and the public about potential significant environmental impacts of projects, identify ways the impacts can be reduced or avoided, prevent significant avoidable environmental damage through alternatives and mitigation, and disclose to the public the reason that decision makers approved a project that may result in unavoidable significant impacts.

CEQA requires the consideration of alternatives to the proposed Amendment and the analysis of impacts associated with those alternatives. By comparing the proposed Amendment to the alternatives, the advantages of each can be weighed and analyzed. Section 15126.6 of the CEQA Guidelines requires that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives."

Five alternatives were analyzed in the Draft SEIR, including the No Project Alternative, to afford decision makers with information about the potential environmental impacts of the proposed Amendment. The SEIR carried forward two of the alternatives analyzed in the Final PEIR, as well as analyzing the No Project Alternative and two new alternatives based on the additional objective of the proposed Amendment to remove the regional road usage charge.

RESPONSE TO COMMENT 4-20

The regional road usage charge was not intended to be implemented until 2030, and as such was only a revenue source for the final 20 years of the approved Plan. Updated revenue assumptions for the Amendment provide sufficient revenues to fund the projects in the approved Plan, including historic levels of infrastructure investment from the federal and state government resulting from the

Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law).

This comment also mischaracterizes the requirements for a financially constrained RTP and inaccurately states that the implementation and challenges to fund the proposed Amendment have not been appropriately discussed. Federal and State laws require SANDAG to develop a regional plan built on reasonable assumptions of the revenues that will be available during the period covered by that plan (Government Code Section 65080(b)(4); 23 CFR 450.322(f)(10)(ii)). New funding sources are revenues that do not currently exist or that may require additional steps before the MPO or transit agency can commit such funding to transportation project (2017 RTP Guidelines for MPOs). Strategies for ensuring their availability must be identified and future revenues may be projected based on historical trends, including consideration of past legislative or executive actions (2017 RTP Guidelines for MPOs). The level of uncertainty in projects based on historical trends is generally greatest for revenues in the "outer years" (10 years or more) of an RTP. Appendix V of the approved Plan, as revised by Attachment 1 to the proposed Amendment, explains the anticipated revenues to fund implementation of the proposed Amendment. Table V.3 in the approved Plan, as revised by Attachment 1 of the proposed Amendment, describes the availability assumptions for new revenue sources identified in Appendix V.

IIJA authorized $1.2 trillion for transportation and infrastructure spending with $550 billion of that figure going toward "new" investments and programs. The federal and state discretionary programs near-term estimates have been updated accordingly to assume historical leveraging rates of local TransNet revenue.

The total estimate of near-term State and Federal Discretionary Programs resulting from IIJA is $6.35 billion.

In Fiscal Years 2021-2023 since the passage of IIJA, SANDAG has already received $1.6 billion in discretionary funding revenue ($876 million in state funding and $766 million in federal funding) compared to the Amendment's assumed $950 million in discretionary funding revenue ($507 million in state funding and $441 million in federal funding).

As explained in Response to Comment 4-19, the Draft SEIR does evaluate a reasonable range of alternatives that achieve most of the basic project objectives and that are potentially feasible.

RESPONSE TO COMMENT 4-21

This comment restates the City's comments on the approved Plan. At the direction of the SANDAG Board, the proposed Amendment is narrowly focused on removing the regional road usage charge while meeting state and federal requirements. The Amendment includes no changes to land use.

For the approved Plan, population and growth impacts are analyzed in Section 4.14 of the Final PEIR. As stated on pages 4.14-16 and 4.14-17: "the regional growth and land use change forecasted in the proposed Plan would be implemented by local jurisdictions through local plans and individual development projects, and most transportation network improvements would be implemented by transportation project sponsors other than SANDAG. The approved Plan was developed to accommodate forecasted regional growth and failing to do so would be inconsistent with the federal and State requirements for RTPs. In addition, precluding growth would conflict with the requirements to provide sufficient housing for the region's population contained in SB 375. As discussed in Section 4.14.2, Government Code Section 65080(b)(2)(B)(ii) requires that the RTP/SCS must house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan."

This comment also addresses future transit priority projects. As described above, future development projects would be implemented by local jurisdictions. CEQA Guidelines Sections 21155 through 21155.4 identify CEQA streamlining provisions for transit priority projects that are consistent with an MPO's SCS that has been accepted by CARB. Figures D.8 and D.9 in Appendix D of the approved Plan identify potential areas for transit priority projects. The approved Plan is an iterative planning document that is typically updated every four years to account for new data, analysis, policy, and experience. SANDAG looks forward to coordinating with the City on future Plan updates.

4-21 cont.

transit services in the Amended Plan. Smart growth areas identified receive prioritized infrastructure investments and transit services to support smart growth. This carries true to those smart growth areas that are accommodated by existing general plans, and for other areas that are not covered by existing general plans. CEQA requires that an EIR discuss the ways in which the proposed project could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the environment surrounding the project. CEQA requires this discussion to include ways in which a project would remove obstacles to population growth or encourage and facilitate other activities that could significantly affect the environment (CEQA Guidelines section 15126.2(d)). The level of detail should reflect the level contained in the plan or plan element being considered (*Rio Vista Farm Bureau Center v. County of Solano* (1992) 5 Cal.App.4th 351), inclusive of new smart growth areas as designated.

4-22

City staff looks forward to working with SANDAG on improving mobility and land use access in the region and building sustainable, equitable and healthy modes of transportation. We appreciate the opportunity to comment on the Amended Plan that will help the region realize these goals. While at the same time, city staff also looks forward to helping SANDAG advance a legally adequate environmental document to support the disclosure and decision-making process. Since the major premise of CEQA is that it "be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language" (*Friends of Mammoth v. Board of Supervisors*, supra, 247, 259), SANDAG should take all action necessary to alert the decision-makers and the public to the environmental changes associated with the project (*County of Inyo v. Yorty* (1973) 32 Cal. App. 3d 795, 810). There is no shortcut to CEQA - the EIR process protects not only the environment but also informed self-government (*Laurel Heights Improvement Assn. v. Regents of University of California*, supra, 376, 392). The SANDAG Board must certify that the final SEIR has been completed in compliance with CEQA and that it considered all of the information in the final SEIR before approving or disapproving the project. As of this writing, the SEIR is not in compliance with CEQA.

If you have any questions related to comments on the transportation network, please contact Tom Frank, Transportation Director/City Engineer, at Tom.Frank@carlsbadca.gov or, if you need additional information related to comments on the land use assumptions, please contact Eric Lardy, City Planner, at Eric.Lardy@carlsbadca.gov.

Sincerely,

MDS MIKE STRONG FOR

JEFF MURPHY
Community Development Director

TOM FRANK
Transportation Director/City Engineer

SD:mh

RESPONSE TO COMMENT 4-22

SANDAG has fully complied with the requirements of CEQA in the preparation of the Draft and Final SEIRs for the proposed Amendment. Regarding disclosure of the proposed Amendment's physical impacts on the environment in the Draft and Final SEIRs, SANDAG has disclosed impacts and identified mitigation measures for impacts on air quality; energy; GHG; noise and vibration; transportation; and cumulative impacts, and has identified alternatives to the proposed Amendment consistent with CEQA, the CEQA Guidelines, and the discussion in *Friends of Mammoth v. Board of Supervisors (1972) 8 Cal.3d 247* referenced in the comment. For clarity with respect to the cited discussion in *County of Inyo v. Yorty (1973) 32 Cal.App. 3d 795*, the court states that an EIR is an "environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return" (*County of Inyo v. Yorty,* p. 810). The court also cites an earlier version of PRC Section 21000, which states that the government of the state should "take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state" (*County of Inyo v. Yorty*, p. 802).

The court in County of Inyo v. Yorty does not state that lead agencies "should take all action necessary to alert decision-makers and the public to the environmental changes associated with the project," contrary to the comment's assertion.

Prior to consideration and certification of the Final SEIR, and consistent with the discussion in *Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal. 3d 376*, SANDAG will provide the SANDAG Board of Directors with a Final SEIR completed in compliance with CEQA Guidelines Section 15132 that reflects SANDAG's independent judgment and analysis as required by CEQA Guidelines Section 15090 (a). SANDAG will also present the SANDAG Board of Directors with Findings consistent with CEQA Guidelines

Section 15091, a Statement of Overriding Considerations consistent with Section 15093, and a Mitigation Monitoring and Reporting Program consistent with Section 15097 prior to the SANDAG Board consideration of the proposed Amendment and Final SEIR.

Attachment:

1. Aug. 8, 2023, City of Carlsbad Comment Letter on the Amendment to the 2021 Regional Plan (includes Aug. 6, 2021, comment letter on Draft Regional Plan and Sept. 30, 2021, clarification letter)

cc: Scott Chadwick, City Manager
Cindie McMahon, City Attorney
Geoff Patnoe, Assistant City Manager
Ron Kemp, Senior Assistant City Attorney
Gary Barberio, Deputy City Manager, Community Services
Paz Gomez, Deputy City Manager, Public Works
Mike Strong, Assistant Community Development Director
Eric Lardy, City Planner
Nathan Schmidt, Transportation Planning and Mobility Manager
Jason Geldert, Engineering Manager
Robert Efird, Principal Planner
Scott Donnell, Senior Planner
Nicole Morrow, Assistant Planner

City of Carlsbad

Aug. 8, 2023

San Diego Association of Governments
401 B Street, Suite 800
San Diego CA 92101
Via: RegionalPlanAmendment@sandag.org

RE: City of Carlsbad Comments on the Amendment to the 2021 Regional Plan

To Whom it May Concern,

The City of Carlsbad appreciates the opportunity to provide comments on the proposed amendment to the 2021 Regional Plan ("Plan Amendment"). This is an important plan for this region and guides the next phases of growth for the member agencies of the San Diego Association of Governments ("SANDAG"). An effectively designed and implemented regional transportation plan ensures improved transportation options for area residents, businesses and other community members; meaningful reductions in greenhouse gas ("GHG") emissions; and improved quality of life as we grow our communities.

The City of Carlsbad ("city") is submitting the following comments based on the policies, projects, programs and other improvements included in the Plan Amendment. The city reserves the right to add, amend, change or replace comments and recommendations based on additional review and understanding of the Plan Amendment and the environmental analysis provided under the California Environmental Quality Act ("CEQA").

4-23 (whole doc)

SECTION 1: LAND USE

1. Alternatives included in the approved 2021 Regional Plan assumed housing in locations that were inconsistent with the city's land use plans; this was discussed in detail in the city's August 6, 2021/September 30, 2021, comments on the draft 2021 Regional Plan (Attachment 1). Consistent with those comments, city staff recommend the Plan Amendment:
   a. Consider the city's land use plans, including the General Plan, Habitat Management Plan, and Local Coastal Program.
   b. Consider the McClellan-Palomar Airport Land Use Compatibility Plan (adopted by the county Airport Land Use Commission and amended Dec. 1, 2011) and the constraints identified therein.
2. City staff are encouraged by recent conversations with SANDAG staff that the proposed 2025 Regional Plan will consider the city's land use documents. Doing so is recommended and expected and will help ensure better accuracy of data and assumptions.

SECTION 2: COMMENTS AND RECOMMENDATIONS

City staff remain concerned that there is not enough detail on the feasibility of implementation of this significant shift in transportation strategy. On specific content in the plans, we outline our recommendations and comments below:

Transportation & Community Development Departments
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2710 t

RESPONSE TO COMMENT 4-23

This comment addresses the proposed Amendment and the approved Plan and is not related to the adequacy of the Draft SEIR. As such, no further response is required.

1. *Paying for the Plan:*

   The 2021 Regional Plan sets out an ambitious plan to build and operate a region-wide system of transportation projects, programs and other improvements. This is a substantial role for SANDAG to play in supporting both the construction and operation of these projects, programs and other improvements. SANDAG should set annual revenue targets to directly fund everything and should approve any recommended sustainable revenue tools to help meet these targets. Many of the funding strategies will require legislative changes, or voter-approved taxation. SANDAG should clarify what will occur if the funding is not available, if opposition to projects stops them from construction, and if General Plans in the region are not modified to implement the Plan/Plan Amendment.

2. *Appendix D: Sustainable Community Strategy Documentation:*

   Appendix D includes the Sustainable Communities Strategy, which outlines assumptions included in the Activity Based Model 2+ ("ABM 2+"). This model will be necessary for use by publicly and privately initiated land use projects preparing documents for consistency with VMT/CEQA Guidelines and Traffic Impact Analysis ("TIA") Evaluations. City staff respectfully request direction from SANDAG on how to conduct modeling with the service bureau and how to factor in these assumptions applied to ABM 2+. Specifically, the addition of pricing, parking costs for coastal communities, 10% teleworking and micromobility. SANDAG should provide direction on how this could be worked into General Plans that are updated every 5-20 years.

   The plan should provide a process for implementing all phases of the Build North County Corridor (NCC) managed lanes project and the supporting active transportation infrastructure projects. It is also recommended that the plan pivot from the existing low ridership fixed routes transit services to flexible fleets along the I-5 and SR-78 corridors to maximize the objectives of the plan. As stated in the Regional Plan, priority Flexible Fleet will help make the region more accessible, equitable, and environmentally friendly.

3. *Appendix A: Transportation Projects, Programs, and Phasing:*

   Trips to and from school sites result in a significant congestion, VMT generation, and peak hour delay throughout the region. Additional funding and projects should be recommended with a specific focus on improving safety and multimodal access in and around school sites along with programs to incentivize non-single occupancy vehicle trips to schools.

   Table A.11: Given the proven success of the Carlsbad Connector microtransit pilot program, the city agrees with the Plan/Plan Amendment's recommendations to provide similar on-demand microtransit systems throughout North County at all mobility hub sites and major transit centers.

   The preferred Interstate-5 freeway alternative identified in the North Coast Corridor ("NCC") Final EIR/EIS is the refined 8+4 Buffer alternative, with four freeway lanes and two managed lanes in each direction and completion by 2035. Appendix A, Table A.5 describes NCC project IDs CC004, 007 - 009 as "8F to 6F+4ML" with completion by 2050. While this might lead to further study, it is not clear why there is a different freeway configuration (i.e., reduction in freeway lanes) proposed. How does a reduction in lanes continue to meet NCC potential project benefits of maintaining or improving traffic operations and improving the safe and efficient regional movement of people and goods?

4. *Active Transportation:*

   The city appreciates the Plan/Plan Amendment's overall approach of providing a connected network of high-quality bicycle facilities throughout the region. Regional bikeways are recommended throughout the city including along Palomar Airport Road which will provide a key east-west connection and El Camino Real which will provide a new north-south bikeway connection through the city. Both roadways are proposed to include "on-street bikeways". Due to the high traffic volumes and vehicle speeds experienced along most of both corridors, the city recommends considering "off-street bikeways" or Class I facilities where feasible in order to stimulate the shift from personal motor vehicle use to people choosing to bike.

   It is extremely important that municipal transportation plans align with regional transportation plans to achieve regional goals for land use and transportation and to promote the region working together to build a cohesive regional transportation network. Considering there are currently no mechanisms in place to ensure municipalities coordinate local transportation plans with regional planning documents, the Plan should provide an approach on how SANDAG plans to engage with municipalities, especially in areas of potential disagreement or conflict (as aforementioned in this subsection and others). It is also recommended that the Plan Amendment provide additional direction regarding the application of protected bikeways in a variety of applicable contexts. While vertical measures such as soft hit posts may be appropriate in lower volume and lower speed roadways, arterial roadways with high traffic volumes and high speeds warrant much more substantial physical protection from vehicles. In addition, special consideration should be given at intersections and driveways which may be impacted due to the additional width and visibility impacts created by protected bikeways.

City staff look forward to working with SANDAG on improving mobility and land use access in the region and building sustainable, equitable and healthy modes of transportation, and we appreciate the opportunity to comment on the Plan Amendment that will help the region realize these goals.

If you have any questions related to comments on the transportation network, please contact Tom Frank, Transportation Director/City Engineer, at Tom.Frank@carlsbadca.gov or if you need additional information related to comments on the land use assumptions, please contact Eric Lardy, City Planner, at Eric.Lardy@carlsbadca.gov.

Sincerely,

JEFF MURPHY
Community Development Director

TOM FRANK
Transportation Director/City Engineer

Attachment:

1. City of Carlsbad comments on draft 2021 Regional Plan dated August 6, 2021

cc: Scott Chadwick, City Manager
Cindie McMahon, City Attorney
Geoff Patnoe, Assistant City Manager
Ron Kemp, Senior Assistant City Attorney
Robby Contreras, Assistant City Attorney
Gary Barberio, Deputy City Manager, Community Services
Paz Gomez, Deputy City Manager, Public Works
Mike Strong, Assistant Director, Community Development
Eric Lardy, City Planner
Nathan Schmidt, Transportation Planning and Mobility Manager
Jason Geldert, Engineering Manager
Robert Efird, Principal Planner
Scott Donnell, Senior Planner
Nicole Morrow, Assistant Planner

City of Carlsbad

cc: Don Neu, City Planner
Nathan Schmidt, Transportation Planning and Mobility Manager
Jason Geldert, Engineering Manager
Eric Lardy, Principal Planner
Scott Donnell, Senior Planner
Corey Funk, Associate Planner

Public Works Branch – Transportation Department
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2766

Attachment 1

City of Carlsbad

Sept. 30, 2021

San Diego Association of Governments
401 B street, Suite 800
San Diego, CA 92101
Via: SDForward@sandag.org

RE: City of Carlsbad Comments on Draft 2021 Regional Plan

To whom it may concern,

This letter serves to inform SANDAG that the City does not wish to remove project CB32 from the Regional Arterials Project list.

Please disregard the comment regarding project CB32 from the attached letter sent to SANDAG on Aug. 6, 2021.

Thank you for bringing this to our attention, and please contact me if you have any other questions regarding the 2021 Regional Plan comment letter.

Best Regards,

Tom Frank, PE
Transportation Director/City Engineer

Attachment A: Letter to SANDAG dated Aug. 6, 2021

cc: Scott Chadwick, City Manager
Celia Brewer, City Attorney
Geoff Patnoe, Assistant City Manager
Ron Kemp, Assistant City Attorney
Robby Contreras, Assistant City Attorney
Gary Barberio, Deputy City Manager, Community Services
Paz Gomez, Deputy City Manager, Public works
Mike Strong, Assistant Director, Community Development

Public Works Branch – Transportation Department
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2766

Attachment A

City of Carlsbad

Aug. 6, 2021

San Diego Association of Governments
401 B Street, Suite 800
San Diego CA 92101
Via: SDForward@sandag.org

RE: City of Carlsbad Comments on Draft 2021 Regional Plan

To Whom it May Concern,

The City of Carlsbad appreciates the opportunity to provide comments on the draft 2021 Regional Plan ("Plan"). This is an important plan for this region and will guide the next phase of growth for the member agencies of the San Diego Association of Governments ("SANDAG"). An effectively designed and implemented regional transportation plan would help ensure improved transportation options for area residents, businesses and other community members; meaningful reductions in greenhouse gas ("GHG") emissions; and improved quality of life as we grow our communities.

The City of Carlsbad ("city") is submitting comments based on the policies, projects, programs and other improvements included in the Plan. Our agency's comment letter is divided into two sections. The first section seeks clarity and other considerations that pertain to our agency's review of the Plan. The second section identifies the city's preliminary comments and recommendations.

Implementing the regional transportation network outlined in the Plan requires municipalities to support the regional vision and deliver on local infrastructure and services like the priority bus routes, local bus services, and pedestrian and cycling connections to major transit infrastructure. These components, which are delivered by municipalities, are essential to creating a coherent and comprehensive local transportation network that feeds into regional services. For that reason, an effective public review of the Plan should involve a transparent and thorough process for identifying and evaluating potential hazards, physical changes to the environment and indirect (off-site and cumulative) impacts that might result from implementation activities that may reasonably occur with the Plan.

The city's residents, businesses and other community members will greatly benefit from the involvement and technical assistance from the prospective Draft Environmental Impact Report ("EIR"). Therefore, what follows in this correspondence represents our agency's preliminary comments and recommendations. The city reserves the right to add, amend, change or replace comments and recommendations based on additional review and understanding of the Plan and the environmental analysis provided under the California Environmental Quality Act ("CEQA").

The city thanks SANDAG staff for meeting with city staff on Aug. 2, 2021, to discuss some of these comments in advance of this letter. Following that meeting, SANDAG provided language that they may recommend adding to the Regional Plan for additional clarification on land use authority. The language is, "Land use authority is reserved to local jurisdictions because they are best positioned to effectively implement the objectives outlined in the Plan through understanding of the unique needs of their communities and geographies." This language will be helpful to clarify that land use authority rests with

Transportation & Community Development Departments
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2710 t

Attachment A

the local jurisdiction. The city still offers the following comments with the intent to support development of a defensible and realistic regional plan.

SECTION 1: CLARITY AND OTHER CONSIDERATIONS

City staff have attended the series of workshops that SANDAG hosted during the public review period, and respectfully starts this section with several questions related to the process of the Plan and the Draft EIR. By way of introduction, a jurisdiction's General Plan, such as the city's General Plan, identifies the expected population of the city and any lands outside of the city limits but within their Sphere of Influence where future growth is anticipated to occur. The city's General Plan identifies the subject area adjacent to the McClellan-Palomar Airport for development under the designation for limited and light industrial use.

For future land use planning, land use assumptions must reasonably proxy and be generally consistent with local planning standards and programs, to be considered growth accommodating rather than growth inducing. SANDAG has the authority under Government Code Section 65584 to determine existing and projected housing needs, as well as the share of housing needs to be allocated to cities and counties, but it is unclear if SANDAG has jurisdiction to allocate new housing growth to areas in a manner not consistent with Government Code Section 65584. Attachment 1 includes additional information on the applicable Government Code and standards. Therefore, and as indicated above, the build-out of properties within the Business Park and flight activity zone must be done in accordance with the city's General Plan Land Use Diagram, as amended, in accordance with city approval.

The initial questions on the planning process associated with developing the Plan are provided below:

1. The SANDAG website states, "The SANDAG Sustainable Communities Strategy and Final EIR from its 2015 Regional Plan will remain valid and in compliance for purposes of state funding eligibility and other state and federal consistency purposes until the SANDAG Board of Directors adopts a new Regional Plan and EIR, provided those actions are completed by the end of December 2021." SANDAG needs to clarify how the Draft EIR, Response to Comments and Adoption will be completed this year and what will occur if they are not completed by the end of this year. Additionally, please clarify when the Draft EIR will be available; it is difficult to completely assess the full impacts of this plan when the public review of the documents is piecemealed.
    a. SANDAG should clarify how public comments on the Plan are going to be addressed in the Draft EIR prior to its release.
    b. In the Draft EIR, SANDAG needs to clearly articulate the impacts to land use and if the Plan will cause a significant environmental impact due to a conflict with any land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Appendix F: Regional Growth Forecast and Sustainable Communities Strategy Land Use Pattern appears to be inconsistent with the city's General Plan and rezone program to accommodate the Regional Housing Needs Assessment, as well as the general plans of other jurisdictions such as the cities of Coronado, Del Mar and the County of San Diego. The Draft EIR should clarify how implementation of this Plan can occur if those changes are not made.

Attachment A

2. The city has three mobility hubs, associated with the Employment Centers Published supporting the SANDAG Regional Plan.[1] McClellan-Palomar Airport is the fifth largest employment center in the region, with Carlsbad State Beach and Carlsbad Village as "Tier 3 and Tier 4" employment centers. The city thanks SANDAG for providing data for analysis to determine impacts and provide for accurate comments on the Plan. Attachment 2 shows a summary of the Mobility Hubs and housing units assumed in the Series 14 Growth Forecast for the year 2050. In summary:
    a. The assumptions in the updated Series 14 Growth Forecast contain inconsistencies with the city's General Plan. The Carlsbad Palomar Major Employment Mobility Hub does include increases in density beyond what the citywide numbers appear to show when they are looked at in more detail.
        i. There are three locations in which density is shown to be inconsistent with good planning principles, the city's General Plan and the Airport Land Use Compatibility Plan. The three most problematic areas (shown in Attachment 3) are:
            1. 736 units on parcels immediately adjacent to the McClellan-Palomar Airport runway. The location of the airport within this mobility hub was shared with SANDAG staff multiple times at workshops. This is inconsistent with the regulations provided by the San Diego County Regional Airport Authority and conflicts with standard planning principles for siting housing away from hazards.
            2. 2,755 units on existing developed resort properties and open space dedicated lands adjacent to Legoland.
            3. 65 units in a preserved open space area.
        ii. SANDAG should provide additional detail why units were assumed in these areas, what planning principles those decisions were based on, and how SANDAG expects this to be implemented.
        iii. Concentration of units in the mobility hubs alone appears to conflict with the direction received from the California Department of Housing and Community Development ("HCD") to implement new Affirmatively Furthering Fair Housing ("AFFH"), which seeks to combat housing discrimination, eliminate racial bias, undo historic patterns of segregation, and lift barriers that restrict access in order to foster inclusive communities and achieve racial equity, fair housing choice and opportunity for all Californians. The allocations of land use provided by SANDAG seem to focus all the higher density housing into one area of the city. (This is one of the largest points of analysis that each jurisdiction in the region needs to respond to in order to receive a certified Housing Element.)
    b. Additionally, looking at the detailed data provided by SANDAG, it is now clear why the citywide numbers only show moderate increases in population. Our analysis has shown that there is an assumed reduction of population by 2,310 persons in the areas within the city but outside of the mobility hubs. This is likely due to assumed reductions in persons per household over time, but SANDAG should clarify the source and reasonableness of this assumption. If housing is not provided consistent with these areas, is it still reasonable to assume persons per household will be reduced in 2050?

[1] SANDAG Website: Employment Centers SANDAG :: PROJECTS :: San Diego's Regional Planning Agency

c. Furthermore, this reduction in population is not limited to the City of Carlsbad. There is an approximately 85,000 reduction in population assumed outside of mobility hubs regionwide. SANDAG needs to address if that is a reasonable assumption and if this will result in other impacts to public and private projects that will rely on this growth forecast, and the associated Activity Based Model (2+) to project future impacts to transportation, GHG, air quality and noise.

d. The forecast has decreased in future population based on current trends, but it is not clear if there is enough housing provided with reductions and increases in some jurisdictions. Will the reduced amount of housing that will be provided result in an increased exacerbation of the affordability crisis?

e. There is a lack of clarity about how the Plan would be implemented at the municipal level. SANDAG should develop an approach for engaging with municipalities to ensure local support for delivering the regional transportation network. Staff from local jurisdiction have the knowledge and ability to share where there are land use assumptions that conflict with planning and zoning laws. Our analysis focused on the City of Carlsbad, but if these types of assumptions are made regionwide, it presents flaws in the overall analysis. These flaws put the assumed reductions in vehicle miles traveled ("VMT") and ability to implement the Regional Plan into question.

3. The area designated is controlled for use and activity density and intensity through its spatial association with the McClellan-Palomar Airport. The McClellan-Palomar Airport is defined by the Federal Aviation Administration ("FAA") as a commercial service airport that, in addition to private aircraft, has regularly scheduled commercial flights to Los Angeles International Airport ("LAX"). The McClellan-Palomar Airport Land Use Compatibility Plan ("ALUCP") is prepared according to FAA requirements and adopted by the San Diego County Regional Airport Authority acting as the Airport Land Use Commission for the County of San Diego.

   a. The ALUCP provides measures to minimize the public's exposure to excessive noise and safety hazards within areas around the airport and identifies areas likely to be impacted by noise and flight activity created by aircraft operations at the airport. These impacted areas include the Airport Influence Area ("AIA"), the Clear Zone and the Flight Activity Zone.

   b. Within the AIA, the ALUCP establishes six safety zones for the purpose of evaluating safety compatibility of new/future land use actions. The safety zone boundaries depict relative risk of aircraft accidents occurring near the airport and are derived from general aviation aircraft accident location data and data regarding the airport's runway configuration and airport operational procedures. The ALUCP limits development intensities in these zones by imposing floor area and lot coverage maximums, by incorporating risk reduction measures in the design and construction of buildings, and/or by restricting certain uses altogether. For example, all residential and virtually all non-residential uses are considered incompatible land uses in some zones, while considered to be either compatible or conditionally compatible with the airport in other zones. Attachment 4 shows the McClellan-Palomar Airport, noise contours and SANDAG's proposed housing units.

   c. If the proposed SANDAG land use assumptions are endorsed, an amendment to the city's General Plan would be required to change the land use designation to Mixed-Use Commercial or residential land uses within the existing Business Park in order to effectuate the underlying assumptions of SANDAG staff. This is not a realistic

Attachment A

assumption. Further, the protected airspace referenced in the AIA and the ALUCP must also be amended based on SANDAG's regional planning assumptions. (The FAA establishes airspace protection zones in the airspace above and surrounding airports in order to protect aircraft from obstructions such as buildings, towers, etc. in navigable airspace.)

d. When a General Plan is adopted or amended, the allowable growth pattern of an area is identified and the expansion or updating of the various land uses as specified in the General Plan can occur throughout the planning horizon. Without such growth considerations, the expansion or intensification of existing land uses could be considered "growth inducing." Unplanned and uncontrolled growth may have significant adverse impacts on the environment. CEQA requires a discussion of how a "project" could increase population, employment or housing growth in surrounding areas and the impacts resulting from this growth. The CEQA Guidelines indicate that a "project" would normally have a significant effect on the environment if it would induce substantial growth or a substantial concentration of population.

4. At this point, it is not clear if SANDAG's assumptions adequately contemplate the development patterns included in the Sustainable Communities Strategy ("SCS")/Regional Transportation Plan ("RTP"), and Regional Air Quality Strategy ("RAQS"), local climate action planning business as-usual estimates, sub-regional traffic modeling, or the airspace assumptions of AIA and the ALUCP.
5. The city seeks clarity on the Plan's underlying assumptions made to justify the proposed extensive high-speed rail network considering the significant changes in travel behavior which have occurred throughout the region as a result of the COVID-19 pandemic and due to the advancements in disruptive technologies such as telecommuting, autonomous vehicles, microtransit, etc.
    a. Recent North County Transit District ("NCTD") Coaster ridership data show riders are not returning to riding the Coaster in comparison to other modes of travel as shown in Attachment 5.
    b. This question is consistent with comments made by SANDAG's panel expert Bob Poole regarding the impact of the COVID-19 pandemic on transit ridership and mega-transit projects. (See comments by Bob Poole during the March 12, 2021 presentation to SANDAG starting at timestamp 1:30 p.m.: https://youtu.be/g-e6bNY5J_8?t=5410)
6. The city seeks clarity on why an alternatives analysis was not conducted with consideration of other transit alternatives such as automated /shared vehicle technologies and personalized zero emissions transit programs that are capable of utilizing the existing regional freeway infrastructure in response to these recent developments explained in the above comment.
7. The city seeks clarity on why the Plan does not incorporate policies to promote roundabouts over signalized intersections and include a budget line item under the Complete Corridors to fund the construction of roundabouts at new locations and to replace signalized intersections when found feasible. This clarification would support the Federal Highway Administration ("FHWA")'s project for *Accelerating Roundabout Implementation in the United States* and the County of San Diego Air Pollution Control Board's support for implementing roundabouts to address GHG and reduce fatalities.
8. The city seeks clarity on the project phasing proposed within the Plan. Specifically, the city is seeking to understand the timing of implementation of unfunded TransNet projects related to

the new projects presented within the Regional Plan. To support this, the city is requesting that SANDAG input the information requested in Table 1 (Attachment 6).

9. The city seeks specific data on the proposed 200 miles of rail service contemplated in the Plan. To support this, the city is requesting that SANDAG input the information requested in Table 3 (Attachment 7). Specific questions:
    a. Please provide more information about the scope of the high-speed rail alignments, potential vehicle technologies and their cost estimates.
    b. Will the Coaster keep the same rail alignment?
    c. What funding is programmed or planned for the Carlsbad Village railroad trench and the other projects along the current NCTD/Coaster Service right-of-way?
    d. Will some of the tracks be at grade with fencing and trains traveling at 110 miles per hour speeds?

SECTION 2: COMMENTS AND RECOMMENDATIONS

In addition to the comments on process and the Draft EIR provided above, city staff remain concerned that there is not enough detail on the feasibility of implementation of this significant shift in transportation strategy. On specific content in the plans, we outline our recommendations and comments below:

1. *Paying for the Plan:*

   The draft 2021 Regional Plan sets out an ambitious plan to build and operate a region-wide system of transportation projects, programs and other improvements. This is a substantial role for SANDAG to play in supporting both the construction and operation of these projects, programs and other improvements. SANDAG should set annual revenue targets to directly fund everything and should approve any recommended sustainable revenue tools to help meet these targets. Many of the funding strategies will require legislative changes, or voter-approved taxation. SANDAG should clarify what will occur if the funding is not available, if opposition to projects stops them from construction, and if General Plans in the region are not modified to implement the Plan.

2. *Appendix D: Sustainable Community Strategy Documentation:*

   Appendix D includes the Sustainable Communities Strategy, which outlines assumptions included in the Activity Based Model 2+ ("ABM 2+"), updated for this. This model will be necessary for use by publicly and privately initiated land use projects preparing documents for consistency with VMT/CEQA Guidelines and Traffic Impact Analysis ("TIA") Evaluations. City staff respectfully request direction from SANDAG on how to conduct modeling with the service bureau and how to factor in these assumptions applied to ABM 2+. Specifically, the addition of pricing, parking costs for coastal communities, 10% teleworking and micromobility. SANDAG should provide direction on how this could be worked into General Plans that are updated every 5-20 years.

3. *Appendix A: Transportation Projects, Programs, and Phasing:*

   Trips to and from school sites result in a significant congestion, VMT generation, and peak hour delay throughout the region. Additional funding and projects should be recommended with a specific focus on improving safety and multimodal access in and around school sites along with programs to incentivize non-single occupancy vehicle trips to schools.

Attachment A

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Table A.11: Given the proven success of the Carlsbad Connector microtransit pilot program, the city agrees with the Plan's recommendations to provide similar on-demand microtransit systems throughout North County at all mobility hub sites and major transit centers.

Table A.13: The segment of El Camino Real between Poinsettia Lane and Camino Vida Roble is proposed to be widened from two to three lanes to prime arterial standards. With the adoption of the city's General Plan, the city has determined that the widening of this portion of El Camino Real is not feasible due to constrained right-of-way and would result in negative impacts to other travel modes. City staff recommend removal of this proposed project recommendation CB32 (that is, a 'do nothing' scenario, or appraise and evaluate different mobility projects and/or alternative designs).

The preferred Interstate-5 freeway alternative identified in the North Coast Corridor ("NCC") Final EIR/EIS is the refined 8+4 Buffer alternative, with four freeway lanes and two managed lanes in each direction and completion by 2035. Appendix A, Table A.5 describes NCC project IDs CC004, 007 - 009 as "8F to 6F+4ML" with completion by 2050. While this might lead to further study, it is not clear why there is a different freeway configuration (i.e., reduction in freeway lanes) proposed. How does a reduction in lanes continue to meet NCC potential project benefits of maintaining or improving traffic operations and improving the safe and efficient regional movement of people and goods?

4. *Active Transportation:*

The city appreciates the Regional Plan's overall approach of providing a connected network of high-quality bicycle facilities throughout the region. Regional bikeways are recommended throughout the city including along Palomar Airport Road which will provide a key east-west connection and El Camino Real which will provide a new north-south bikeway connection through the city. Both roadways are proposed to include "on-street bikeways". Due to the high traffic volumes and vehicle speeds experienced along most of both corridors, the city recommends considering "off-street bikeways" or Class I facilities where feasible in order to stimulate the shift from personal motor vehicle use to people choosing to bike.

It is extremely important that municipal transportation plans align with regional transportation plans to achieve regional goals for land use and transportation and to promote the region working together to build a cohesive regional transportation network. Considering there are currently no mechanisms in place to ensure municipalities coordinate local transportation plans with regional planning documents, the Plan should provide an approach on how SANDAG plans to engage with municipalities, especially in areas of potential disagreement or conflict (as aforementioned in this subsection and others). It is also recommended that the Plan provide additional direction regarding the application of protected bikeways in a variety of applicable contexts. While vertical measures such as soft hit posts may be appropriate in lower volume and lower speed roadways, arterial roadways with high traffic volumes and high speeds warrant much more substantial physical protection from vehicles. In addition, special consideration should be given at intersections and driveways which may be impacted due to the additional width and visibility impacts created by protected bikeways.

City staff look forward to working with SANDAG on improving mobility and land use access in the region and building sustainable, equitable and healthy modes of transportation, and we appreciate the opportunity to comment on the Plan that will help the region realize these goals.

Attachment A

If you have any questions related to comments on the transportation network, please contact Tom Frank, Transportation Director/City Engineer, at Tom.Frank@carlsbadca.gov or if you need additional information related to comments on the land use assumptions, please contact Eric Lardy, Principal Planner, at Eric.Lardy@carlsbadca.gov.

Sincerely,

MMS
for

JEFF MURPHY
Community Development Director

TOM FRANK
Transportation Director/City Engineer

Attachments:

1. Government Code 65020 (S.B. 375) Summary
2. City of Carlsbad Mobility Hubs
3. City of Carlsbad – Palomar Airport Road Mobility Hub Analysis
4. Palomar-McLellan Airport Flight Paths
5. Recent NCTD Coaster Ridership Data
6. Table 1 - Project Data Request
7. Table 3 - Detail of Proposed Rail Lines

cc: Scott Chadwick, City Manager
Celia Brewer, City Attorney
Geoff Patnoe, Assistant City Manager
Ron Kemp, Assistant City Attorney
Robby Contreras, Assistant City Attorney
Gary Barberio, Deputy City Manager, Community Services
Paz Gomez, Deputy City Manager, Public Works
Mike Strong, Assistant Director, Community Development
Don Neu, City Planner
Nathan Schmidt, Transportation Planning and Mobility Manager
Jason Geldert, Engineering Manager
Eric Lardy, Principal Planner
Scott Donnell, Senior Planner
Corey Funk, Associate Planner

Attachment A

Attachment 1: Government Code 65020 (S.B. 375) Summary

Government Code section ("GOV §") 65080, also referred to as California Senate Bill 375 (Steinberg, 2008) ("SB 375"), is one area of law that provides SANDAG with guidance to which a regional transportation plan must be developed.

Among other things, the regional transportation plan that is developed "shall be an internally consistent document" (GOV § 65080 (b)) and shall include a "sustainable communities strategy prepared by each metropolitan planning organizations as follows" (GOV § 65080 (b)(2)(B)):

> *Each metropolitan planning organization shall prepare a sustainable communities strategy, subject to the requirements of Part 450 of Title 23 of, and Part 93 of Title 40 of, the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors. The sustainable communities strategy shall (i) identify the general location of uses, residential densities, and building intensities within the region, (ii) identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth, (iii) identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65584, (iv) identify a transportation network to service the transportation needs of the region, (v) gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01 , (vi) consider the state housing goals specified in Sections 65580 and 65581, (vii) set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board, and (viii) allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. Sec. 7506).*

The 2021 draft Regional Transportation Plan includes a Sustainable Communities Strategy ("SCS"), as required by SB 375 for the San Diego region (herein after called "draft Regional Plan"). The draft Regional Plan indicates that "SB 375 requires the SCS to include a pattern for forecasted growth and development that accomplishes the following: 1) When combined with the transportation network, the SCS will achieve the regional GHG emission–reduction targets; 2). The SCS accommodates the Regional Housing Needs Assessment ("RHNA") Determination; and 3) The SCS utilizes the most recent planning assumptions. (Reference p. 19 of the 2021 Regional Plan.)

Predicting the effect of transportation plans or projects on land uses and land use planning is critical to developing context sensitive solutions for transportation projects. Therefore, utilization of the most recent planning assumptions is not only necessary but is required as specifically stated therein GOV § 65080. If inconsistencies are found in the land use assumptions or adverse impacts are anticipated, SANDAG should be actively engaged in the development of measures to address these issues.

The SANDAG Board of Directors approved the final RHNA plan with the final housing unit allocation on July 10, 2020, which was based on the most recent land use planning assumptions and an adopted methodology to allocate housing in accordance with GOV §§ 65584.04(d and m). The City of Carlsbad received a total RHNA allocation of 3,873 units as a result of RHNA plan adoption. The adopted April 6, 2021 city's Housing Element accommodates its housing needs through current zoning and other programs

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as needed to meet the city's RHNA obligation at all income levels. The land use inputs derived from this local planning document constitutes the most recent land use assumptions. On July 13, 2021 the Department of Housing and Community Development found "the adopted housing element is in substantial compliance with State Housing Element Law (Article 10.6 of the Gov. Code).

The most recent planning assumptions are critical for the development of the draft Regional Plan as the document must comply with other specific state and federal mandates including a SCS per California Senate Bill 375, which achieves GHG emissions reduction targets set by the California Air Resources Board and compliance with federal civil rights (Title VI) requirements, environmental justice considerations, air quality conformity, and public participation. To monitor compliance and attainment of state reduction goals in GHG, GOV § 65080 (b)(2)) requires that:

> *(H) Prior to adopting a sustainable communities strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy and set forth the difference, if any, between the amount of that reduction and the target for the region established by the state board.*
>
> *(J)(i) Prior to starting the public participation process adopted pursuant to subparagraph (F), the metropolitan planning organization shall submit a description to the state board of the technical methodology it intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and, if appropriate, its alternative planning strategy.*

There is inevitably some uncertainty regarding the use of projected future conditions. However, what is certain is that the project will not operate under the conditions that exist today. There will be new residential and employment growth in the intervening years between now and the proposed build-out of the draft Regional Plan. Nonetheless, projections utilized should represent the best available information assembled by the local agencies with jurisdiction and expertise. Judgments about land use assumptions utilized in the draft Regional Plan should be based on and supported by facts, adopted plans, and "most recent planning assumptions," rather than speculation and personal opinions. The land use assumptions for "uses, residential densities, and building intensities within the region" (as required by GOV § 65080 (b)(2)(B)(i)) should also be the same, as that provided to the state board (as required per GOV §§ 65080 (b)(2)(H and J) in estimating and analyzing GHG from the SCS and the effect on growth and whether the effects of that growth would be significant in the context of the region's plans, natural setting, and growth patterns. Ultimately, the SCS must demonstrate whether SANDAG can meet the per capita passenger vehicle-related GHG emissions targets for 2035 set by the California Air Resources Board ("CARB").

SB 375 directs CARB to accept or reject the determination of SANDAG that its SCS submitted to CARB would, if implemented, achieve the region's GHG emissions reduction targets. CARB's technical evaluation of SANDAG's draft Regional Plan would be based on all the evidence provided, including the models, the data inputs and assumptions, the SCS strategies, and the performance indicators.

The transportation and planning assumptions are also extremely important as it is relied on for other master planning exercises. The Regional Air Quality Strategy ("RAQS") relies on information from CARB and SANDAG for information regarding projected growth in the cities and San Diego County. This in turn is utilized to address other state requirements, including the San Diego portion of the California State Implementation Plan ("SIP") and promulgating their own rules and regulations regarding air quality in the region or to address federal requirements.

Attachment A

Attachment 1: Government Code 65020 (S.B. 375) Summary

The analysis of land use impacts for transportation projects is guided by FHWA Technical Advisory T 6640.8 and the CEQA Guidelines.

Under the FHWA Technical Advisory T 6640.8 (G)(1), Guidance for Preparing and Processing Environmental, states:

> *This discussion [of land use] should identify the current development trends and the State and/or local government plans and policies on land use and growth in the area which will be impacted by the proposed project. These plans and policies are normally reflected in the area's comprehensive development plan, and include land use, transportation, public facilities, housing, community services, and other areas.*
>
> *The land use discussion should assess the consistency of the alternatives with the comprehensive development plans adopted for the area and (if applicable) other plans used in the development of the transportation plan required by Section [23 U.S. Code §] 134. The secondary social, economic, and environmental impacts of any substantial, foreseeable, induced development should be presented for each alternative, including adverse effects on existing communities. Where possible, the distinction between planned and unplanned growth should be identified.*

There is also a requirement to analyze the land use planning inconsistencies per CEQA Guidelines § 15126.2(a), which specifies that an EIR for a proposed project include:

> *The Significant Environmental Effects of the Proposed Project. An EIR shall identify and focus on the significant effects of the proposed project on the environment. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, the human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause or risk exacerbating by bringing development and people into the area affected. For example, the EIR should evaluate any potentially significant direct, indirect, or cumulative environmental impacts of locating development in areas susceptible to hazardous conditions (e.g., floodplains, coastlines, wildfire risk areas), including both short-term and long-term conditions, as identified in authoritative hazard maps, risk assessments or in land use plans addressing such hazards areas.*

Since the new land use assumptions are being utilized, as described by this letter, the EIR that is prepared shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected. The following are the basic steps in analyzing land use impacts as part of the community impact assessment process:

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Attachment 1: Government Code 65020 (S.B. 375) Summary

1. Inventory the existing land use patterns (including undeveloped land), development trends, and transportation systems. The inventory of existing land uses should include the following land use types: residential, commercial, industrial, recreational, institutional, public services, community services, emergency services, transportation, utilities, agriculture, and undeveloped land in the study area. The study area should include the surrounding community that is generally associated with the project area within which community impacts could occur. The inventory should also address development trends and identify recent developments in the study area to include the development's name, size, status (planned, built, under construction), and the jurisdiction in which it is located. A map showing the location of existing and planned land uses in the area should also be prepared.
2. Determine whether the project is consistent with local and regional policies that govern land use and development. For the consistency analysis, the policies and programs considered in the analysis should include: transportation plans and programs (MTPs/RTPs and MTIPs/RTIPs), regional growth plans, local General Plans that establish land use and growth management policies for the study area, and any specific or pipeline development proposals. This analysis should also include a discussion of consistency with the Coastal Zone Management Act of 1972, California Coastal Act of 1976, the National Wild and Scenic Rivers Act (16 USC 1271) and the California Wild and Scenic Rivers Act (Pub. Res. Code § 5093.50 et seq.). After preparing a preliminary list of relevant plans to be considered in the analysis, the SANDAG planner should meet with the staff of the various agencies to review the list to determine if it is complete and revise the list as necessary.
3. Assess the changes that would occur in land uses and growth with and without the project.
4. The draft Regional plan and each project alternative should be considered separately since the results may be different.
5. Develop measures to avoid, minimize, and/or mitigate potential adverse effects.

The resulting environmental analysis should identify the current development trends and the State and/or local government plans and policies on land use and growth in the area which will be impacted by the proposed project. These plans and policies are normally reflected in local General Plans. If found to be consistent, then the findings in the EIR should be documented in the report and no further analysis or action is necessary. When found not to be inconsistent with a policy or program, then consideration must be given to modifying the draft Reginal Plan alternative to make it consistent, or measures to address the inconsistency must be developed. SANDAG should be actively engaged in the development of measures to address these issues and be prepared to assess the consistency of the draft Regional Plan and alternatives with the comprehensive development plans adopted for the area and (if applicable) other plans used in the development of the transportation plan required by Section 23 U.S. Code § 134. For any new land use growth assumptions, the secondary social, economic, and environmental impacts of any substantial, foreseeable, induced development should be presented for the draft Regional Plan and each alternative, including adverse effects on existing communities. The results should be shared with the public during the public involvement process, e.g., at community meetings, etc. Public input should be considered by SANDAG and if necessary, the findings of the analysis should be revised to reflect information gained through the public involvement process.

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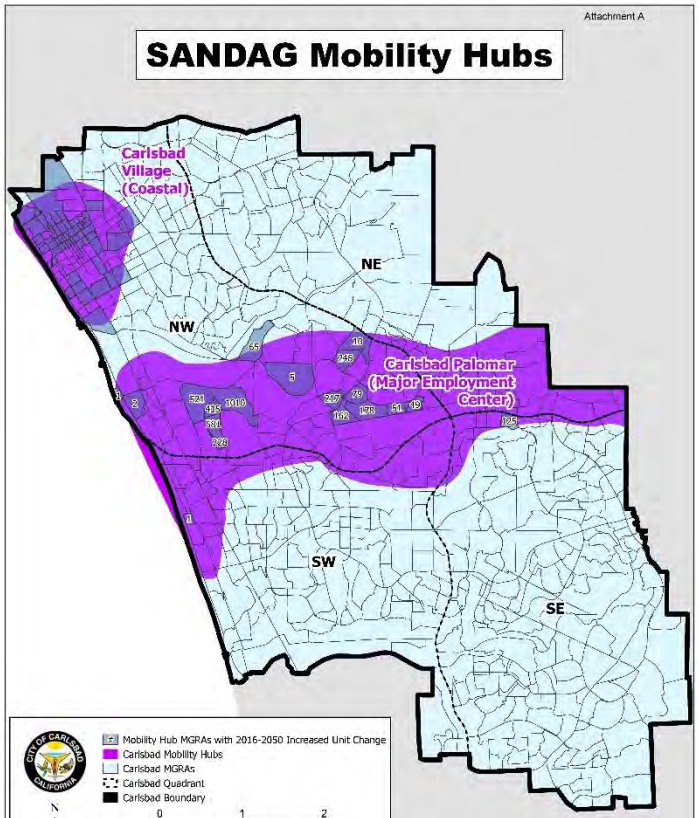
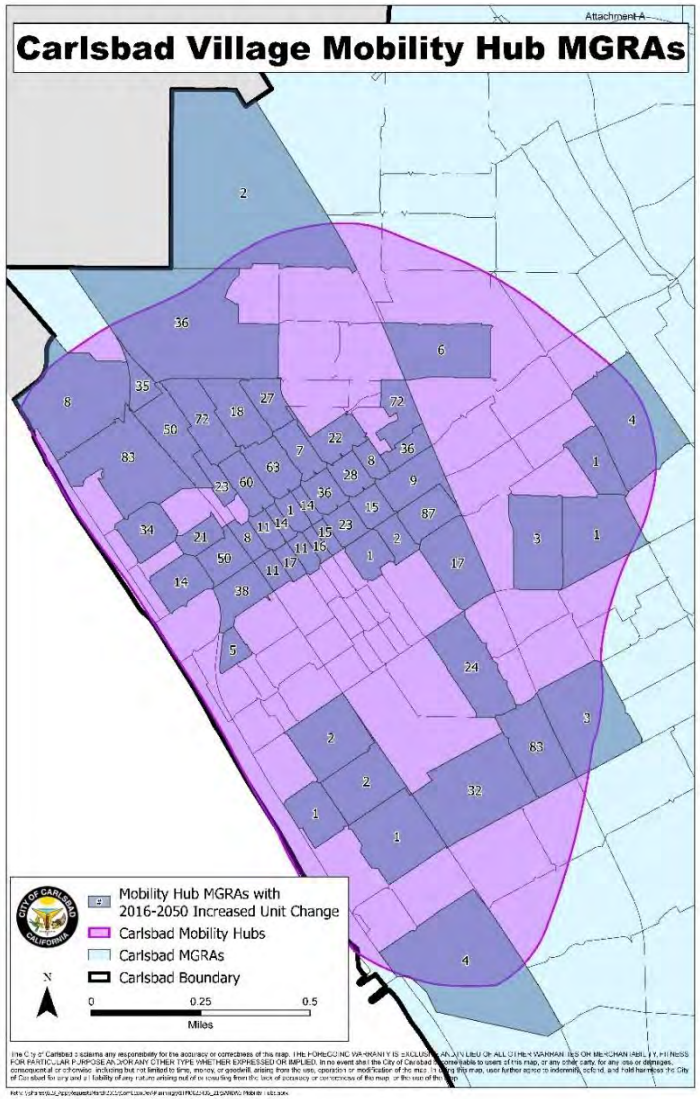
Attachment A



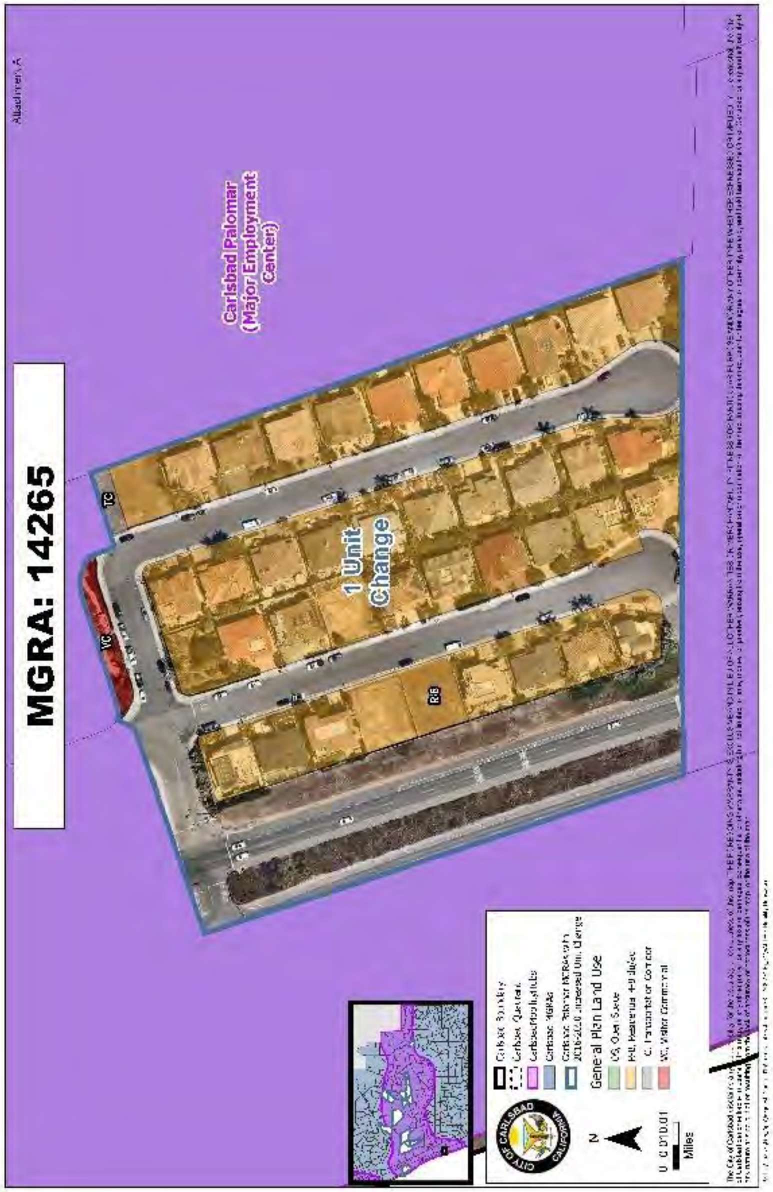
Hub Name	Hub Type	Total Population 2016	Total Houses 2016	Total Population 2025	Total Houses 2025	Total Jobs 2025	Total Population 2035	Total Houses 2035	Total Jobs 2035	Total Population 2050	Total Houses 2050	Total Jobs 2050
Carlsbad Village	Coastal	14087	6430	15095	6539	9290	16177	7075	9667	17293	7607	10044
Carlsbad Palomar	Major Employment Center	12853	5475	12275	5461	61074	19465	8503	67005	21080	9265	72900
N/A	Outside of Hubs	86239	34247	88793	35855	13896	84039	35855	14345	83929	35855	14900
N/A	All of Carlsbad	113179	46152	116163	47855	84260	119681	51433	91017	122302	52727	97844


Attachment A
Carlsbad Village Mobility Hub MGRAs
Mobility Hub MGRAs with 2016-2050 Increased Unit Change
Carlsbad Mobility Hubs
Carlsbad MGRAs
Carlsbad Boundary
N
0
0.25
0.5
Miles

MGRA Closer Look
Carlsbad Village (Coastal)
Carlsbad Palomar (Major Employment Center)
NW
NE
SW
SE
General Plan Land Use
Miles


MGRA: 14249
Carlsbad Palomar
(Major Employment
Center)
1 Unit
Change
2 Unit Change
S
General Plan Land Use
Miles

MGRA: 14251
Carlsbad Palomar (Major Employment Center)
1 Unit Change
2 Unit Change
General Plan Land Use
Miles


MGRA: 14265
Carlsbad Palomar
(Major Employment Center)
1 Unit
Change
TC
VC
R-8
General Plan Land Use
Miles

MGRA: 17984
Carlsbad Palomar
(Major Employment
Center)
125 Unit
Change
R-23
Carlsbad Boundary
Carlsbad Quarries
Carlsbad Rail Lines
Carlsbad MGRAs
Carlsbad Palomar MGRAs with
2015-2050 Increased Unit Change
General Plan Land Use
L Use Shopping Center
R- Planned Industrial
R-23 Residential 15-23 du/ac
N
0 0.01 0.02
Miles

MGRA: 22906
10 Unit Change
248 Unit Change
Carlsbad Palomar (Major Employment Center)
R-4
OS
PI
Aladhren A
Carlsbad Boundary
Carlsbad Quercus
Carlsbad Tribal Lands
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2021 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
R-4, Residential Dwelling
N
0 0.02 0.04
Miles

MGRA: 22910
10 Unit Change
248 Unit Change
Carlsbad Palomar (Major Employment Center)
OS
PI
Carlsbad Boundary
Carlsbad Quadrants
Carlsbad Municipal Lands
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2021 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
R-1, Residential Density
N
0 0.01 0.03
Miles

MGRA: 22917
65 Unit Change
5 Unit Change
217 Unit Change
R4
OS
Attachment A
Carlsbad Boundary
Carlsbad Quadrants
Carlsbad Hub Nodes
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
R-1.5, Residential 0-1.5 du/ac
R-15, Residential 8-15 du/ac
R-4, Residential 0-4 du/ac
N
0 0.02 0.04
Miles

MGRA: 22925
Carlsbad Palomar (Major Employment Center)
79 Unit Change
178 Unit Change
Carlsbad Boundary
Carlsbad Quarries
Carlsbad Rail Lands
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2050 Increased Unit Change
General Plan Land Use
OS Open Space
PI Planned Industrial
N
0 0.01 0.03
Miles

MGRA: 22926
Owned by Gemological Institute of America
Owned by CB Ranch Enterprises
521 Unit Change
1010 Unit Change
415 Unit Change
581 Unit Change
OS
PI
VC
Carlsbad Boundary
Carlsbad Queries
Carlsbad Hot Lots
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
R, Regional Commercial
VC, Visitor Commercial
N
0 0.03 0.05
Miles

MGRA: 22928
Owned by M and A Gabaee
521 Unit Change
415 Unit Change
1010 Unit Change
OS
Carlsbad Palomar (Major Employment Center)
VC
Owned by Grand Pacific Carlsbad LP
VC designation does not allow residential uses
Unit
nge
Carlsbad Boundary
Carlsbad Quadrants
Carlsbad Municipal Islands
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2021 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
VC, Visitor Commercial
N
0 0.02 0.04
Miles

MGRA: 22931
Carlsbad Palomar (Major Employment Center)
49 Unit Change
Carlsbad Boundary
Carlsbad Quadrant
Carlsbad Municipal Lands
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2050 Increased Unit Change
General Plan Land Use
PL Planned Industria
N
0 0.01 0.02
Miles

MGRA: 22930
Attachment A
5 Unit Change
79 Unit Change
178 Unit Change
217 Unit Change
162 Unit Change
OS
PI
P/O
Carlsbad Palomar Major Employment Center
Carlsbad Boundary
Carlsbad Quadrant
Carlsbad Municipal Islands
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2015-2020 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
P/O, Planned Industrial/Office
N
0 0.01 0.03
Miles

MGRA: 22933
217 Unit Change
79 Unit Change
162 Unit Change
178 Unit Change
PUD
OS
PI
General Plan Land Use
OS Open Space
Miles

MGRA: 22934
521 Unit Change
415 Unit Change
581 Unit Change
1010 Unit Change
Carlsbad Palomar (Major Employment Center)
General Plan Land Use
N
Miles

MGRA: 22936
217 Unit Change
79 Unit Change
178 Unit Change
51 Unit Change
162 Unit
Carlsbad Palomar (Major Employment Center)
General Plan Land Use
Miles

MGRA: 22937
51 Unit Change
49 Unit Change
Carlsbad Palomar (Major Employment Center)
General Plan Land Use
Miles

MGRA: 22941
Change
521 Unit Change
581 Unit Change
Carlsbad Palomar (Major Employment Center)
228 Unit Change
1010 Unit Change
VC
Miles

MGRA: 22947
581 Unit Change
228 Unit Change
General Plan Land Use
Miles

Carlsbad Palomar Mobility Hub MGRAs Near Airport
Notes
1. 2010 McClellan-Palomar Airport ALUCP Po cy 3.3.3 prohibits residential uses on properties, or portions of properties, with airport noise exposures greater than 65 dB CNEL
2. 2010 McClellan-Palomar Airport ALUCP Po cy 3.4.4 prohibits residential uses on properties, or portions of properties, within airport safety zones 1, 2 and 5.
65 dB CNEL
70 dB CNEL
75 dB CNEL
60 dB CNEL
Carlsbad Quadrant
MGRAs with 2015-2050 Increased Unit Change
Airport MGRA
ALUCP 2010 Safety Zones:
Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6
0 0.54 1.08
Miles

Attachment A Attachment 5

PLEASE NOTE: PRELIMINARY RIDERSHIP DATA - UNAUDITED AND SUBJECT TO ADJUSTMENTS

Month	COASTER - TOTAL RIDERSHIP			
	FY21	FY20	Variance	%
July	10,263	149,515	(139,252)	(93.1%)
Aug	9,412	133,482	(124,070)	(92.9%)
Sept	10,020	114,233	(104,213)	(91.2%)
Oct	10,968	111,045	(100,077)	(90.1%)
Nov	9,232	94,551	(85,319)	(90.2%)
Dec	7,519	83,951	(76,432)	(91.0%)
Jan	6,848	98,791	(91,943)	(93.1%)
Feb	7,866	91,845	(83,979)	(91.4%)
Mar	11,203	46,510	(35,307)	(75.9%)
Apr	15,184	5,244	9,940	189.5%
May	19,214	6,207	13,007	209.6%
June**	44,978	8,734	36,244	415.0%
YTD Total	**162,707**	**0**	**(781,401)**	
FY Total	162,707	944,108		

**Not final as of July 19, 2021

Month	COASTER - WEEKDAY			
	FY21	FY20	Variance	%
July	10,263	131,218	(120,955)	(92.2%)
Aug	9,412	112,100	(102,688)	(91.6%)
Sept	10,020	92,159	(82,139)	(89.1%)
Oct	10,968	105,601	(94,633)	(89.6%)
Nov	9,232	80,912	(71,680)	(88.6%)
Dec	7,519	75,534	(68,015)	(90.0%)
Jan	6,848	89,920	(83,072)	(92.4%)
Feb	7,866	84,613	(76,747)	(90.7%)
Mar	11,203	44,368	(33,165)	(74.7%)
Apr	15,184	5,244	9,940	189.5%
May	17,221	6,207	11,014	177.4%
June**	35,192	8,734	26,458	302.9%
YTD Total	**150,928**	**0**	**(685,682)**	
FY Total	150,928	836,610		

**Not final as of July 19, 2021

Month	COASTER - SATURDAY			
	FY21	FY20	Variance	%
July	-	9,415	(9,415)	(100.0%)
Aug	-	14,348	(14,348)	(100.0%)
Sept		8,449	(8,449)	(100.0%)
Oct	-	3,247	(3,247)	(100.0%)
Nov	-	8,385	(8,385)	(100.0%)
Dec	-	4,387	(4,387)	(100.0%)
Jan	-	3,218	(3,218)	(100.0%)
Feb	-	5,181	(5,181)	(100.0%)
Mar	-	665	(665)	(100.0%)
Apr		0	0	
May	1,387	0	1,387	
June**	5,881	0	5,881	
YTD Total	**7,268**	**0**	**(50,027)**	
FY Total	7,268	57,295		

**Not final as of July 19, 2021

Month	COASTER - SUNDAY			
	FY21	FY20	Variance	%
July	-	8,882	(8,882)	(100.0%)
Aug	-	7,034	(7,034)	(100.0%)
Sept	-	13,625	(13,625)	(100.0%)
Oct	-	2,197	(2,197)	(100.0%)
Nov	-	5,254	(5,254)	(100.0%)
Dec		4,030	(4,030)	(100.0%)
Jan	-	5,653	(5,653)	(100.0%)
Feb	-	2,051	(2,051)	(100.0%)
Mar	-	1,477	(1,477)	(100.0%)
Apr	-	0	0	
May	606	0	606	
June**	3,905	0	3,905	
YTD Total	**4,511**	**0**	**(45,692)**	
FY Total	4,511	50,203		

**Not final as of July 19, 2021

Attachment A

ATTACHMENT 6 – Project Data Request

Table 1: Project Information Request

Project	Estimated Total Project Cost	Current Planned Year of Construction	Draft RTP Assumed Year of Construction	Assumed Federal/State Matching Funding (%)
San Dieguito Lagoon Double Track and Platform				
Batiquitos Lagoon Double Track and Bridge Replacement				
Eastbrook to Shell Double Track				
Carlsbad Village Trench				
La Costa to Swami Double Track				
San Onofre Bridge Replacements				
Rose Canyon Bridge Replacements				

Attachment A

ATTACHMENT 7 – Detail of Proposed Rail Lines

Table 3: Detail of Proposed Rail Lines

	Rail Mode (CR, LR, HSR, Hybrid)	Directional Miles	% of Directional Miles Grade Separated/Tunnel	Number of Stations	Average Distance Between Stations	Average Speed Operated	Interoperable with COASTER equipment (Y/N)
New Rail Line							

COMMENT LETTER 5: COUNTY OF SAN DIEGO

Comment Letter 5

County of San Diego

DAHVIA LYNCH
DIRECTOR

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VINCE NICOLETTI
ASSISTANT DIRECTOR

August 28, 2023

Kirsten Uchitel
Associate Planner
SANDAG
401 B Street, Suite 800
San Diego, CA 92101

Sent via email to: RegionalPlanAmendment@sandag.org

REQUEST FOR COMMENTS ON THE SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT TO THE 2021 REGIONAL PLAN FOR THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)

Dear Kirsten Uchitel,

5-1 Thank you for the opportunity to review and provide comment on the San Diego Association of Governments (SANDAG) 2021 Regional Plan Supplemental Environmental Impact Report (SEIR). The County has previously provided comments on the 2021 Regional Plan Amendment on August 8, 2023 (Attachment A), the 2021 Draft Programmatic Environmental Impact Report (PEIR) on October 11, 2021 (Attachment B), and the 2021 Draft Regional Plan on August 6, 2021 (Attachment C).

In these letters, the County outlined opportunities and requested further clarification, exploration, and consideration of equitable and sustainable strategies for all communities within the region with specific emphasis on the unincorporated communities that have less access to alternative modes of transportation but higher populations than several incorporated cities. These comments still stand with the removal of the Regional Road Usage Charge (RUC), and the County looks forward to further discussions with SANDAG on how to best address equity considerations for the unincorporated areas.

The County is requesting a SANDAG Response to Comments on County comments provided in Sections 1 and 2 below and look forward to continued conversations and identification of solutions to comments provided in Section 3. County staff is committed to continuing to work with SANDAG staff on our shared goals of implementing programs and services to improve the quality of life of all residents and offers the following comments for your consideration. Please note that the comments provided should not be construed as County support or opposition for this Project.

RESPONSE TO COMMENT 5-1

SANDAG appreciates the County of San Diego's feedback on the proposed Amendment and your participation in the environmental review process. Please refer to subsequent responses to your comments below for detailed responses.

The County's comments on the proposed Amendment are addressed in the master responses to the proposed Amendment found in Appendix F.2. Please note that Response to Comments 5-3 through 5-7 apply to the proposed Amendment or to the approved Plan, not to the adequacy of the Draft SEIR, but responses are nevertheless provided.

Kirsten Uchitel
August 28, 2023
Page 2

Project Scope and Considerations

5-2 It appears, with the exception of pricing, the SEIR utilizes the same baseline conditions that were approved in the Plan PEIR. The policy and program areas also appear to remain unchanged, while combining recent data for a few significant criteria to better represent existing conditions. The SEIR states that the proposed Amendment would not change land use or anticipated growth within the region or introduce new transportation network or facility improvements from what was analyzed in the approved Plan PEIR, but rather compares anticipated future physical conditions that will result from the proposed Amendment to the baseline conditions for each resource area.

Section 1: Revenue Assumptions

5-3 The 2021 Regional Plan SEIR and the 2021 Regional Plan Amendment, discuss and analyze potential impacts due to the removal of the RUC. The Regional Road User Charge (RUC) was previously deemed a necessary component in the 2021 Regional Plan. However, the SEIR assumes a less than significant impact for removal of the RUC as the RUC was not intended to be implemented until 2035. The County requests further clarification on the anticipated revenues and criteria outlined below and further discussed in Attachment A.

1. **Revenue Assumptions**: How will the 2021 Regional Plan meet its revenue assumptions and proposed mitigation, including the risks and impacts to projects if these anticipated revenue sources are not realized over the life of the Plan? It is unclear whether projects that have previously been planned, programmed, or awarded as part of TransNet would retain funding that was previously allocated, or if there would be any changes to the current allocation or use of funds that local agencies receive directly for local road system improvements if the revenue assumptions are not realized; and

5-4 2. **State RUC:** As California is preparing to eliminate the sale of new gas-fueled cars and trucks by 2035, the current pilot State RUC could be a potentially critical funding source for Metropolitan Planning Organizations (MPO) and local governments. The County would like to understand if a State RUC is implemented, how it would impact various MPOs and local member agencies in terms funding eligibility for State RUC revenue or other funding sources such as TransNet. The County would like clarification on how the pilot State RUC is being considered within SANDAGs Regional Planning efforts and how it will be equitably distributed and not disproportionally impact unincorporated communities with limited access to transit.

Section 2: RTP Project Prioritization

The County requests to better understand how investment would be prioritized to ensure that both the benefits and costs of the Regional Plan are equitably distributed across the region. Further clarification of the methodology for how the amended plan and future projects will function without the RUC would be beneficial, as discussed in Attachment A.

5-5 1. **Project Prioritization:** It is unclear what methodology SANDAG will utilize for prioritizing projects if funding assumptions are not realized, including what, if any, criteria would be utilized to include or not include projects on the list for funding and how will local jurisdictions be involved in the process of project prioritization. The County reemphasizes that revenues generated should be allocated to support additional transportation and mobility options in unincorporated communities, which often have longer commutes and less access to alternative transportation options due to absence of regional planning for transit services to these communities.

RESPONSE TO COMMENT 5-2

This comment summarizes the scope of the SEIR and notes that the SEIR utilized the same baseline conditions that were in the approved Plan PEIR. This is not a comment on the adequacy of the SEIR. As such, no further response is required.

RESPONSE TO COMMENT 5-3

The regional road usage charge was not intended to be implemented until 2030, and as such was only a revenue source for the final 20 years of the approved Plan. The regional road usage charge was projected to generate $14.2 billion in revenues between 2030 and 2050 under the approved Plan and was anticipated to support transportation expenditures between 2030 and 2050, in combination with several other revenue sources. These regional road usage charge revenues have been excluded from the revenue projections in the Amendment.

Updated revenue assumptions for the Amendment provide sufficient revenues to fund the projects in the approved Plan. In updating revenue assumptions for the Amendment, SANDAG included the Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law), which was signed into law in November 2021, after the financial plan for the approved Plan was developed. The IIJA authorized $1.2 trillion for transportation and infrastructure spending with $550 billion of that figure going toward "new" investments and programs. The historic level of infrastructure investment from the federal and state government in the early phase years of the approved Plan was unknown and underestimated. The federal and state discretionary programs near-term estimates have been updated to assume historical leveraging rates of local TransNet revenue. The total estimate of near-term State and Federal Discretionary Programs resulting from IIJA is $6.35 billion.

In Fiscal Years 2021-2023 since the passage of IIJA, SANDAG has received $1.6 billion in discretionary funding revenue ($876 million in state funding and $766 million in federal funding) compared to the Amendment's assumed $950 million in discretionary funding revenue ($507 million in state funding and $441 million in federal funding).

RESPONSE TO COMMENT 5-4

The proposed state road usage charge would be administered by the State of California and revenue eligibility would likely be determined by the funding agency at the state level. The proposed Amendment assumes that Future State Revenues for Transportation may include a state road usage charge or other state transportation funding increase at a level that covers the funding gap created as fuel taxes depreciate over time due to greater fuel efficiency. The additional revenues are assumed to start in 2030 to fund the gap and support transit and highway capital expenses.

RESPONSE TO COMMENT 5-5

Project prioritization based on planning horizon years 2025, 2035 and 2050 under the Amendment remains unchanged from the approved Plan. It is worth noting that there will be more unknowns for revenues and costs in the outer years of the Regional Plan. SANDAG is typically required to update the Regional Plan every four years to account for the changes in funding outlooks, priorities, and planning assumptions, and will update priorities, costs, and revenues as part of the 2025 Regional Plan.

Section 3: Previously Provided Comments

Transportation and Focused Growth
SANDAG has provided scoping for unchanged components to the approved Plan which focuses population and employment growth within mobility hubs and existing urban areas to protect sensitive habitat and natural resource areas. The approved Plan also maintains transportation investments to support compact land development patterns to reduce "sprawl", land use patterns which promote social equity, and reduce vehicle miles traveled (VMT) while enhancing the efficiency of the transportation network through new technologies.
The County would like to take this opportunity to readdress that less than 1% of the unincorporated area was included within mobility hubs, which is where transit and on-demand travel infrastructure investment is focused. To promote greater equity, mobility hubs should be inclusive of adjacent unincorporated communities at a minimum, as many of these communities have greater populations than the incorporated cities and often less access to alternative transportation options. The County would like to continue to work with SANDAG to ensure equitable distribution of funding across the region. 5-6

1. **VMT Efficient and Infill Areas:** Specifically, the County is interested in understanding what land use strategies SANDAG is currently looking at to enhance funding support for transportation-related improvements for the unincorporated region. The County would like to ensure that unincorporated areas prime for funding located within with County's adopted Transportation Study Guide (TSG) that identifies VMT efficient and infill areas within the unincorporated area (maps previously provided to SANDAG) are included in the RTP.

Regional Housing Needs Assessment and Sustainable Communities Strategy
The County continues to request clarification on alignment between the Regional Housing Needs Assessment (RHNA) and the Sustainable Communities Strategies (SCS) as outlined in Attachment A. Specifically, how the goals in each of these plans can align where they appear to conflict today. 5-7

Green House Gas Emissions
In addition, the County would like to reiterate the request that SANDAG align GHG reduction and housing goals both in the 2021 Regional Plan and is looking for clarification on how GHG emissions are quantified with planned and future projects through the removal of the RUC. For an integrated and sustainable planning approach, it is important to achieve alignment between GHG reduction strategies and RHNA goals. 5-8

Conclusion
The County of San Diego is the second largest jurisdiction in the San Diego region, representing over 500,000 residents of its unincorporated communities. The County continues to request further clarification, exploration, and consideration of equitable and sustainable strategies for all communities within the region with specific emphasis on the unincorporated communities that have less access to alternative modes of transportation. Our main concern is that the Plan will focus future planning and transportation funding in the more urbanized cities, exacerbating existing disparities in transit services and infrastructure for unincorporated areas. The County is committed to working with SANDAG to ensure that potential funding and project opportunities within the unincorporated areas are not precluded in the future. 5-9

RESPONSE TO COMMENT 5-6

This comment reiterates the County of San Diego's comments provided on the approved Plan and is not related to the adequacy of the Draft SEIR.

The coverage area of each regional Mobility Hub represents a general area defined through a propensity analysis (detailed in Appendix T to the approved Plan). The mobility hubs of the approved Plan depict a framework that will be used to guide future collaborative planning efforts between SANDAG and local jurisdictions. SANDAG agrees that certain unincorporated areas identified by the County (i.e., North County Metro, Lakeside, and Spring Valley) are appropriate to consider in future mobility hub planning. The identified areas also align with Transit Priority Areas. In the final 2021 approved Plan, mobility hub maps were updated to reflect Transit Priority Areas to be more inclusive of these areas.

Investments in the approved Plan for unincorporated communities include improvements to local bus service (increased frequencies and span of service) and Flexible Fleet services. Additional details on the improvements to local bus service has been added to Appendix A to the approved Plan. In addition, the investments in the mobility hubs also serve residents of the unincorporated area as many residents live near a mobility hub and will be able to access the transit system within a reasonable amount of time on a Flexible Fleet service, then be able to make use of the Rapid bus, light rail, or commuter rail systems.

RESPONSE TO COMMENT 5-7

This comment reiterates the County of San Diego's comments provided on the approved Plan and is not related to the adequacy of the Draft SEIR.

The approved Plan accommodates the regional housing need determined by the Department of Housing and Community Development for the 6th Cycle RHNA. That determination specifically identified additional need resulting from a low vacancy rate, overcrowding, and housing unit demolitions in the region. The remaining housing projected through 2050 is based on the January

2020 vintage of the Department of Finance population projections. As described in Appendix F to the approved Plan, additional assumptions used in developing the forecasted housing units include a gradual increase in the region's vacancy rate to 4 percent by 2040, identification of vacation rentals as unoccupiable units, and a decline in household size as the population ages. While land use authority is reserved to the local jurisdictions, land use patterns will directly impact GHG emissions from the transportation sector. Government Code section 65080(b)(2)(B) requires that the SCS "set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board."

The SCS included in the approved Plan projects development that would achieve the state-mandated GHG emissions reduction target when integrated with the transportation investments, programs and policies in the Plan. The Regional Plan and its SCS are iterative planning documents that are typically updated every four years to account for new data, analysis, policy, and experience.

RESPONSE TO COMMENT 5-8

See Response to Comment 5-7 above for how the approved Plan projects development and transportation network improvements that would achieve the state-mandated GHG emissions reduction target. The analysis in Section 4.3*, Greenhouse Gas Emissions*, in this SEIR is based on the *2016 GHG Inventory and Projections for the San Diego Region* report prepared by SANDAG (Appendix H of the approved Plan PEIR), the updated Activity Based Model (ABM) traffic data associated with the proposed Amendment, and the updated EMFAC2017 emission rates associated with the repeal of the SAFE Vehicles Rule Part One. This report provides an estimate of 2016 GHG emissions for the San Diego region and GHG projections for the years 2025, 2035, and 2050. As discussed under Impact GHG-1 in Section 4.3, the proposed Amendment would result in a slight increase in GHG emissions within the San Diego region compared to the approved

5-9 cont.

The County appreciates the opportunity to comment on this Project. We look forward to receiving responses to our SEIR comments on Sections 1 and 2 and additional coordination between the County and SANDAG on our comments provided in Section 3. If you have any questions regarding these comments, please contact Ashley Rivero, Sustainable Land Use / Environmental Planner / Long Range Planning Division, at (619) 629-4438, or via e-mail at Ashley.Rivero@sdcounty.ca.gov.

Sincerely,

Lynnette Santos

Lynnette Santos
Chief, Long Range Planning Division
Planning & Development Services

Enclosures: Attachment A – COSD Comment Letter dated 08-08-2023 (2021 Amendment)
Attachment B – COSD Comment Letter dated 10-11-2021 (2021 PEIR)
Attachment C – COSD Comment Letter dated 08-06-2021 (2021 RP)

cc: Stephanie Hernandez, CAO Staff Officer, LUEG (Stephanie.Hernandez@sdcounty.ca.gov)
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Plan (0.5 percent in 2035 and 0.6 percent in 2050). This impact was determined to be less than significant because the proposed Amendment would not directly or indirectly result in an increase in GHG emissions compared to existing conditions because annual regional emissions would be approximately 28 percent lower in 2035 and 31 percent lower in 2050 relative to 2016.

RESPONSE TO COMMENT 5-9

Thank you for your comments. SANDAG looks forward to future coordination with the County of San Diego during preparation of the 2025 Regional Plan to address the concerns expressed in this comment.

Attachment A

County of San Diego

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August 8, 2023

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REQUEST FOR COMMENTS ON THE AMENDMENT TO THE 2021 REGIONAL PLAN FOR THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)

Dear Kirsten Uchitel,

5-10 (whole document)

County of San Diego (County) staff has reviewed the San Diego Association of Governments (SANDAG) Amendment to the 2021 Regional Plan (Project), dated June 13, 2023. The amendment proposes to remove the regional Road User Charge (RUC) from the 2021 Regional Plan. Included as part of this amendment are updates to the financial strategies intended to demonstrate that there will be sufficient revenues to pay for the planned transportation improvements without the RUC. The Amendment is also intended to demonstrate that the federal Air Quality Planning and Transportation Conformity will also still be met and analyzes consistency with state targets to reduce greenhouse gas (GHG) emissions consistent with Senate Bill 375 (SB 375).

County staff is committed to continuing to partner with SANDAG staff on our shared goals of implementing programs and services to improve the quality of life of our residents and offers the following comments for consideration. The comments provided below are not an indication of County support or opposition for this Project. However, the County remains concerned that the original 2021 Regional Plan does not sufficiently take into consideration the existing population of the unincorporated area, particularly underserved and disadvantaged communities. Currently, the Regional Plan planning framework precludes the County from competing for millions of dollars in much-needed infrastructure and planning funding available to the region. The County is concerned that the reduced revenue projected under the updated Regional Plan will exacerbate these inequities and possible future funding to the unincorporated area. This comment letter includes a summary of these, and other key issue areas identified by staff in previous comment letters to SANDAG on both the 2021 Regional Plan (August 6th, 2021) and the 2021 Regional

RESPONSE TO COMMENT 5-10

This comment was submitted during the NOP scoping period for the SEIR and is not a comment on the adequacy of the SEIR. The SEIR preparers received the County's NOP comments and considered them in the preparation of the SEIR. Many of the concerns expressed in the NOP comment letter are repeated in the County's Draft SEIR comment letter, and are addressed in the above responses. No additional response is required.

Plan Draft Programmatic Environmental Impact Report (October 11, 2021), provided as attachments to this comment letter (Attachment A and Attachment B, respectively). The County requests that SANDAG consider and provide responses to the County's comments.

Removal of the Regional Road User Charge and Revenue Assumptions

The Regional Road User Charge (RUC) was previously deemed a necessary component in the 2021 Regional Plan. As was shared in our comments on the 2021 Regional Plan (attachment A), it is important for the County to better understand how investment would be applied to ensure that both the benefits and costs of the Regional Plan are equitably distributed across the region and the methodology for how the amended plan and future projects will function without the RUC. The proposed project provides updated revenue assumptions that show a net decrease in revenues from $173 billion to $163 billion over the plan's 30-year life. The updated revenue assumptions include future local sales tax revenue, updated TransNet revenue, and updated State and Federal funding. The Amendment states that this revenue will be sufficient to fund the anticipated transportation improvements as well as the ability to document the federal Air Quality Planning and Transportation Conformity; however, these funding sources are not guaranteed and therefore, may not be realized.

For example, a TransNet amendment may not qualify for the 2024 ballot and/or may not be passed by the voters and Bipartisan Infrastructure Law funding (BIL) is a competitive grant process that may not provide the level of funding that is anticipated. Considering this, the County is requesting further clarification on:

1. **Revenue Assumptions**: How the 2021 Regional Plan will meet its revenue assumptions, including the risks and impacts to projects if these anticipated revenue sources are not realized over the life of the Plan. It is unclear whether projects that have previously been planned, programmed, or awarded as part of TransNet would retain funding that was previously allocated, or if there would be any changes to the current allocation or use of funds that local agencies receive directly for local road system improvements if the revenue assumptions are not realized; and

2. **Project Prioritization:** It is unclear what methodology SANDAG will utilize for prioritizing projects if funding assumptions are not realized, including what, if any, criteria would be utilized to include or not include projects on the list for funding and how will local jurisdictions be involved in the process of project prioritization. The County reemphasizes that revenues generated should be allocated to support additional transportation and mobility options in unincorporated communities, which often have longer commutes and less access to alternative transportation options due to absence of regional planning for transit services to these communities.

Expansion of Mobility Hubs

In previous comment letters to SANDAG, the County provided comments regarding the need for more consideration and planning for the unincorporated areas. Less than 1% of the unincorporated area was included within mobility hubs, which is where transit and on-demand travel infrastructure investment is focused. To promote greater equity, mobility hubs should be inclusive of adjacent unincorporated communities, many which have greater populations than the incorporated cities and often, less access to alternative transportation options.

The removal of the RUC should be examined in terms of its impact on the planned transportation system, particularly in providing travelers with alternatives to driving. Previously, the County provided comment regarding the 2021 Regional Plan which delineated the boundaries of mobility hubs along jurisdictional boundaries, excluding more than 99% of the unincorporated area. The County maintains that there are opportunities to expand the proposed mobility hubs to include unincorporated communities, which would benefit from additional access to investment associated with inclusion in the adjacent mobility hubs, as these communities have few existing alternative options to driving. Below are some areas the County requests clarification on regarding mobility hubs:

1. **Implications:** Providing an assessment on the implications of the change in proposed funding sources, including the removal of the RUC, on the unincorporated county and its potential impact on growth in these areas is important.

2. **Development:** Understanding how this change might affect growth dynamics is key for evaluating regional development.

3. **Boundaries:** Reconsidering the boundaries of mobility hubs to include unincorporated areas is an important aspect to address within the regional plan. The County requests further details on SANDAG's approach to reevaluating the boundaries of the mobility hubs.

Regional Housing Needs Assessment and Sustainable Communities Strategy

County staff relies on SANDAG population, housing, and job growth forecasts for planning efforts. For the 6th Cycle Regional Housing Needs Allocation (RHNA), the unincorporated portion of the County was allocated 6,700 units for the planning period of 2021 – 2029. The 2021 Regional Plan forecasts that the County will build 7,419 units through 2050. Historic data shows that from 2010 to 2020, 7,330 new homes were built in the unincorporated area. If that trend continued, an additional 22,000 new homes would be built in the unincorporated area by 2050. In contrast to these historical trends, the Regional Plan forecast projects that the unincorporated county will only grow by 719 units between 2029 and 2035 and projects no future growth in the unincorporated area through 2050. The Sustainable Community Strategy for the unincorporated area should not be a no-growth strategy. The County is interested in understanding how SANDAG will account for future growth within the unincorporated areas, including natural growth beyond 2035 in the Regional Plan. Growth within the unincorporated areas should be included in the regional planning process. Below are some areas the County requests clarification regarding RHNA and the Sustainable Communities Strategies (SCS):

1. **Goals and Growth:** The County is requesting further transparency as to how SANDAG plans to reconcile this discrepancy and ensure alignment between RHNA goals, growth forecasts, funding availability, and the need to incorporate future growth in the unincorporated areas into the regional planning process.

2. **Alignment:** There should be alignment between RHNA goals, growth forecasts, and funding availability.

Greenhouse Gas Reduction Strategies

The County has and continues to request that SANDAG align GHG reduction and housing goals both in the 2021 Regional Plan and in the forthcoming 2025 Regional Plan. Ensuring alignment between GHG reduction strategies and RHNA goals is also essential for an integrated and sustainable planning approach. SANDAG's alignment with California Air and Resource Board (CARB) targets for transportation emissions must consider similar GHG reduction targets which are also set by CARB for local jurisdictions. The Amendment to the 2021 Regional Plan also identifies the need for funding beyond a fuel tax due to the shift in electric vehicles (EV) and more fuel-efficient vehicles. Below are some areas the County requests clarification on regarding GHG Reduction Strategies:

1. **Feasibility:** The County requests further transparency about the strategy and feasibility of implementing programs and plans to achieve GHG reductions in compliance with State targets that may be impacted from the removal of the RUC. Elaborating on how SANDAG intends to align these components would enhance transparency and clarity and will help ensure that coordination of regional GHG reduction goals.

2. **Local Alignment:** Please clarify how RUC removal and funding sources impact SANDAG partnerships which rely on grant funding to initiate programs, improvements, and initiatives which support smart growth in Mobility Hubs, connection, and reduction of Vehicle Miles Traveled (VMT) initiatives for GHG emissions within the unincorporated areas including environmental considerations and RHNA growth projection alignments.

3. **Cost:** It would be valuable to know if SANDAG made network performance assumptions to account for the contemporary increased costs of vehicles, rate of electric vehicle adoption, maintenance, fuel, insurance, inflation, and the overall cost of living for drivers, commuters, and other social and demographic trends and shifts to quantify the economic and greenhouse gas emissions impact.

4. **Funding Allocations:** Clarifying the approach taken to funding allocation would provide a better understanding of the analysis for the GHG emission reduction alignments with the state, CARB, grant funding, and expanding Mobility Hub connections within the unincorporated region. Regarding the implementation of projects and achievement of compliant emission levels, it would be beneficial to clarify which funds have been reallocated or will be added for this purpose.

Conclusion

Loss or reallocation of funding due to the removal of funding sources such as the RUC and pending funding sources could affect anticipated projects and limit the County's ability to provide housing and affordable, reliable, and safe mobility options, particularly to underserved communities. It is important to understand how SANDAG will address potential scenarios where revenue sources, such as TransNet funding or competitive BIL funding, are not realized at the anticipated levels. In such cases, it would be valuable to know how SANDAG will prioritize projects and adjust its strategies to ensure effective and equitable resource allocation and what role local jurisdictions will have in the project prioritization process. The County would like to understand if there are plans to revise an updated RUC or consideration of a similar revenue stream to replace the RUC and how SANDAG plans to address the County's previously provided feedback (Attachment A and Attachment B). The County is committed to working with SANDAG to ensure

that potential funding and project opportunities within the unincorporated areas are not precluded in the future. The County would like to understand how County comments provided to date will be addressed in this amended plan and on a go-forward basis.

The County appreciates the opportunity to comment on this Project. We look forward to receiving future documents related to this Project and providing additional assistance, at your request. If you have any questions regarding these comments, please contact Ashley Rivero, Land Use / Environmental Planner / Long Range Planning Division, at (619) 629-4438, or via e-mail at Ashley.Rivero@sdcounty.ca.gov.

Sincerely,

Lynnette Santos

Lynnette Santos
Chief, Long Range Planning Division
Planning & Development Services

Enclosures: Attachment A – COSD Comment Letter 2021-08-06
Attachment B – COSD Comment Letter 2021-10-11

cc: Stephanie Hernandez, CAO Staff Officer, LUEG (Stephanie.Hernandez@sdcounty.ca.gov)
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Attachment B

County of San Diego

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ACTING ASSISTANT DIRECTOR

October 11, 2021

Kirsten Uchitel
Associate Planner
SANDAG
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San Diego, CA 92101

Sent via email to: RegionalPlanEIR@sandag.org

RE: REQUEST FOR COMMENTS ON THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT FOR SAN DIEGO FORWARD: THE 2021 REGIONAL PLAN FOR SANDAG

Dear Ms. Uchitel,

5-11 (whole document)

The County of San Diego (County) staff reviewed SANDAG's Draft Programmatic Environmental Impact Report (Draft PEIR) for "San Diego Forward: The 2021 Regional Plan," dated August 2021. County staff provided detailed comments regarding the 2021 Regional Plan (Proposed Plan) in a letter previously submitted to SANDAG. The letter, dated August 6, 2021 (Attachment A), outlined opportunities within the Proposed Plan for which County staff requested further clarification, exploration, and consideration. County staff would like to continue discussions with SANDAG on how these opportunities align with the objectives of the proposed plan and the Draft PEIR.

To ensure that potential opportunities within the unincorporated area are not precluded in the future, County staff requests that SANDAG consider the comments below on the Draft PEIR and that any necessary refinements be reflected in Chapter 2, Project Description, and analyzed in the appropriate sections of the Final PEIR. County staff appreciates the opportunity to review the Draft PEIR for the Proposed Plan and offers the following comments for your consideration:

GENERAL

1. The Draft PEIR (Table 2-5) notes that 56% (1,855,597 out of 3,309,510 total people) of San Diego County residents are currently located outside of a Mobility Hub Network, including 512,597 people in the unincorporated area. With the significant investment described in the Proposed Plan, County staff would like to ensure that it is fairly and equitably distributed for the benefit of all County residents, including rural residents living in unincorporated communities.

RESPONSE TO COMMENT 5-11

Thank you for providing the County of San Diego's comment letter on the approved Plan PEIR. Responses to these comments were provided in Responses to Comments 12-1 through 12-48 in Appendix P1 to the approved Plan PEIR.

2. Staff recommends the inclusion of potential investments in roads identified in the County's Mobility Element and in the Regional Arterial System that would further connect the unincorporated area to proposed mobility hubs, with consideration of those roads that also serve as evacuation routes.

3. Staff would also request consideration of how transit can be aligned with recreation access points to increase access to these important regional amenities.

4. The Proposed Plan focuses on mobility and land use changes that would serve three primary user groups: pedestrians, bicyclists, and vehicles. Please consider updating the analysis to consider mobility needs for wildlife (wildlife corridors) and for equestrians where appropriate.

5. From a social equity standpoint, please consider if allowing single occupancy vehicles should be permitted in managed lanes. Allowing single occupants that can afford to travel in managed lanes will create some inequities in the community.

AIRPORTS

1. The San Diego County Regional Airport Authority adopted Airport Land Use Compatibility Plans for the eight airports, which included land use compatibility policies related to airspace, noise, safety, and overflight. Those policies have been adopted by the County of San Diego through its General Plan and Zoning Code. After evaluating the forecasted increases in housing and jobs around the Mobility Hubs, there are several land use assumptions made in the Proposed Plan related to safety and noise around Fallbrook Airpark, Jacumba Airport, Gillespie Field, and McClellan–Palomar Airport that County staff would like to better understand. For example, there are forecasted incompatible housing increases within the Runway Protection Zones at Gillespie Field. These inconsistencies could result in making the assumed intensities and density increases included in the Proposed Plan unachievable.

AESTHETICS AND VISUAL RESOURCES

1. Page 4.1-10 of the Draft PEIR mentions the County of San Diego Dark Sky Ordinance and associated regulation of outdoor light fixtures within 15 miles of local observatories. This ordinance also includes the minimization of light pollution to reduce impacts to wildlife. Please consider expanding the analysis to address direct and indirect impacts due to light and glare on open space lands and wildlife corridors/linkages.

2. It is not clear what type of trees and vegetation will be used to replace impacted vegetation in cases where vegetation disruption causes potential aesthetic impacts (Mitigation Measures AES-2a, 2b, AES-3a). Mitigation Measure BIO-1e specifies that certain invasive species shall not be used to replace impacted vegetation. Please consider adding that same requirement to the Aesthetic/Visual Resources mitigation measures in the Draft PEIR.

BIOLOGICAL RESOURCES

1. Please clarify the significant reduction in acreages impacted between the 2015 EIR and the 2021 Draft EIR, especially as they relate to Wetlands and Riparian Habitat, Upland Habitat, Agricultural Land, and Transportation. The differences do not appear to correlate with the changes or updates made between the 2015 and 2021 Regional Plan.

2. On January 13, 2017, County staff submitted comments to SANDAG on the Notice of Preparation (NOP) of the Regional Plan Draft PEIR (Attachment B). In that letter, the County requested that SANDAG coordinate with County staff and evaluate in the Draft PEIR potential direct and indirect impacts on the Multiple Species Conservation Plan (MSCP). The comments related to the MSCP still stand (Attachment B). As such, it is not clear how the Proposed Plan would impact the MSCP, or if there is specific mitigation proposed to reduce these impacts. Please consider updating the analysis to clarify these potential impacts and associated mitigation.

3. Please ensure that maps are using the latest GIS data available from SanGIS, which is regularly updated. For example, the maps showing Open Space Parks and Recreation land (Figures 4.15-1 and 4.15-2) seem to be missing some of the County's Department of Parks and Recreation properties. Please ensure all references to County Department of Parks and Recreation properties are updated throughout the 2021 Draft PEIR.

4. Please consider including County parks and preserves and associated proposed project impacts to each specific park and preserve within the Draft PEIR; data on County parks and preserves can be found on SanGIS. For example, on Page 4.4-107, it states that the largest area of encroachment and associated impacts would occur on the Otay Ranch Preserve. However, the level and extent of that potential impact is not clear. Please coordinate in advance with the County Department of Parks and Recreation prior to implementation of projects that may have impacts to County parks and preserves.

5. The figures within the Draft PEIR do not show property ownership overlayed with the proposed project. To better understand and analyze potential impacts of the project, please consider the inclusion of a figure that shows County parks and preserves.

6. Please consider revising "Hardline Preserve" to "MSCP Preserve" throughout the Draft PEIR, as MSCP Preserve is the term most commonly used.

7. In Table 4.2-2 and Table 4.4-6, Otay Ranch and the associated General Development Plan/Subregional Plan are categorized as falling under the jurisdiction of the City of Chula Vista. While the text clarifies that Otay Ranch is jointly owned and managed by the City of Chula Vista and the County, the categorization in the tables is unclear. Please consider revising the tables to show the joint ownership and management of this area.

8. Figure 4.4-16, San Diego Conservation Planning Areas and Conserved Lands, does not appear to be consistent with the Subarea Plans under Adopted MSCP/MHCP Subregional Plans listed in Table 4.4-5. Please consider revising these to show all Subarea Plan Areas.

9. On page 4.4-107, Section BIO-4 Analysis Methodology, please consider updating the methodology to take into consideration requirements of the Public Park Preservation Act of

1971 (Public Resources Code Sections 5400-5409). In the event the Proposed Plan results in "take" of any County MSCP Preserve Lands, this would be considered "take" of designated park land and may require land or other compensation for loss of park land.

10. In Figures 4.4-3 through 4.4-8, one of the data sources for these figures is stated as the County of San Diego's SanBios data from 2017. Please consider using the County of San Diego's SanBios data through 2020, as this contains updated data.

11. Table 4.4-5 states that the County is pursuing an amendment to the South County Subarea Plan to include the Quino checkerspot butterfly (QCB). Please remove reference to QCB as the County has expanded the project to the Regional Butterflies Habitat Conservation Plan (RBHCP) to include a comprehensive approach that would cover QCB, Harbison's dun skipper, Hermes copper, and the Laguna Mountains skipper.

    a. Additionally, the RBHCP in currently being developed and has not yet been adopted. Therefore, reference to the RBHCP may not need to be included in Table 4.4-5 related to adopted regional conservation plans. Please consider removing the reference.

12. Given the significance and regional importance of wildlife corridors and wildlife linkages, please consider updating the analysis to consider areas where linkages and corridors could be impacted by the Proposed Plan and any mitigation measures that could be implemented to improve wildlife linkages.

13. Spread of invasive plants is a significant regional issue that many land managers face throughout the San Diego region. County staff supports Mitigation Measure BIO-1e, which would require a prohibition on planting or seeding of invasive species that appear on the most recent version of the California Invasive Plant Council California Invasive Plant Inventory. Please consider inclusion of an integrated invasive plant control plan with enforceable protocols for maintenance, construction, and emergency activities to follow when working within and moving between important habitat areas.

14. Section 4.4 has a description of the TransNet Environmental Mitigation Program (EMP) and states that the EMP provides funding for the acquisition, restoration, and management costs for the implementation of local Natural Community Conservation Plans (NCCPs). The EMP or other funding from TransNet may not provide a long-term regional funding source for conservation, including funding for the acquisition or ongoing management and monitoring. Please consider updating the PEIR to clarify that an adequate regional funding source has not yet been identified or put in place, which leaves local jurisdictions responsible for securing ongoing funding to implement local NCCPs.

CULTURAL RESOURCES

1. Please consider associated potential impacts on County parks and preserves related to cultural and historical resources. Staff understand that this is a PEIR, so please include the maximum possible area of impacts. Please coordinate in advance with the County Department of Parks and Recreation prior to implementation of projects that may have impacts to County parks and preserves and associated cultural and historical resources.

GEOLOGY, SOILS AND PALEONTOLOGY

1. The Grading and Erosion Regulations section does not identify and summarize applicable grading and erosion control ordinances. Applicable regulations are generally referenced to support a less-than-significant determination for thresholds (e.g GEO-3, Result in Substantial Soil Erosion or the Loss of Topsoil). The County's Grading Ordinance appears to only be referenced within the context of paleontological resources. Please consider also referencing the County's Grading Ordinance in the Grading and Erosion Regulations section.

2. Please consider revising Table 4.7-3 to reference the County of San Diego General Plan Goals S-8 and S-9. Local Policies Concerning Geologic and Seismic Hazards references Goal S-7, but it should read "The San Diego County General Plan Goal S-8 and S-9 in the Safety Element requires minimized personal injury and property damage resulting from seismic hazards, and damage caused by mudslides, landslides, or rock falls."

3. Within Table 4.7-4, Local Policies Concerning Unique Geological and Paleontological Features, for the County of San Diego, please consider including the following: "COS-9.1 Preservation. Require the salvage and preservation of unique paleontological resources when exposed to the elements during excavation or grading activities or other development processes."

4. The Draft PEIR states "there would be development on soils incapable of supporting septic tanks or Onsite Wastewater Treatment Systems (OWTS)." However, the analysis also states that through future corrective measures/regulatory requirements, impacts to groundwater would be less than significant. Please consider adding a discussion of which regulations would be applicable and how those regulatory requirements would ensure that there would be no adverse groundwater impacts.

GREENHOUSE GAS EMISSIONS

1. On January 13, 2017, the County submitted comments to SANDAG on the Notice of Preparation (NOP) of the Regional Plan Draft PEIR (Attachment B). At the time of these comments, the County was in the process of preparing the 2018 Climate Action Plan (CAP). Since the release of the NOP and submittal of these comments, County staff is now preparing a CAP Update that will set new greenhouse gas (GHG) emissions targets and identify measures to reduce GHG emissions in the unincorporated area. County staff would like to work collaboratively with SANDAG on the Proposed Plan to identify an efficient and cleaner multi-modal transportation system that reduces vehicle miles traveled for unincorporated area residents by providing mobility options, which would reduce greenhouse gas emissions, and improve air quality for all residents in the region (Attachment A). County staff requests that SANDAG consider the comments provided previously and listed below in the Draft PEIR.

    a. *Analyze alternatives that address multi-modal transportation options for the unincorporated county, particularly as it relates to transit service and alternative fuel infrastructure.* County staff would encourage SANDAG to consider extending the benefits of mobility hubs and transit leap opportunities to unincorporated communities in which these services do not currently exist.

b. *Analyze whether the developed/urban communities within the unincorporated county meet the Urban Area Transit Strategy.* The Urban Area Transit Strategy, considered in the previous 2050 Regional Transportation Plan, is not considered in this Proposed Plan and is replaced with broad concepts of Mobility Hubs. County staff is supportive of these efforts to centralize mobility investments for all users in urbanized areas. However, staff would encourage SANDAG to consider in the project description and analysis the potential for mobility hubs concepts that can be applied to unincorporated area communities that are not currently identified as being within and benefiting from mobility hubs and associated investments (Attachment A).

c. *Analyze an environmentally sustainable transportation system that can reduce vehicle miles traveled, gasoline consumption, and GHG emissions, while providing alternative modes of transportation for all economic sectors of our population.* County staff continues to encourage SANDAG to consider and identify sustainable transportation systems and strategies that can reduce vehicle miles traveled and GHG emissions from residents in unincorporated communities. For example, extending existing transit routes and reducing headways to increase transit service to unincorporated communities will encourage increased ridership, reduce vehicle trips, and will assist in decreasing GHG emissions.

d. *The County requests that SANDAG staff coordinate with County staff to ensure that the most recent planning assumptions are incorporated in the transportation models and growth forecasts.* It is not clear what projects or plans were considered and incorporated into the Proposed Plan modeling. However, there are some areas in which inconsistencies appear between approved development projects in the unincorporated area and projected growth identified in the Proposed Plan modeling. County staff relies on SANDAG population, housing, and job growth forecasts for planning efforts. As recently as July 2021, long-range planning efforts, such as the County's Housing Element Update, have relied on forecasts that project future housing growth in the unincorporated area of 50,184 new units between 2018 and 2050. These prior projections are significantly greater than the forecasted growth of 7,419 units during a similar time period in the Proposed Plan. Further, historic data shows that from 2010 to 2020, 7,330 new homes were built in the unincorporated area. If that trend continued, an additional 22,000 new homes would be built in the unincorporated area by 2050. County staff would appreciate continued coordination with SANDAG staff to ensure the most recent planning assumptions and projects are considered.

2. Based upon a review of the Draft PEIR, County staff encourages continued collaboration with SANDAG to ensure the most recent planning and land use assumptions (including approved development projects or those that are under construction) are reflected in regional modeling and growth forecasting. Through continued collaboration, the County can support the vision of the Proposed Plan by developing the CAP Update and related efforts based on similar assumptions and goals.

HAZARDS AND HAZARDOUS MATERIALS

1. Within Table 4.9-1 Major EnviroStor Hazardous Waste and Substances Sites in the San Diego Region, the list of sites does not appear to match the current Cortese list on the Department of Toxic Substances Control's (DTSC) website. Please consider adding a figure

to show where these sites are in relation to proposed land use changes and transportation improvements.

2. Threshold HAZ-1 seems to apply specifically for potential release of hazardous materials during pre-construction, demolition, or construction activities. However, the analysis in this section also discusses the potential for releases during operational activities. Please consider updating the mitigation measure to reduce the risk of hazardous materials releases during project operation.

HYDROLOGY AND WATER QUALITY

1. Please consider augmenting the analysis to consider potential water quality impacts that could affect sensitive wildlife species and their associated habitats.

LAND USE

1. The County's *Community Trails Master Plan* identifies multiple regional trails that are regional resources, as they would benefit residents and visitors throughout the region. Please consider how the potential transportation and land use changes could impact the connectivity of these regional trails. The County also requests that SANDAG consider further coordination with the County Department of Parks and Recreation during implementation of the Proposed Plan when potential regional and community trail impacts are anticipated. Additionally, please consider working with County staff to look for further opportunities to provide trail connections during implementation of transportation infrastructure projects where feasible.

PUBLIC SERVICES AND UTILITIES (RECREATIONAL FACILITIES)

1. Within the Section "County and City General Plans," please consider adding the County's Parkland Dedication Ordinance, Community Trails Master Plan, and County of San Diego Parks Master Plan to the Draft PEIR, as these are all resource documents that discuss regional trail and recreation facilities.

2. Page 4.15-42 and Page 4.15-45, Section REC-1:

    a. 2025
        i. The Regional Growth and Land Use Change section states that "*As noted under Threshold PS-1, approximately 78.8 percent of the 2025 population growth would occur within the City of San Diego, City of Chula Vista, and City of Escondido.*" Of the remaining 21.2 percent, it is unclear what portion is anticipated within the unincorporated County area. Please consider revising the PEIR to further clarify this.
        ii. Transportation Network Improvements and Programs section: Please consider adding a table showing areas of impacts to recreational facilities belonging to or within the County's jurisdiction. The PEIR does not appear to specify which County of San Diego Recreational Facilities are impacted by the proposed project.

b. 2035

i. As with the comment above under "2025," please consider revising the Regional Growth and Land Use Change section to show the percentage breakdown within the unincorporated area of the county.

ii. This section also states, *"Between 2026 and 2035, the majority of the open space conversions would occur as a result of growth and land use change in the Warner Springs area shown in Figure 4.15-2, which would convert 275 acres of open space parks to spaced rural residential* use." However, the analysis does not appear to explain the potential impact associated with this proposed loss of open space/park land. It should also be noted that this project is not yet approved and therefore may not result in open space conversion for additional growth and land use change(s). Please consider updating the analysis to take this into consideration and to further clarify and explain potential impacts.

3. Page 4.15-47, under REC-1 Implement Mitigation Measures Parks and other Recreational Facilities, please specify and/or provide information on the impacted facilities within the unincorporated areas of the county. Are there impacts to existing parks, campgrounds, trails, etc.? Please also consider including details of impacted County of San Diego facilities within the environmental document.

4. In the Pedestrian Facilities section of the Draft PEIR it states, "It should be noted that trail facilities are also considered part of the pedestrian network. The trail facilities within the San Diego region are further described and analyzed in Section 4.15, Public Services and Utilities, of this PEIR, along with other recreational facilities." Section 4.15 Public Services and Utilities further explains the trail facilities. However, the information is limited in that it only references the California Coastal Trail. Trails are an important aspect of the regional transportation network. Please consider updating the analysis to include existing trails and pathways and include this information as part of the pedestrian facilities assessment. The County's existing *Community Trails Master Plan* may be used as a reference document regarding regional trails.

TRANSPORTATION

1. If the boundaries of the proposed mobility hubs are not intended to be static, please include narratives and/or graphics to further clarify that the boundaries are not absolute.

2. County staff recommends that any 5 Big Moves pilot program or case study include and/or consider the unincorporated area (i.e. Flexible Fleet Strategic Plan).

3. Please coordinate with County staff in advance of transportation plans that go through or near County properties and facilities.

4. Regarding page 4.16-34, 4.16.3 SIGNIFICANCE CRITERIA, TRA-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including -transit, roadway, bicycle, and pedestrian facilities:

a. 2025: Transportation Network Improvements and Programs, under Pedestrian (page 4.16-34). Table 4.16-8 shows a Pedestrian Analysis table showing average daily walking trips, walking mode share, and average length of walking trip. It is unclear as to whether these include an assessment of trail system(s) and trail facilities. Please consider including trails as a part of this analysis.

b. 2035: Transportation Network Improvements and Programs. Same comment as 2025 above.

c. 2050: Transportation Network Improvements and Programs. Same comment as 2025 above.

Thank you again for the opportunity to comment on the Draft PEIR. County staff looks forward to continued discussions with SANDAG on how we can work together to better ensure that consideration is given to future investments and incentives that would result in expanded options for transit, active transportation, and shorter and fewer automobile trips. If you have any questions regarding these comments, please contact Luis Duran, Land Use/Environmental Planner, at (619) 214-4698, or via e-mail at luis.duran@sdcounty.ca.gov.

Sincerely,

Lynnette Tessitore

Lynnette Tessitore
Chief, Long Range Planning Division
Planning & Development Services

cc: Rosa Olascoaga, Policy Advisor, Board of Supervisors, District 1
Gregory Kazmer, Land Use Director, Board of Supervisors, District 2
Cody Petterson, Policy Advisor, Board of Supervisors, District 3
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August 6, 2021

Hasan Ikhrata
Executive Director
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San Diego, CA 92101

Sent via email to: SDForward@sandag.org

REQUEST FOR COMMENTS ON THE DRAFT 2021 REGIONAL PLAN FOR THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)

Dear Mr. Ikhrata,

Thank you to the San Diego Association of Governments (SANDAG) for your efforts to create a Regional Comprehensive Plan and Sustainable Communities Strategy (Regional Plan) to help design a regional transportation system that is fast, fair, clean and reduces greenhouse gas emissions. As County staff, we are committed to working with SANDAG staff on our shared goals of implementing programs and services to improve the quality of life of our residents as we determine where and how we grow, connect people and places, protect the environment, and provide opportunity for all of our region's residents.

This comment letter outlines areas within the Regional Plan for which County staff would like to request further clarification, exploration, and consideration. Attachment A provides additional comments from County staff for your consideration and incorporates additional information related to County-specific plans or policies that may further inform the Regional Plan.

LAND USE, TRANSPORTATION PLANNING, AND SMART GROWTH

Land use and transportation planning in the San Diego region is evolving to better address the most pressing issues of today, including climate change, quality of life, attainable housing, and social and economic inequities. The County has several planning efforts underway which prioritize addressing these issues, including the Regional Decarbonization Framework, the Climate Action Plan Update, the Electric Vehicle Roadmap, Office of Environmental and Climate Justice, and establishment of VMT thresholds. While independent of the Regional Plan, these efforts are aligned with the goals of the Regional Plan. County staff is interested in further understanding the regional growth modeling assumptions used within the Regional Plan and alignment with these County efforts.

PLANNING FOR THE UNINCORPORATED AREAS

The County represents more than 500,000 residents who live within 34 unincorporated communities throughout the region. County staff would like to better understand how the Regional Plan will address transportation options outside of proposed mobility hubs for those communities. The unincorporated community of Ramona, for example, has a population of 36,000 residents, which is a larger population than the incorporated communities of Imperial Beach, Lemon Grove, Coronado, Solana Beach, and Del Mar.

Less than 1% of the unincorporated area is within the proposed mobility hubs, which is where transit and on-demand travel infrastructure investment will be focused. The unincorporated north and east county communities represent a significant population with higher-than-average VMT in the region. Investment in public transit and other transportation options will make it easier for people to drive less, which results in decreased GHG emissions. However, investment outside of mobility hubs appears to be limited, which would make it difficult for unincorporated residents to use new transit service.

To promote greater equity, County staff see opportunities to expand the proposed mobility hubs to include adjacent unincorporated communities. When we overlay the proposed mobility hubs with the County's VMT efficient areas (using both the unincorporated and regional averages), North County Metro, Lakeside, and Spring Valley (Attachment B) are adjacent to what appear to be proposed mobility hubs. These unincorporated communities would benefit from additional access and investment associated with inclusion in adjacent mobility hubs, as these communities have few existing alternative options to driving.

County staff is also interested in understanding how Regional Housing Needs Assessment (RHNA) allocations would be assigned. For the current 6th RHNA cycle, which covers 2021 – 2029, SANDAG allocated 6,700 units for the unincorporated area, with a total housing forecast in the Regional Plan of 7,419 units through 2050 for the unincorporated area. This forecast projects the County's RHNA allocation of 6,700 units being met by 2029, with an additional growth of 719 units by 2035, and projects no further growth in the unincorporated area through 2050. Based on this forecast, it appears that beyond 2035, all future housing needs in the region from RHNA cycles would be allocated to and met by growth in incorporated cities.

In order to fulfill the goals of the Regional Plan in providing access to affordable, reliable, and safe mobility options for everyone in the region, County staff would like to work with SANDAG to ensure consideration is given to future investments and incentives within the unincorporated area that would result in expanded options for transit and active transportation, and to encourage shorter and fewer automobile trips, including locations of mobility hubs, transit leap, flexible fleets, and complete corridors.

COMMUTER PATTERNS AND MOBILITY IN THE UNINCORPORATED AREA

The Regional Plan focuses on five key investment opportunities: Next Operating System (OS), Complete Corridors, Transit Leap, Mobility Hubs, and Flexible Fleets. Many of the Regional Plan investments would be contained within proposed mobility hubs and along identified complete corridors. The majority of infrastructure improvements appear to support a shift to new rail and trolley line infrastructure, largely along the coastal areas. However, Ramona, Lakeside, Spring Valley, and other unincorporated east and north county communities represent a significant population that would benefit from similar consideration for infrastructure improvements as that proposed for the coastal communities with less population. According to SANDAG's "Commuting Patterns in the San Diego Region" study, a majority of the unincorporated east and north county residents who are employed commute outside the boundaries of their County Supervisorial

district, with 84% of District 2 residents working outside the district and 82% of District 5 residents working outside the district. Vehicle miles traveled could be reduced through greater mobility options for the unincorporated area (i.e., expansion of mobility hubs, increased transit options such as bus rapid transit, and improvements to transit frequency and service areas).

The County worked closely with SANDAG as part of the 2015 Regional Plan to identify roads in the unincorporated areas to include in the Regional Arterial System (RAS). Many of these roads serve as evacuation routes during emergencies, provide access to unincorporated communities from Caltrans roads, and create a link to the larger San Diego region.

County staff would like to continue coordinating with SANDAG to further identify Regional Plan investments in infrastructure, technology, and communication improvements for roads identified in both the County's Mobility Element and unincorporated roads included in the RAS and how these investments will further connect the unincorporated area to proposed mobility hubs, flexible fleets, or transit leaps. In addition to providing efficient movement of people and goods, these investments would increase the efficiency of evacuation routes, relay important information on evacuation conditions to first responders, and assist in getting residents safely away from hazardous conditions, all important components of resiliency planning.

FUNDING AND FINANCING

County staff appreciates the difficulty in forecasting funding and revenue sources for a regional transportation network. The Regional Plan identifies use of TransNet funds as part of the implementation, but it is not clear whether projects that have previously been planned, programmed, or awarded as part of the previous plan using TransNet would retain that funding allocation, or if there would be a reallocation of these funds as part of the Regional Plan. It is also unclear if there would be any changes to the current allocation or use of funds that local agencies receive directly for local road system improvements. The unincorporated area relies on TransNet funding to build, improve, and maintain transportation facilities that enhance roadway safety and support smart growth development, including road infrastructure to support increased transit options. Loss or reallocation of this funding could affect these projects and limit the County's ability to provide transportation services in support of our goal of reducing greenhouse gas emissions.

The Regional Plan indicates that user fees would help build a transportation system that provides travelers with alternatives to driving. County staff would like to further discuss how the proposed road user charges would be developed, implemented, and applied to ensure that this funding strategy will not disproportionately burden unincorporated communities, which often have longer commutes and less access to alternative transportation options due to lack of regional planning for transit services to these communities. Revenues generated should also be allocated to support additional transportation and mobility options in unincorporated communities, while vehicle use by those with access to alternate modes of transportation should be disincentivized since their communities are receiving significant investments in public transit.

County staff looks forward to learning more about how future funding and investment would be applied to ensure that both the benefits and the costs of the Regional Plan are equitably distributed across the region.

RESOURCE DISTRIBUTION

The Regional Plan provides SANDAG with an opportunity to guide future investments in a way that meets smart growth objectives and reduces GHG emissions, but also guides future allocation of resources to achieve equitable outcomes. Several of the unincorporated communities, such as Lakeside, Spring Valley, and Ramona, have larger populations than some of the incorporated

cities that are prioritized in the Regional Plan. In review of the proposed plan expenditures, a majority of the capital investments (55% of RTP funding) appear to go toward mobility hubs, complete corridors, and Next OS investments that are primarily outside of unincorporated communities. It is unclear what proportion of investment would go toward addressing mobility challenges within unincorporated communities and infrastructure investment that would provide linkages between the unincorporated areas and the proposed mobility hubs, transit leap, flexible fleets, and complete corridors. County staff is committed to working with SANDAG to further identify opportunities to equitably distribute the mobility benefits of the 5 Big Moves and further reduce GHG emissions regionwide.

The County appreciates the opportunity to comment on the Draft Regional Plan, and staff looks forward to future discussions regarding these comments. If you have questions regarding this letter, please contact Rami Talleh, Deputy Director with the Department of Planning and Development Services at 858-495-5475 or Rami.Talleh@sdcounty.ca.gov.

Sincerely,

SARAH E. AGHASSI
Deputy Chief Administrative Officer

cc: Chair Nathan Fletcher: Board of Supervisors, District 4
Vice Chair Nora Vargas: Board of Supervisors, District 1
Supervisor Joel Anderson: Board of Supervisors, District 2
Supervisor Terra Lawson-Remer: Board of Supervisors, District 3
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Kathleen Flannery, Acting Director, Planning and Development Services
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Brian Albright, Director, Department of Parks and Recreation

Attachments:
Attachment A: Comments from County Departments and Divisions
Attachment B: Expansion Potential of Mobility Hubs (North County Metro, Lakeside, and Spring Valley)

County of San Diego

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

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ATTACHMENT A
2021 REGIONAL PLAN COMMENTS FROM COUNTY OF SAN DIEGO DEPARTMENTS AND DIVISIONS

County of San Diego (County) staff in Planning & Development Services, the Department of Public Works, and the Department of Parks and Recreation reviewed the San Diego Association of Governments' (SANDAG) Draft 2021 Regional Plan (Regional Plan), for applicability to their respective work programs and County initiatives that are planned or currently underway. The County offers the following comments for your consideration.

TRANSPORTATION

1. County staff would be interested to better understand and discuss further with SANDAG the potential for Regional Plan strategies to be used as part of a potential regional mitigation strategy related to Vehicle Miles Traveled (VMT).

2. When would funding be expected to be implemented related to Transit Leap/Flexible Fleet Connections to Mobility Hub areas, as this is a potential opportunity to reduce VMT for residents living in the unincorporated area?

3. The County has developed an Electric Vehicle (EV) Roadmap and is committed to assisting with the deployment of regionwide EV infrastructure to reduce GHG emissions in the transportation sector. Could SANDAG provide additional details on the future development, application, and implementation of the proposed Road User Fees and other proposed road usage revenues? Will consideration be given to exemptions for use of clean mobility strategies?

4. County staff would like to discuss with SANDAG staff the Regional Plan strategies, including funding for Major Transit (for purposes of CEQA, defined as a rail transit station, ferry terminal *served by bus or rail, and a bus stop with two or more lines that provide transit service at 15 minute intervals or better during peak commute periods)* in areas of the unincorporated area that are identified as "VMT efficient" in the SANDAG VMT Map.

5. There is significant investment in development and infrastructure in the Otay Mesa area, and Otay Mesa is identified as a "Mobility Hub" area in the RTP. County staff would like to better understand what funding has been identified for this "Mobility Hub" area.

6. County staff would like to discuss with SANDAG the potential for "Major Transit" services along the I-15 corridor, such as the potential for buses on shoulders.

ROADS/TRAFFIC/FIELD ENGINEERING

7. Complete Corridors, such as the SR-67 and I-15 Corridors, are envisioned to act as the backbone of the regional transportation system. In addition to providing for safe and comfortable spaces to get around for all modes of transportation, road improvements such as intersection widening are important for the safe and reliable movement of all road users. County staff would like to discuss further identification and investment within complete corridors that provide linkages to the unincorporated area. These improvements could assist in providing routes for the County's eastern and northern rural regions that could be essential in the event of accidents or fire evacuation. For example, County staff would like to discuss with SANDAG the option of including safety improvements along the SR-67 Corridor on Wildcat Canyon Road, as this road is a relief route to SR-67. Additionally, road improvements on Old Hwy 395 and Pala Temecula Road in the north county may merit further conversation, as both of these roads serve as alternate routes to I-15 during peak traffic hours.

8. County staff would like to further discuss improvements of low flow crossings that are necessary to limit area flooding as well as the safe passage of motorists.

9. County staff would like to work with SANDAG to identify evacuation routes at a regional level, and the possibility of creating a separate section within the Regional Plan that would identify improvements of these routes and potential funding that could be part of the 2021 Regional Plan.

10. County staff would like to discuss with SANDAG how Smart Infrastructure and Connected Vehicles will address the legal and financial challenges with sharing traffic signal data with private entities and the liability of the potential misuse of signal timing data.

11. County staff would like to better understand the impact of Electric Vehicle Infrastructure on County of San Diego public right of way.

WATERSHED

12. Stormwater Management & Regional Needs Assessment; suggested edits in Appendix R, page R-2:
    a. "The County of San Diego has initiated an update of the 2010 Needs Assessment's 40-year water quality cost estimate using more recent water quality planning documents and strategies for achieving regulatory compliance and water quality objectives throughout the region. Since 2010, the Copermittees have worked to formulate Water Quality Improvement Plans (WQIPs) for the region's watersheds, including strategies, planned projects, and schedules to address their respective water quality objectives and compliance needs. The update to the Needs Assessment is intended to assist the County in planning and decision making and will draw upon the most recent WQIPs, with a focus on unincorporated areas to develop updated cost information."

BIOLOGY

13. Figure AA.1 shows the conserved habitat lands in the San Diego region (light green) and displays the areas included in the four subregional habitat conservation plans (subfigure).
    a. The Pre-Approved Mitigation Area (PAMA) of the South County Multiple Species Conservation Program (MSCP) and draft PAMA of the draft North County MSCP are labeled as "Proposed Conserved Habitat Lands" (dark green). This label may be misinterpreted by readers. While the MSCP Preserves will be assembled within the PAMA, not all PAMA designated lands will be conserved or are being actively pursued for conservation at this time.
    b. The draft Focused Conservation Area (FCA) of the draft East County MSCP was not included in the "Proposed Conserved Habitat Lands" (dark green). This area is equivalent to the draft North County MSCP's draft PAMA and should be included in this figure.
    c. The Rancho Guejito property located north of San Pasqual Valley Road will not be included in future iterations of the draft North County MSCP Permit Area. The portions of this property identified within the draft North County MSCP should be changed from dark green to white to reflect this change.
    d. In the subfigure, both the draft North County MSCP and Multiple Habitat Conservation Plan (MHCP) are identified by the number "4." The MHCP area should be identified by the number "1" to correspond with the provided key.

14. Although the draft 2021 Regional Plan mentions the importance of protecting habitat corridors and wildlife linkages through land acquisition, it does not appear to include the construction of safe passageways to connect wildlife to preserved lands bisected by existing and future regional transit corridors. It is recommended that SANDAG work with the San Diego Monitoring and Management Program (SDMMP) and community partners to identify the areas along regional transit corridors that would benefit from wildlife crossings and that these improvements be included in future regional projects.

PARKS AND RECREATION

15. For proposed projects that occur adjacent to Department of Parks and Recreation (DPR) County-managed lands, DPR staff would like to coordinate with SANDAG staff to ensure wildlife connectivity is maintained from adjacent lands to preserved County lands, including wildlife-only crossings.

16. For proposed projects that occur adjacent to or near existing or potential future trail connections, DPR staff would like to coordinate with SANDAG staff on trail connectivity throughout the County and incorporate safe multi-use crossings such as bridges or overpasses for recreational use.

17. DPR staff request SANDAG staff coordinate in developing SANDAG's 5 Comprehensive Multimodal Corridor Plans as mentioned in Appendix B: Implementation near DPR facilities:
    a. Central Mobility Hub and Connections, Coast, Canyons, and Trails – State Route 52, North County – SPRINTER/Palomar Airport Road/State Route 78/State Route 76, San Vicente – State Route 67, South Bay to Sorrento – Purple Line/Interstate 805/Blue Line/Interstate 5 South.

b. Study additional seven corridors to inform the next Regional Continuing Actions.
c. Pursue funding opportunities for projects, programs, and services identified in completed CMCPs.

18. County Staff would like to discuss with SANDAG the possibility of including trails and trail systems within the unincorporated area as part of the 2021 Regional Plan and to consider California Coastal Trail connections to DPR facilities.

AIRPORTS

19. As the owner and operator for eight airports in the region, County Airports continues efforts to safely operate its facilities, ensure future land uses are compatible with aircraft operations, and protect the health and safety of people and property within the vicinity of an airport. The County's airports serve as transportation hubs, emergency service facilities and economic engines in their communities. McClellan-Palomar Airport is the only commercial airport in North County and has over 145,000 annual aircraft operations. It is also a Customs and Border Protection Port of Entry. In East County, Gillespie Field is the 44th busiest airport in the nation with 240,000 annual operations. Both of these airports support thousands of jobs and generate hundreds of millions of dollars in economic activity. The County looks forward to the integration of these airports into the regional transportation system.

20. The San Diego County Regional Airport Authority adopted Airport Land Use Compatibility Plans for the eight airports, which included land use compatibility policies related to airspace, noise, safety and overflight. Those policies have been adopted by the County of San Diego through its General Plan and Zoning Code. After evaluating the forecasted increases in housing and jobs around the Mobility Hubs, there are several land use assumptions related to safety and noise around Fallbrook Airpark, Jacumba Airport, Gillespie Field and McClellan-Palomar Airport that County staff would like to better understand. For example, there are forecasted incompatible housing increases within the Runway Protection Zones at Gillespie Field. These inconsistencies could result in the assumed intensities and densities increases being unachievable.

County of San Diego

SARAH E. AGHASSI
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ATTACHMENT B
2021 REGIONAL PLAN PROPOSED MOBILITY HUB EXPANSION AREAS

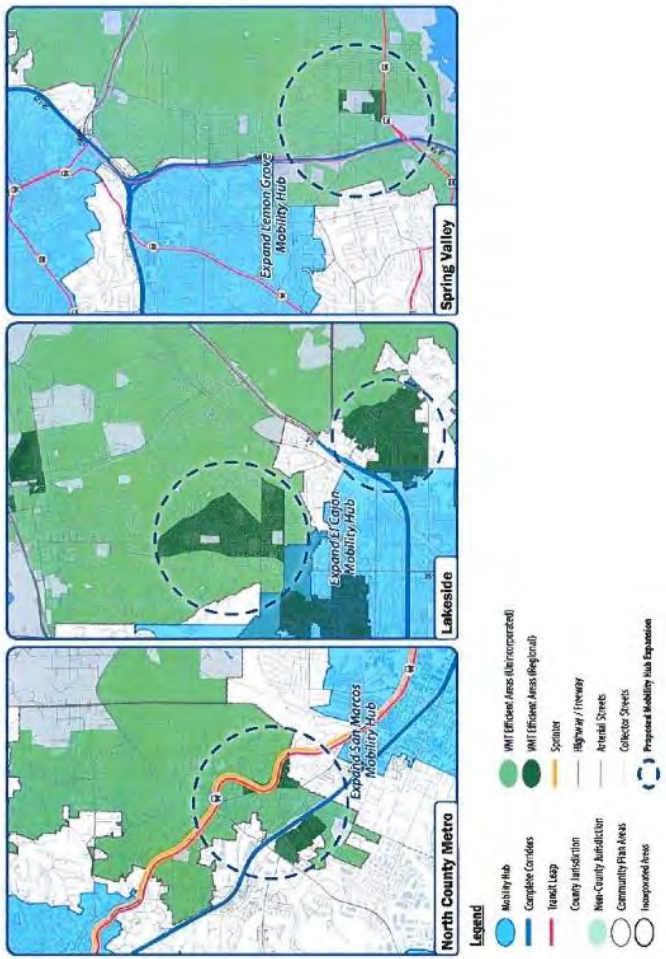
The Regional Plan will focus future investment, development, and growth in centralized areas referred to as "mobility hubs." There are locations in the unincorporated area that the County has forecasted for future growth, which included already designated Regional Housing Needs Assessment (RHNA) sites, and are located within close proximity to a proposed mobility hub. The County would like to work with SANDAG to consider the expansion of proposed mobility hubs to include additional unincorporated north and east county communities. As indicated in Figure 1, these proposed expansions include areas in North County Metro, Lakeside, and Spring Valley. Additional details for these three mobility hub expansions are provided below.

The North County Metro community is located between the proposed Vista and San Marcos mobility hubs. Expansion of the San Marcos mobility hub could include the Buena Creek Sprinter Station and additional housing units, including multiple RHNA sites.

Lakeside has multiple areas that are identified as efficient areas compared to the regional vehicle miles traveled (VMT) average. These areas are located immediately adjacent to the proposed El Cajon mobility hub. Expansion of the El Cajon mobility hub could include these VMT efficient areas as well as potentially including additional growth areas in Lakeside along the I-8 corridor.

Spring Valley is located east of the proposed Lemon Grove mobility hub and south of the proposed La Mesa mobility hub. This community has existing transit access along Jamacha Boulevard and is in close proximity to the MTS Trolley stations in Lemon Grove. Expansion of this mobility hub could include the Spring Valley areas near SR-125 and along Jamacha Boulevard.

Figure 1 Proposed Mobility Hub Expansions in North and East County



County of San Diego

MARK WARDLAW
DIRECTOR

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January 13, 2017

Andrew Martin
Senior Regional Planner
SANDAG
401 B Street, Suite 800
San Diego, CA 92101

Via email to: Andrew.martin@sandag.org

COMMENTS ON THE NOTICE OF PREPARATION OF A PROGRAM ENVIRONMENTAL IMPACT REPORT FOR SAN DIEGO FORWARD: THE REGIONAL PLAN

Dear Mr. Martin,

The County of San Diego (County) has reviewed the Notice of Preparation for the San Diego Forward Regional Plan Program Environmental Impact Report (PEIR). We appreciate the opportunity to provide input for SANDAG's consideration. The County offers the following comments.

TRAFFIC/TRANSPORTATION

The County is currently developing an Active Transportation Plan (ATP) for the unincorporated communities of the county. The ATP will integrate and update several existing plans and documents into a single plan. The ATP will serve as a master plan and policy document to guide the development and maintenance of active transportation infrastructure including sidewalks, pathways, multi-use trails, and bikeways; the ATP will include the Safe Routes to School programs for the unincorporated county. Additionally, the ATP is expected to be one of the implementation measures for the County's Climate Action Plan. Please consider identifying transit improvements and ATP and Transportation Demand Measures (TDM) in the SANDAG Regional Plan and PEIR which will assist the rural unincorporated areas in meeting the region's greenhouse gas (GHG) emission goals.

AIRPORTS

Incorporating the Regional Aviation Strategic Plan (RASP) and Airport Multimodal Accessibility Plan (AMAP) assumptions into the development of the Regional Plan is an important part of planning for the region's future transportation needs. Aviation travel is expected to grow substantially according to projections from the San Diego Regional Airport Authority and SANDAG. Please consider prioritizing the ground transportation network surrounding McClellan-Palomar and Gillespie Field airports to accommodate increased demand as San Diego International Airport nears operational capacity.

CLIMATE CHANGE AND GREENHOUSE GAS

The County is currently developing a Climate Action Plan for the unincorporated county. The largest GHG emission source in the region is the Transportation Sector. The County looks towards the Regional Plan to lead the efforts in reducing GHG emissions in the Transportation Sector. The recommendations noted are important for the local jurisdictions in meeting their share of the region's GHG emission reductions. The County and SANDAG, working collaboratively on the Regional Plan, can move towards an efficient and cleaner multi-modal transportation system. As it relates to SANDAG's Regional Plan, the County requests the following be considered:

a. Analyze alternatives that address multi-modal transportation options for the unincorporated county, particularly as it relates to transit service and alternative fuel infrastructure;

b. Analyze whether the developed/urban communities within the unincorporated county meet the Urban Area Transit Strategy;

c. Analyze an environmentally sustainable transportation system that can reduce vehicle miles traveled, gasoline consumption, and GHG emissions, while providing alternatives modes of transportation for all economic sectors of our population;

d. Clarify whether the Regional Plan GHG emission reductions will be consistent with the Air Resources Board (ARB) 2030 Target Scoping Plan; and

e. SANDAG's 2015 Regional Transportation Plan incorporated the County's 2011 General Plan Update Land Use and Mobility Elements. Since 2011, the County has adopted several general plan amendments (GPA) to the 2011 General Plan. The County requests that SANDAG staff coordinate with County staff to ensure that the adopted GPAs are incorporated in the transportation models and growth forecasts for the Regional Plan and PEIR Analysis.

MULTIPLE SPECIES CONSERVATION PLAN (MSCP)

The proposed Regional Plan covers areas that are critical to the County's Multiple Species Conservation Program (MSCP), both North and South County plans—including the assembly of a Preserve in each. The South County Subarea Plan was adopted in 1997; and the North County Plan is currently in development. As the Regional Plan encourages projects that are consistent with an SCS that achieves GHG reductions, we would anticipate that the PEIR would analyze the effects of the proposed Regional Plan on the MSCP South and North County plans, the assembly of the Preserve and full implementation of the plans. Any effect (direct or indirect) of the Regional Plan on the MSCP should be evaluated (and mitigated, if necessary). SANDAG staff should coordinate with County staff to best determine how to evaluate the MSCP South and NC Plan in the upcoming Regional Plan and PEIR.

PARKS AND RECREATION

The County's trails and pathway network provides safe, secure, healthy, affordable, and convenient travel choices between the places where people live, work, and play while reducing use of personal vehicles, thereby reducing GHG emissions. Please consider incorporating a discussion of the County's Community Trails Master Plan and encourage investment in trails and pathways that connect people with places where they live, work, and play.

VECTOR CONTROL PROGRAM

The County's Vector Control Program (VCP) is responsible for the protection of public health through the surveillance and control of mosquitoes that are vectors for human disease including West Nile virus (WNV). The VCP has completed their review and has the following comments regarding the Regional Plan.

1. The VCP requests that when implementing transportation projects or components of the environmental mitigation program, impacts from possible mosquito breeding sources are considered. Any area that is capable of accumulating and holding at least ½ inch of water for more than 96 hours can support mosquito breeding and development.

2. For your information, the County's Guidelines for Determining Significance for Vectors can be accessed at http://www.sandiegocounty.gov/content/dam/sdc/pds/docs/vector_guidelines.pdf.

3. The California Department of Public Health Best Management Practices for Mosquito Control in California is available at http://www.cdph.ca.gov/HealthInfo/discond/Documents/BMPforMosquitoControl07-12.pdf.

The County looks forward to receiving future documents and/or notices related to this project and providing additional assistance at your request. If you have any questions regarding these comments, please contact Danny Serrano, Land Use / Environmental Planner at (858) 694-3680, or via email at daniel.serrano@sdcounty.ca.gov.

Sincerely,

MARY KOPASKIE, Chief
Advance Planning Division
Planning & Development Services

Email cc: Michael De La Rosa, Policy Advisor, Board of Supervisors, District 1
Adam Wilson, Policy Advisor, Board of Supervisors, District 2
Dustin Steiner, Chief of Staff, Board of Supervisors, District 3
Adrian Granda, Policy Advisor, Board of Supervisors, District 4
Melanie Wilson, Policy Advisor, Board of Supervisors, District 5
Vincent Kattoula, CAO Staff Officer, LUEG
Nick Ortiz, Project Manager, PDS
Everett Hauser, Transportation Specialist, PDS
Bulmaro Canseco, Planner, PDS
Jeff Kashak, Planner, DPW
Richard Chin, Associate Transportation Specialist, DPW
Eric Lardy, Chief, Community Health Division, DEH

Attachment C

County of San Diego

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

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August 6, 2021

Hasan Ikhrata
Executive Director
SANDAG
401 B Street, Suite 800
San Diego, CA 92101

Sent via email to: SDForward@sandag.org

REQUEST FOR COMMENTS ON THE DRAFT 2021 REGIONAL PLAN FOR THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)

Dear Mr. Ikhrata,

Thank you to the San Diego Association of Governments (SANDAG) for your efforts to create a Regional Comprehensive Plan and Sustainable Communities Strategy (Regional Plan) to help design a regional transportation system that is fast, fair, clean and reduces greenhouse gas emissions. As County staff, we are committed to working with SANDAG staff on our shared goals of implementing programs and services to improve the quality of life of our residents as we determine where and how we grow, connect people and places, protect the environment, and provide opportunity for all of our region's residents.

5-12 (whole document)

This comment letter outlines areas within the Regional Plan for which County staff would like to request further clarification, exploration, and consideration. Attachment A provides additional comments from County staff for your consideration and incorporates additional information related to County-specific plans or policies that may further inform the Regional Plan.

LAND USE, TRANSPORTATION PLANNING, AND SMART GROWTH

Land use and transportation planning in the San Diego region is evolving to better address the most pressing issues of today, including climate change, quality of life, attainable housing, and social and economic inequities. The County has several planning efforts underway which prioritize addressing these issues, including the Regional Decarbonization Framework, the Climate Action Plan Update, the Electric Vehicle Roadmap, Office of Environmental and Climate Justice, and establishment of VMT thresholds. While independent of the Regional Plan, these efforts are aligned with the goals of the Regional Plan. County staff is interested in further understanding the regional growth modeling assumptions used within the Regional Plan and alignment with these County efforts.

RESPONSE TO COMMENT 5-12

Thank you for providing the County of San Diego's comment letter on the draft approved Plan. Responses to these comments were provided in responses L165 through 174 in Appendix P2 to the approved Plan PEIR.

PLANNING FOR THE UNINCORPORATED AREAS

The County represents more than 500,000 residents who live within 34 unincorporated communities throughout the region. County staff would like to better understand how the Regional Plan will address transportation options outside of proposed mobility hubs for those communities. The unincorporated community of Ramona, for example, has a population of 36,000 residents, which is a larger population than the incorporated communities of Imperial Beach, Lemon Grove, Coronado, Solana Beach, and Del Mar.

Less than 1% of the unincorporated area is within the proposed mobility hubs, which is where transit and on-demand travel infrastructure investment will be focused. The unincorporated north and east county communities represent a significant population with higher-than-average VMT in the region. Investment in public transit and other transportation options will make it easier for people to drive less, which results in decreased GHG emissions. However, investment outside of mobility hubs appears to be limited, which would make it difficult for unincorporated residents to use new transit service.

To promote greater equity, County staff see opportunities to expand the proposed mobility hubs to include adjacent unincorporated communities. When we overlay the proposed mobility hubs with the County's VMT efficient areas (using both the unincorporated and regional averages), North County Metro, Lakeside, and Spring Valley (Attachment B) are adjacent to what appear to be proposed mobility hubs. These unincorporated communities would benefit from additional access and investment associated with inclusion in adjacent mobility hubs, as these communities have few existing alternative options to driving.

County staff is also interested in understanding how Regional Housing Needs Assessment (RHNA) allocations would be assigned. For the current 6th RHNA cycle, which covers 2021 – 2029, SANDAG allocated 6,700 units for the unincorporated area, with a total housing forecast in the Regional Plan of 7,419 units through 2050 for the unincorporated area. This forecast projects the County's RHNA allocation of 6,700 units being met by 2029, with an additional growth of 719 units by 2035, and projects no further growth in the unincorporated area through 2050. Based on this forecast, it appears that beyond 2035, all future housing needs in the region from RHNA cycles would be allocated to and met by growth in incorporated cities.

In order to fulfill the goals of the Regional Plan in providing access to affordable, reliable, and safe mobility options for everyone in the region, County staff would like to work with SANDAG to ensure consideration is given to future investments and incentives within the unincorporated area that would result in expanded options for transit and active transportation, and to encourage shorter and fewer automobile trips, including locations of mobility hubs, transit leap, flexible fleets, and complete corridors.

COMMUTER PATTERNS AND MOBILITY IN THE UNINCORPORATED AREA

The Regional Plan focuses on five key investment opportunities: Next Operating System (OS), Complete Corridors, Transit Leap, Mobility Hubs, and Flexible Fleets. Many of the Regional Plan investments would be contained within proposed mobility hubs and along identified complete corridors. The majority of infrastructure improvements appear to support a shift to new rail and trolley line infrastructure, largely along the coastal areas. However, Ramona, Lakeside, Spring Valley, and other unincorporated east and north county communities represent a significant population that would benefit from similar consideration for infrastructure improvements as that proposed for the coastal communities with less population. According to SANDAG's "Commuting Patterns in the San Diego Region" study, a majority of the unincorporated east and north county residents who are employed commute outside the boundaries of their County Supervisorial

district, with 84% of District 2 residents working outside the district and 82% of District 5 residents working outside the district. Vehicle miles traveled could be reduced through greater mobility options for the unincorporated area (i.e., expansion of mobility hubs, increased transit options such as bus rapid transit, and improvements to transit frequency and service areas).

The County worked closely with SANDAG as part of the 2015 Regional Plan to identify roads in the unincorporated areas to include in the Regional Arterial System (RAS). Many of these roads serve as evacuation routes during emergencies, provide access to unincorporated communities from Caltrans roads, and create a link to the larger San Diego region.

County staff would like to continue coordinating with SANDAG to further identify Regional Plan investments in infrastructure, technology, and communication improvements for roads identified in both the County's Mobility Element and unincorporated roads included in the RAS and how these investments will further connect the unincorporated area to proposed mobility hubs, flexible fleets, or transit leaps. In addition to providing efficient movement of people and goods, these investments would increase the efficiency of evacuation routes, relay important information on evacuation conditions to first responders, and assist in getting residents safely away from hazardous conditions, all important components of resiliency planning.

FUNDING AND FINANCING

County staff appreciates the difficulty in forecasting funding and revenue sources for a regional transportation network. The Regional Plan identifies use of TransNet funds as part of the implementation, but it is not clear whether projects that have previously been planned, programmed, or awarded as part of the previous plan using TransNet would retain that funding allocation, or if there would be a reallocation of these funds as part of the Regional Plan. It is also unclear if there would be any changes to the current allocation or use of funds that local agencies receive directly for local road system improvements. The unincorporated area relies on TransNet funding to build, improve, and maintain transportation facilities that enhance roadway safety and support smart growth development, including road infrastructure to support increased transit options. Loss or reallocation of this funding could affect these projects and limit the County's ability to provide transportation services in support of our goal of reducing greenhouse gas emissions.

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The County appreciates the opportunity to comment on the Draft Regional Plan, and staff looks forward to future discussions regarding these comments. If you have questions regarding this letter, please contact Rami Talleh, Deputy Director with the Department of Planning and Development Services at 858-495-5475 or Rami.Talleh@sdcounty.ca.gov.

Sincerely,

SARAH E. AGHASSI
Deputy Chief Administrative Officer

cc: Chair Nathan Fletcher: Board of Supervisors, District 4
Vice Chair Nora Vargas: Board of Supervisors, District 1
Supervisor Joel Anderson: Board of Supervisors, District 2
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Attachment B: Expansion Potential of Mobility Hubs (North County Metro, Lakeside, and Spring Valley)

County of San Diego

SARAH E. AGHASSI
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ATTACHMENT A
2021 REGIONAL PLAN COMMENTS FROM COUNTY OF SAN DIEGO DEPARTMENTS AND DIVISIONS

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1. County staff would be interested to better understand and discuss further with SANDAG the potential for Regional Plan strategies to be used as part of a potential regional mitigation strategy related to Vehicle Miles Traveled (VMT).

2. When would funding be expected to be implemented related to Transit Leap/Flexible Fleet Connections to Mobility Hub areas, as this is a potential opportunity to reduce VMT for residents living in the unincorporated area?

3. The County has developed an Electric Vehicle (EV) Roadmap and is committed to assisting with the deployment of regionwide EV infrastructure to reduce GHG emissions in the transportation sector. Could SANDAG provide additional details on the future development, application, and implementation of the proposed Road User Fees and other proposed road usage revenues? Will consideration be given to exemptions for use of clean mobility strategies?

4. County staff would like to discuss with SANDAG staff the Regional Plan strategies, including funding for Major Transit (for purposes of CEQA, defined as a rail transit station, ferry terminal *served by bus or rail, and a bus stop with two or more lines that provide transit service at 15 minute intervals or better during peak commute periods)* in areas of the unincorporated area that are identified as "VMT efficient" in the SANDAG VMT Map.

5. There is significant investment in development and infrastructure in the Otay Mesa area, and Otay Mesa is identified as a "Mobility Hub" area in the RTP. County staff would like to better understand what funding has been identified for this "Mobility Hub" area.

6. County staff would like to discuss with SANDAG the potential for "Major Transit" services along the I-15 corridor, such as the potential for buses on shoulders.

ROADS/TRAFFIC/FIELD ENGINEERING

7. Complete Corridors, such as the SR-67 and I-15 Corridors, are envisioned to act as the backbone of the regional transportation system. In addition to providing for safe and comfortable spaces to get around for all modes of transportation, road improvements such as intersection widening are important for the safe and reliable movement of all road users. County staff would like to discuss further identification and investment within complete corridors that provide linkages to the unincorporated area. These improvements could assist in providing routes for the County's eastern and northern rural regions that could be essential in the event of accidents or fire evacuation. For example, County staff would like to discuss with SANDAG the option of including safety improvements along the SR-67 Corridor on Wildcat Canyon Road, as this road is a relief route to SR-67. Additionally, road improvements on Old Hwy 395 and Pala Temecula Road in the north county may merit further conversation, as both of these roads serve as alternate routes to I-15 during peak traffic hours.

8. County staff would like to further discuss improvements of low flow crossings that are necessary to limit area flooding as well as the safe passage of motorists.

9. County staff would like to work with SANDAG to identify evacuation routes at a regional level, and the possibility of creating a separate section within the Regional Plan that would identify improvements of these routes and potential funding that could be part of the 2021 Regional Plan.

10. County staff would like to discuss with SANDAG how Smart Infrastructure and Connected Vehicles will address the legal and financial challenges with sharing traffic signal data with private entities and the liability of the potential misuse of signal timing data.

11. County staff would like to better understand the impact of Electric Vehicle Infrastructure on County of San Diego public right of way.

WATERSHED

12. Stormwater Management & Regional Needs Assessment; suggested edits in Appendix R, page R-2:
    a. "The County of San Diego has initiated an update of the 2010 Needs Assessment's 40-year water quality cost estimate using more recent water quality planning documents and strategies for achieving regulatory compliance and water quality objectives throughout the region. Since 2010, the Copermittees have worked to formulate Water Quality Improvement Plans (WQIPs) for the region's watersheds, including strategies, planned projects, and schedules to address their respective water quality objectives and compliance needs. The update to the Needs Assessment is intended to assist the County in planning and decision making and will draw upon the most recent WQIPs, with a focus on unincorporated areas to develop updated cost information."

BIOLOGY

13. Figure AA.1 shows the conserved habitat lands in the San Diego region (light green) and displays the areas included in the four subregional habitat conservation plans (subfigure).
    a. The Pre-Approved Mitigation Area (PAMA) of the South County Multiple Species Conservation Program (MSCP) and draft PAMA of the draft North County MSCP are labeled as "Proposed Conserved Habitat Lands" (dark green). This label may be misinterpreted by readers. While the MSCP Preserves will be assembled within the PAMA, not all PAMA designated lands will be conserved or are being actively pursued for conservation at this time.
    b. The draft Focused Conservation Area (FCA) of the draft East County MSCP was not included in the "Proposed Conserved Habitat Lands" (dark green). This area is equivalent to the draft North County MSCP's draft PAMA and should be included in this figure.
    c. The Rancho Guejito property located north of San Pasqual Valley Road will not be included in future iterations of the draft North County MSCP Permit Area. The portions of this property identified within the draft North County MSCP should be changed from dark green to white to reflect this change.
    d. In the subfigure, both the draft North County MSCP and Multiple Habitat Conservation Plan (MHCP) are identified by the number "4." The MHCP area should be identified by the number "1" to correspond with the provided key.

14. Although the draft 2021 Regional Plan mentions the importance of protecting habitat corridors and wildlife linkages through land acquisition, it does not appear to include the construction of safe passageways to connect wildlife to preserved lands bisected by existing and future regional transit corridors. It is recommended that SANDAG work with the San Diego Monitoring and Management Program (SDMMP) and community partners to identify the areas along regional transit corridors that would benefit from wildlife crossings and that these improvements be included in future regional projects.

PARKS AND RECREATION

15. For proposed projects that occur adjacent to Department of Parks and Recreation (DPR) County-managed lands, DPR staff would like to coordinate with SANDAG staff to ensure wildlife connectivity is maintained from adjacent lands to preserved County lands, including wildlife-only crossings.

16. For proposed projects that occur adjacent to or near existing or potential future trail connections, DPR staff would like to coordinate with SANDAG staff on trail connectivity throughout the County and incorporate safe multi-use crossings such as bridges or overpasses for recreational use.

17. DPR staff request SANDAG staff coordinate in developing SANDAG's 5 Comprehensive Multimodal Corridor Plans as mentioned in Appendix B: Implementation near DPR facilities:
    a. Central Mobility Hub and Connections, Coast, Canyons, and Trails – State Route 52, North County – SPRINTER/Palomar Airport Road/State Route 78/State Route 76, San Vicente – State Route 67, South Bay to Sorrento – Purple Line/Interstate 805/Blue Line/Interstate 5 South.

b. Study additional seven corridors to inform the next Regional Continuing Actions.
c. Pursue funding opportunities for projects, programs, and services identified in completed CMCPs.

18. County Staff would like to discuss with SANDAG the possibility of including trails and trail systems within the unincorporated area as part of the 2021 Regional Plan and to consider California Coastal Trail connections to DPR facilities.

AIRPORTS

19. As the owner and operator for eight airports in the region, County Airports continues efforts to safely operate its facilities, ensure future land uses are compatible with aircraft operations, and protect the health and safety of people and property within the vicinity of an airport. The County's airports serve as transportation hubs, emergency service facilities and economic engines in their communities. McClellan-Palomar Airport is the only commercial airport in North County and has over 145,000 annual aircraft operations. It is also a Customs and Border Protection Port of Entry. In East County, Gillespie Field is the 44th busiest airport in the nation with 240,000 annual operations. Both of these airports support thousands of jobs and generate hundreds of millions of dollars in economic activity. The County looks forward to the integration of these airports into the regional transportation system.

20. The San Diego County Regional Airport Authority adopted Airport Land Use Compatibility Plans for the eight airports, which included land use compatibility policies related to airspace, noise, safety and overflight. Those policies have been adopted by the County of San Diego through its General Plan and Zoning Code. After evaluating the forecasted increases in housing and jobs around the Mobility Hubs, there are several land use assumptions related to safety and noise around Fallbrook Airpark, Jacumba Airport, Gillespie Field and McClellan-Palomar Airport that County staff would like to better understand. For example, there are forecasted incompatible housing increases within the Runway Protection Zones at Gillespie Field. These inconsistencies could result in the assumed intensities and densities increases being unachievable.

County of San Diego

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

LAND USE AND ENVIRONMENT GROUP
1600 PACIFIC HIGHWAY, ROOM 212, SAN DIEGO, CA 92101
(619) 531-6256
www.sdcounty.ca.gov/lueg

ATTACHMENT B
2021 REGIONAL PLAN PROPOSED MOBILITY HUB EXPANSION AREAS

The Regional Plan will focus future investment, development, and growth in centralized areas referred to as "mobility hubs." There are locations in the unincorporated area that the County has forecasted for future growth, which included already designated Regional Housing Needs Assessment (RHNA) sites, and are located within close proximity to a proposed mobility hub. The County would like to work with SANDAG to consider the expansion of proposed mobility hubs to include additional unincorporated north and east county communities. As indicated in Figure 1, these proposed expansions include areas in North County Metro, Lakeside, and Spring Valley. Additional details for these three mobility hub expansions are provided below.

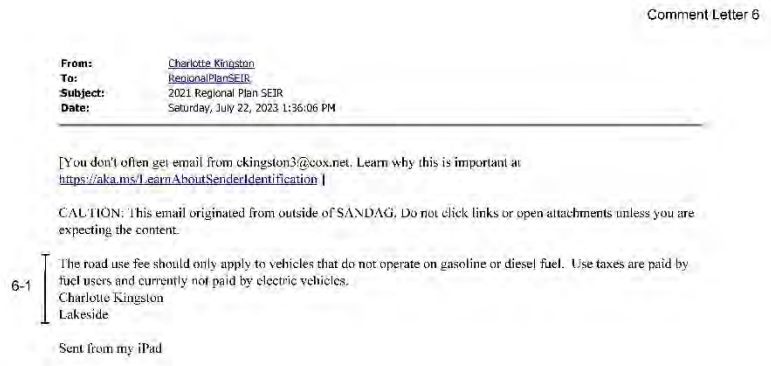
The North County Metro community is located between the proposed Vista and San Marcos mobility hubs. Expansion of the San Marcos mobility hub could include the Buena Creek Sprinter Station and additional housing units, including multiple RHNA sites.

Lakeside has multiple areas that are identified as efficient areas compared to the regional vehicle miles traveled (VMT) average. These areas are located immediately adjacent to the proposed El Cajon mobility hub. Expansion of the El Cajon mobility hub could include these VMT efficient areas as well as potentially including additional growth areas in Lakeside along the I-8 corridor.

Spring Valley is located east of the proposed Lemon Grove mobility hub and south of the proposed La Mesa mobility hub. This community has existing transit access along Jamacha Boulevard and is in close proximity to the MTS Trolley stations in Lemon Grove. Expansion of this mobility hub could include the Spring Valley areas near SR-125 and along Jamacha Boulevard.

Figure 1 Proposed Mobility Hub Expansions in North and East County
North County Metro
Expand San Marcos Mobility Hub
Lakeside
Expand El Cajon Mobility Hub
Spring Valley
Expand Lemon Grove Mobility Hub
Legend
Mobility Hub
Complete Corridors
Transit Leap
County Jurisdiction
Non-County Jurisdiction
Community Plan Areas
Incorporated Areas
VMT Efficient Areas (Unincorporated)
VMT Efficient Areas (Regional)
Sprinter
Highway / Freeway
Arterial Streets
Collector Streets
Proposed Mobility Hub Expansion

COMMENT LETTER 6: CHARLOTTE KINGSTON



Comment Letter 6

From: Charlotte Kingston
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 1:36:06 PM

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6-1 The road use fee should only apply to vehicles that do not operate on gasoline or diesel fuel. Use taxes are paid by fuel users and currently not paid by electric vehicles.
Charlotte Kingston
Lakeside

Sent from my iPad

RESPONSE TO COMMENT 6-1

This comment recommends that the road usage charge should only apply to vehicles that do not operate on gasoline or diesel and is not related to the adequacy of the Draft SEIR. The proposed Amendment removes the regional road usage charge for all vehicle types from the approved Plan. Due to the economic challenges posed in the aftermath of the recent pandemic and the more recent rise in inflation, the increased costs of a regional road usage charge on residents of the San Diego region, whether applied to gasoline or electric vehicles, is financially burdensome and undesirable from a policy perspective.

COMMENT LETTER 7: MOSES LONETTO

Comment Letter 7

From: moses lonetto
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Sunday, July 23, 2023 6:08:29 PM

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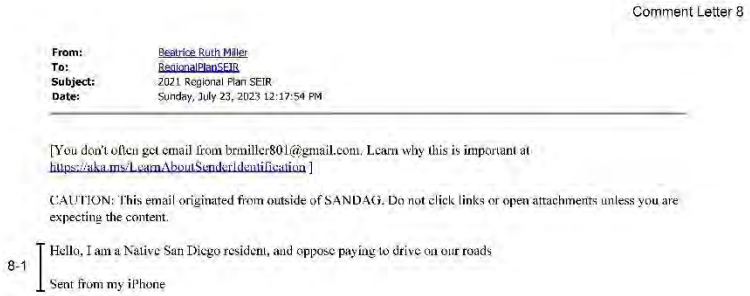
7-1 Remove user charge from plan!
Thank you.

RESPONSE TO COMMENT 7-1

Thank you for your comment. The proposed Amendment removes the regional road usage charge from the approved Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

COMMENT LETTER 8: BEATRICE MILLER



Comment Letter 8

From: Beatrice Ruth Miller
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Sunday, July 23, 2023 12:17:54 PM

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8-1 Hello, I am a Native San Diego resident, and oppose paying to drive on our roads

Sent from my iPhone

RESPONSE TO COMMENT 8-1

Thank you for your comment. The proposed Amendment removes the regional road usage charge from the approved Plan.

COMMENT LETTER 9: RICHARD MORANVILLE

Comment Letter 9

From: Richard Moranville
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 9:03:26 AM

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9-1 Sandag should be disbanded. It is to political and no longer has the constituency interests in mind.

Sent from my iPhone

RESPONSE TO COMMENT 9-1

This comment is not related to the proposed Amendment or the adequacy of the SEIR. As such, no further response is required.

COMMENT LETTER 10: NEYGOM@GMAIL.COM

Comment Letter 10

From: neygom@gmail.com
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 9:49:22 AM

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10-1 Although I am not 100% sure what is going on with SANDAG, my spouse and I are both union electrical workers and constantly hear about the battles and struggles happening between the construction industry and SANDAG.

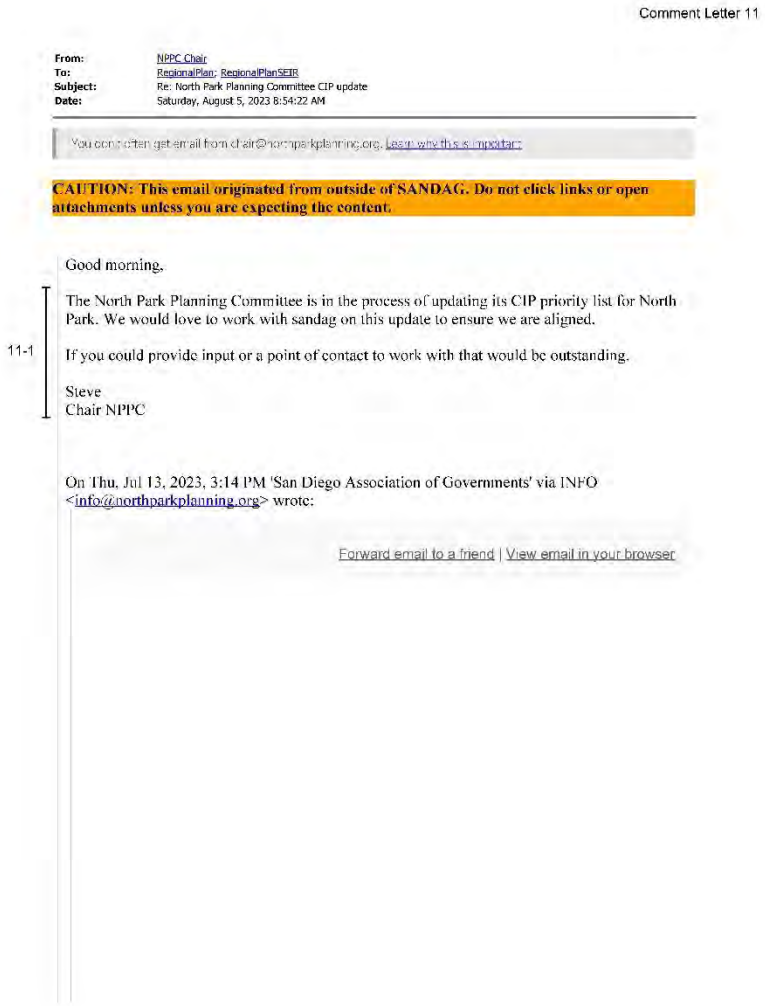
As a local citizen, I have spoken with workers who are employed by SANDAG, and there is a lot of fear and uncertainty regarding the things the organization wants to enforce on people who own, and rely on, private vehicles for transportation.
I have been out of a vehicle for about 9months in the past due to a vehicular accident, and I can attest to having a very negative experience on public transport. It is not uncommon to say we have awful reliability, the public safety of utilizing these services is terrible and law enforcement rarely gets involved, and ultimately nothing beats owning a car. However, it seems that even people employed by this organization who have insider experience and information from SANDAG, fear abuse of power and exploitation on a financial level from the group. Citizens who have owned cars for decades are upset that the group will want to turn this city into a public transportation utopia and the reliability of owning a vehicle will become second best due to the taxation and charges the company wants to implement on average citizens. This would be horrible and per usual, there are always other ways of going green that would not compromise putting the working class in a position where commuting becomes a struggle.

Sent from my iPhone

RESPONSE TO COMMENT 10-1

Thank you for your comment. The proposed Amendment removes the regional road usage charge from the approved Plan. SANDAG agrees that action is needed now to provide fast, frequent, reliable, accessible, and safe transit so that commuting is not a "struggle." One of the major goals of the approved Plan is to develop a safe, equitable, and accessible system that improves everyone's access to basic needs, opportunities, and major destinations. The approved Plan also shows a threefold focus in social equity focused populations (people with low incomes, people of color, and seniors) living within a half-mile of commuter rail, light rail, or rapid transit stop. Currently, only 25 percent of low-income residents can access the region's largest employment centers (Sorrento Valley, Kearny Mesa, and Downtown) in 30 minutes via transit. With the approved Plan implemented, that percentage will increase to 42 percent by 2050.

COMMENT LETTER 11: NORTH PARK PLANNING COMMITTEE



Comment Letter 11

From: NPPC Chair
To: RegionalPlan; RegionalPlanSEIR
Subject: Re: North Park Planning Committee CIP update
Date: Saturday, August 5, 2023 8:54:22 AM

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Good morning,

The North Park Planning Committee is in the process of updating its CIP priority list for North Park. We would love to work with sandag on this update to ensure we are aligned.

11-1 If you could provide input or a point of contact to work with that would be outstanding.

Steve
Chair NPPC

On Thu, Jul 13, 2023, 3:14 PM 'San Diego Association of Governments' via INFO <info@northparkplanning.org> wrote:

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RESPONSE TO COMMENT 11-1

Thank you for your comment. SANDAG looks forward to coordinating with the North Park Planning Committee. This comment is not related to the proposed Amendment or the adequacy of the SEIR. As such, no further response is required.

COMMENT LETTER 12: GREG PAYNE

Comment Letter 12

From: gpayne1
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 9:20:31 AM

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12-1 I am opposed to a mileage tax. I also believe that while busses serve a purpose in some areas like downtown they do not work everywhere. It need to be a combination to include private cars

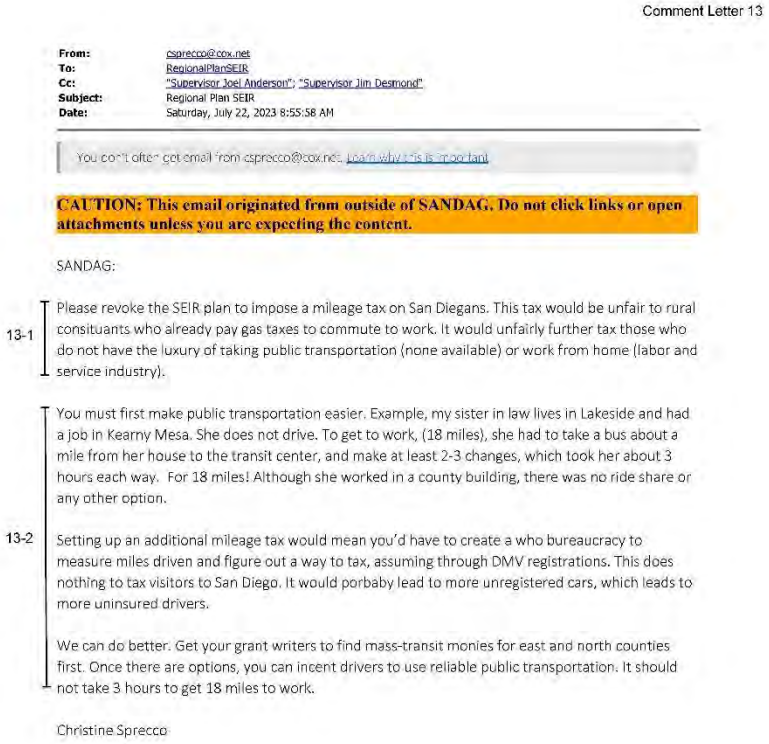
Best regards
Greg Payne

Sent from my Verizon, Samsung Galaxy smartphone

RESPONSE TO COMMENT 12-1

Thank you for your comment. The proposed Amendment removes the regional road usage charge from the approved Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

COMMENT LETTER 13: CHRISTINE SPRECCO



Comment Letter 13

From: csprecco@cox.net
To: RegionalPlanSEIR
Cc: "Supervisor Joel Anderson"; "Supervisor Jim Desmond"
Subject: Regional Plan SEIR
Date: Saturday, July 22, 2023 8:55:58 AM

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SANDAG:

13-1 Please revoke the SEIR plan to impose a mileage tax on San Diegans. This tax would be unfair to rural consituants who already pay gas taxes to commute to work. It would unfairly further tax those who do not have the luxury of taking public transportation (none available) or work from home (labor and service industry).

13-2 You must first make public transportation easier. Example, my sister in law lives in Lakeside and had a job in Kearny Mesa. She does not drive. To get to work, (18 miles), she had to take a bus about a mile from her house to the transit center, and make at least 2-3 changes, which took her about 3 hours each way. For 18 miles! Although she worked in a county building, there was no ride share or any other option.

Setting up an additional mileage tax would mean you'd have to create a who bureaucracy to measure miles driven and figure out a way to tax, assuming through DMV registrations. This does nothing to tax visitors to San Diego. It would porbaby lead to more unregistered cars, which leads to more uninsured drivers.

We can do better. Get your grant writers to find mass-transit monies for east and north counties first. Once there are options, you can incent drivers to use reliable public transportation. It should not take 3 hours to get 18 miles to work.

Christine Sprecco

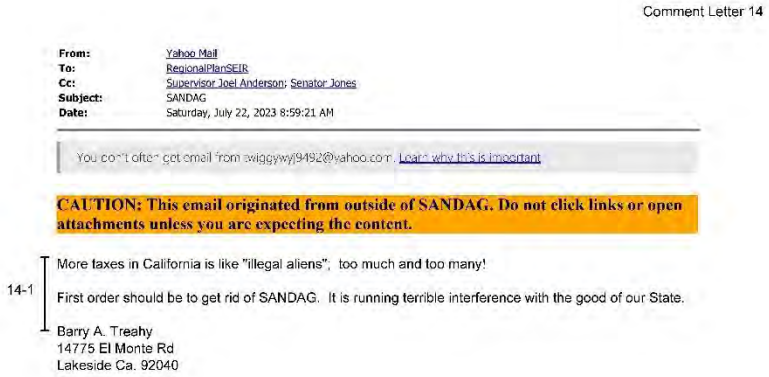
RESPONSE TO COMMENT 13-1

Thank you for your comment. The proposed Amendment removes the regional road usage charge from the approved Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

RESPONSE TO COMMENT 13-2

This comment expresses need for transportation network improvements and is not related to the proposed Amendment or the adequacy of the SEIR. SANDAG agrees that action is needed now to provide fast, frequent, reliable, and accessible transit, especially on highly utilized routes. One of the major goals of the approved Plan is to develop a safe, equitable, and accessible system that improves everyone's access to basic needs, opportunities, and major destinations. The approved Plan also shows a threefold focus in social equity focused populations (people with low incomes, people of color, and seniors) living within a half-mile of commuter rail, light rail, or rapid transit stop. Currently, only 25 percent of low-income residents can access the region's largest employment centers (Sorrento Valley, Kearny Mesa, and Downtown) in 30 minutes via transit. With the approved Plan implemented, that percentage will increase to 42 percent by 2050.

COMMENT LETTER 14: BARRY TREAHY



Comment Letter 14

From: Yahoo Mail
To: RegionalPlanSEIR
Cc: Supervisor Joel Anderson; Senator Jones
Subject: SANDAG
Date: Saturday, July 22, 2023 8:59:21 AM

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14-1 More taxes in California is like "illegal aliens", too much and too many!

First order should be to get rid of SANDAG. It is running terrible interference with the good of our State.

Barry A. Treahy
14775 El Monte Rd
Lakeside Ca. 92040

RESPONSE TO COMMENT 14-1

The proposed Amendment removes the regional road usage charge from the approved Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

COMMENT LETTER 15: BRUCE TRUAX

Comment Letter 15

From: Bruce Truax
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 9:58:21 AM

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To Whom It May Concern,

15-1 This proposed road tax will kill the low and middle income people of our county. The make-up of our county does not support a reasonable mass transit system. It simply won't work in supporting they way we live in this county. Try loading up several hundred pounds of tools and get them to your job on mass transit. That would be a real feat. Probably would not even work in a major city. Let's see you guys shift to mass transit for several months and then come back and tell us how it works.

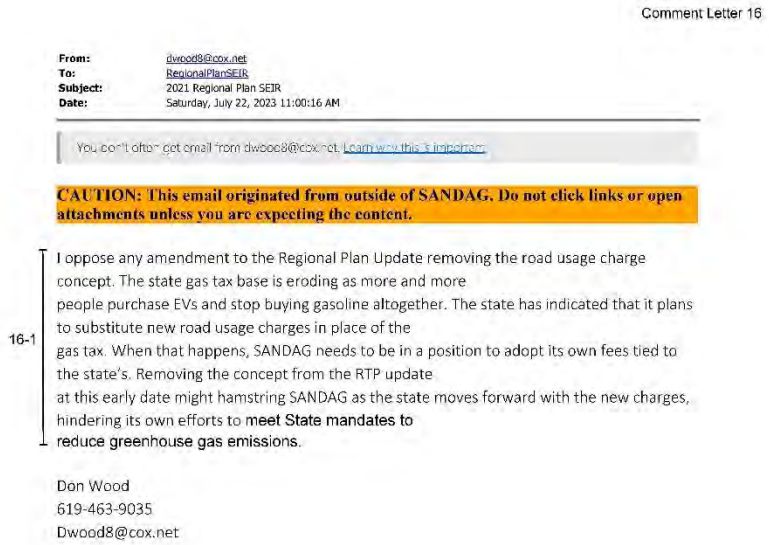
Thank you,
Bruce Truax

Sent from Mail for Windows

RESPONSE TO COMMENT 15-1

Thank you for your comment. The proposed Amendment removes the regional road usage charge from the approved Plan. This comment is not related to the adequacy of the Draft SEIR. As such, no further response is required.

COMMENT LETTER 16: DON WOOD



Comment Letter 16

From: dwood8@cox.net
To: RegionalPlanSEIR
Subject: 2021 Regional Plan SEIR
Date: Saturday, July 22, 2023 11:00:16 AM

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16-1 I oppose any amendment to the Regional Plan Update removing the road usage charge concept. The state gas tax base is eroding as more and more people purchase EVs and stop buying gasoline altogether. The state has indicated that it plans to substitute new road usage charges in place of the gas tax. When that happens, SANDAG needs to be in a position to adopt its own fees tied to the state's. Removing the concept from the RTP update at this early date might hamstring SANDAG as the state moves forward with the new charges, hindering its own efforts to meet State mandates to reduce greenhouse gas emissions.

Don Wood
619-463-9035
Dwood8@cox.net

RESPONSE TO COMMENT 16-1

The proposed Amendment removes the regional road usage charge from the approved Plan not the state road usage charge. The proposed state road usage charge is entirely separate from the regional road usage charge. The Amendment has no impact on the proposed state road usage charge, which is outside of SANDAG's authority. The approved Plan assumes the San Diego region will receive future revenues resulting from a state road usage charge, which is still in the pilot program phase. SANDAG will continue to coordinate with the state and other metropolitan planning organizations on the state's road usage charge pilot program.

As discussed under Impact GHG-1 in Section 4.3, *Greenhouse Gas Emissions*, of the SEIR, the proposed Amendment would result in a slight increase in GHG emissions within the San Diego region compared to the approved Plan (0.5 percent in 2035 and 0.6 percent in 2050). This impact was determined to be less than significant because the proposed Amendment would not directly or indirectly result in an increase in GHG emissions compared to existing conditions because annual regional emissions would be approximately 28 percent lower in 2035 and 31 percent lower in 2050 relative to 2016. Additionally, as discussed under Impact GHG-2 in Section 4.3, the proposed Amendment would meet SB 375's 2035 emission reduction target of 19 percent and would exceed the Board Resolution for a 30 percent reduction in per capita GHG emissions from all on-road transportation by 2035.

However, the proposed Amendment's GHG emissions would be inconsistent with the State's ability to achieve the goals of SB 32, 2022 Scoping Plan, EO B-55-18, EO S-3-05, and AB 1279. As discussed in Section 4.3 in the SEIR, mitigation measures would help reduce regional GHG emissions by reducing VMT, increasing use of zero-emission fuels, sequestering carbon from the atmosphere, and other measures; they would reduce inconsistency of the proposed Amendment's GHG emissions with the State's ability to achieve the

SB 32, 2022 Scoping Plan, EO B-55-18, EO S-3-05, and AB 1279 GHG reduction goals. However, full implementation of the changes required to achieve these goals is beyond SANDAG's and local agencies' current jurisdiction and authority. As such, they were identified as significant and unavoidable. While the proposed Amendment results in significant impacts related to VMT and GHG, anticipated reductions in per capita VMT and GHG, along with proposed mitigation measures, would reduce inconsistency of the proposed Amendment with the State's ability to achieve VMT and GHG goals, and puts SANDAG on a trajectory that more closely aligns with regulatory targets.

COMMENT LETTER 17: MIKE BULLOCK

Comment Letter 17

Commenter: Mike Bullock
Agency: None, However, I am an Associate Member, County Democratic Party Central Committee
Contact Information: mike_bullock@earthlink.net
Date Received: 8/28/2023
Comment:

17-1 SANDAG's RTP2011 resulted in a lawsuit that was joined by the state of CA (AG Harris). One issue was SANDAG's incorrect position that it could ignore S-3-05, the Governor's Executive Order that established 3 climate mandates for CA. The AG disagreed with SANDAG, stating that S-3-05 was an official CA policy and an attempt to stabilize the climate, and that climate stabilization was an objective of CEQA. The AG won on this point. Today, SB 32 is a CA climate mandate. The official plan to achieve SB 32 is the CARB Scoping Plan, adopted in December of 2022. No CEQA document, like the Draft (or Final) SEIR for the modified (degraded) RTP2021, can ignore SB 32 or fail to comply with the CARB Scoping Plan. Failing to achieve SB 32 (comply with the CARB Scoping Plan) is equivalent to climate destabilization, which would push the impact of the modified RTP far over the significance threshold, with no good reason, since the mitigation measures in the CARB Scoping Plan are enforceable and feasible. The modified RTP2021 needs to comply with Appendix E of the CARB Scoping Plan. It must reduce driving by 25% with respect to 2019 levels, by 2030.

17-2 To do this it must increase transit service levels (as specified in Appendix E), have a Road Use Charge, and priced parking must become widespread. You will claim that you can't price parking. However, I have specified how this could be done and you could write a Requirements Document to support an RFP process to select a vendor to design, install, and operate the system for SANDAG employees. I have presented the car parking system to many conferences, so it has been peer reviewed. A solid majority of employees would like the system because those that drove to work every day would break even and those that drove to work less than every day would earn extra money. In my comment letter to you regarding the Scoping, I included a reference showing one potential vendor (the CEO of ACE Parking) who would submit a proposal. A vendor would be anxious to manage parking (the system increases economic equity and choice while it reduces driving) everywhere.

RESPONSE TO COMMENT 17-1

Please see Response to Comments 2-1 and 2-3 for a detailed discussion about the proposed Amendment's consistency with state climate goals and the 2022 Scoping Plan.

RESPONSE TO COMMENT 17-2

This comment provides suggestions to reduce driving by 25 percent compared to 2019 levels by 2030 and to improve parking management. See Response to Comment 2-3 regarding VMT impacts and Response to Comment 2-4 regarding parking management strategies. See *Appendix B: Implementation Actions* of the approved Plan for additional road pricing strategies.

COMMENT LETTER 18: MICHAEL HAMPSON

Comment Letter 18

Commenter: Michael Hampson
Agency: Private Citizen
Contact Information: mikewestcoast@yahoo.com
Date Received: 7/14/2023
Comment:

18-1 Item 1: Make all Rapid Bus Lines into trolley lines. Yes, this means merging the bus and trolley unions.

18-2 Item 2: Add more trolley lines west to east in San Diego like this:
A) Going from the Mexico border to Oceanside, have trolleys traveling west to east, from the beach to the far eastern inland areas.

18-3 Item 3: Add more trolley lines from north to south like this:
A) Add a trolley line along route 15 freeway from the Escondido area (or from Valley Center) going south, then where the 15 freeway and 805 freeway meets and have the trolley go south along the 805 freeway to the border.

B) Add another trolley line from Romona going south down route 67 through Lakeside to Jamul.

C) Add another trolley from Santee going south through El Cajon through Spring Valley going south to the 125 to the border.

18-4 Item 4: Plan now for the California high-speed railway coming to San Diego in the 2030s and make sure there is plenty of parking for cars (preferable free parking and security controlled parking) and make sure the trolley lines connects to California high-speed railway.

RESPONSE TO COMMENT 18-1

This comment requests specific transportation network improvements and is not related to the proposed Amendment or the adequacy of the SEIR. See Appendix A to the approved Plan for a list of specific transportation improvement projects including improvements to trolley services.

RESPONSE TO COMMENT 18-2

This comment requests specific transportation network improvements and is not related to the proposed Amendment or the adequacy of the SEIR. See Appendix A to the approved Plan for a list of specific transportation improvement projects including improvements to trolley services.

RESPONSE TO COMMENT 18-3

This comment requests specific transportation network improvements and is not related to the proposed Amendment or the adequacy of the SEIR. See Appendix A to the approved Plan for a list of specific transportation improvement projects including improvements to trolley services.

RESPONSE TO COMMENT 18-4

This comment requests specific transportation network improvements and is not related to the proposed Amendment or the adequacy of the SEIR. The California High Speed Rail project is included in Appendix A of the approved Plan as it is slated to connect Los Angeles to San Diego via the Inland Empire with stations planned in Murrieta/Temecula and Escondido. This project would be implemented and funded by the California High Speed Rail Authority. SANDAG will track the project as it is developed by the State.

COMMENT LETTER 19: MICHAEL LADOUCEUR

Comment Letter 19

Commenter: Michael LaDouceur
Agency: Not Provided
Contact Information: mic.ladou@gmail.com
Date Received: 7/31/2023
Comment:

19-1 Comment 1: It is inappropriate and irresponsible to update future revenue (Updated revenue assumption 3 in particular) while failing to update future costs. Cost estimates were based on costs in 2020 dollars. It is unclear whether inflation was factored into the cost estimates provided in Appendix U. Inflation over the last 2 years has been historically high and could have a large impact on whether the cost estimates from 2020 are still reasonable. As such, it is inappropriate to compare updated Transnet revenue (updated with the most recent data) with outdated cost estimates. Therefore, it is unsupported and incorrect to state that revenues would exceed costs under the proposed amendment. It is also unsupported and incorrect to state that "no changes to projects listed in the 2021 Regional Plan would result from the proposed Amendment", because no such analysis has been completed. SANDAG has the fiscal responsibility to update the 2020 cost estimates to ensure that both revenues and costs are using similar projections.

19-2 Comment 2: SANDAG has not provided reasonable justification for updating the State Discretionary Program estimates and Federal Discretionary Program estimates. SANDAG should provide justification for the estimates. Has SANDAG or other local or regional transit agencies received increased funding since the Bipartisan Infrastructure Law (BIL) was passed? Are there reasonably foreseeable dollars that will be coming from BIL and how is SANDAG certain of this? Appendix V of Attachment A to the Errata states that Federal funding "assumes one large New Starts eligible project and three Small Starts eligible projects per decade...", but it is unclear how these assumptions were made and whether they are reasonable. These assumptions are critical to balancing revenues and cost and implementing all aspects of the 2021 Regional Plan. Future transportation plans could be significantly altered if these assumptions are incorrect, which would lead to other calculations being incorrect, such as the projected decrease in Green House Gasses.

RESPONSE TO COMMENT 19-1

The Amendment costs are reflected in 2020 and year of expenditure dollars in Attachment 1 to the Amendment: Errata to the approved Plan. Generally, planning assumptions must be updated at least every five years according to FHWA Guidance for the Use of Latest Planning Assumptions in Transportation Conformity Determinations. (Environmental Protection Agency, *EPA420-B-08-901, Guidance for the Use of Latest Planning Assumptions in Transportation Conformity Determinations, Revision to January 18, 2001, Guidance Memorandum,* 2008). Consistent with the transportation conformity rules and regulations, SANDAG consulted with federal agencies early in the Amendment development process concerning the latest planning assumptions for the Amendment. The cost information from the approved Plan was the latest available at the time SANDAG began its transportation conformity analysis for the Amendment.

RESPONSE TO COMMENT 19-2

In updating revenue assumptions for the Amendment, SANDAG included the Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law), which was signed into law in November 2021. The Infrastructure Investment and Jobs Act (IIJA) authorized $1.2 trillion for transportation and infrastructure spending with $550 billion of that figure going toward "new" investments and programs. The historic level of infrastructure investment from the federal and state government in the early phase years of the approved Plan was unknown and underestimated. The federal and state discretionary programs near-term estimates have been updated to assume historical leveraging rates of local TransNet revenue.The total estimate of near-term State and Federal Discretionary Programs resulting from IIJA is $6.35 billion.

In Fiscal Years 2021-2023 since the passage of IIJA, SANDAG has received $1.6 billion in discretionary funding revenue ($876 million in state funding and $766 million in federal funding) compared to the Amendment's assumed $950 million in discretionary funding revenue

($507 million in state funding and $441 million in federal funding). The assumptions for future New Starts/Small Starts projects are based on SANDAG's historical success in receiving New Starts funding and on the pipeline of eligible projects over the 30-year planning period.

COMMENT LETTER 20: HARRY NUNNS

Comment Letter 20

Commenter: Harry Nunns
Agency: Not Provided
Contact Information: Harry.nunns@gmail.com
Date Received: 8/6/2023
Comment:

20-1 There is 4 miles of rail corridor in Rose Canyon between Genesee Ave and Balboa Ave with no pedestrian crossings. Given the number of people walking in the canyon as well as commuting between Clairemont, UC and PB, I think there is a duty for the railway to provide a safe crossing. I use the Rose Canyon Bikeway to commute with my son from UC to Northwest Clairemont, and I have to make a 4mile detour down to Balboa since there is no bike/pedestrian rail crossing. I think there needs to be one bridge at Jutland Dr to Sante Fe st, and a second crossing at Gilman/La Jolla Colony.

RESPONSE TO COMMENT 20-1

This comment requests specific pedestrian and bikeway improvements and is not related to the proposed Amendment or the adequacy of the SEIR.

The approved Plan and proposed Amendment aim to create safe and well-connected routes for bicyclists and pedestrians. The intention of the network in the Regional Plan is a framework which facilitates trips associated with regional purposes designed to enhance neighborhood connections to schools, employment centers, and other everyday destinations. The regional network will not include details regarding the types of bicycle and pedestrian facilities for specific projects are not yet determined and will require future planning and coordination with local jurisdictions, community members, and stakeholders.

COMMENT LETTER 21: DANIEL PARKER

Comment Letter 21

Commenter: Daniel Parker
Agency: Not Provided
Contact Information: pennyplay@gmail.com
Date Received: 8/11/2023
Comment:

21-1 The vast majority of tax paying and voting residents do not support 3 story apartment/condos with minimal parking in existing mature contemporary neighborhoods. Already, I live in a relatively upscale neighborhood with a half dozen UCSD residents with an addition half dozen cars. Parking is sparse, existing residents and voters don't support this. Multi-story buildings will cause a revolt.

RESPONSE TO COMMENT 21-1

This comment is not related to the proposed Amendment or the adequacy of the SEIR. As such, no further response is required.

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Appendix F.2

Comments and Responses on the Draft Amendment

Attachment C:
Public Participation

Table of Contents

Public Participation

Introduction

In September 2022, the San Diego Association of Governments (SANDAG) Board directed staff to prepare an amendment to the 2021 Regional Plan (Amendment). The proposed Amendment was available for public review and comment from June 13, 2023, through August 8, 2023, to solicit public input on the proposed Amendment. During the public review period, four public meetings were held: a public hearing on June 23, 2023, and three virtual workshops on July 18, July 31, and August 8, 2023.

SANDAG also received comments on the proposed Amendment through an online comment response form; and via e-mail. A total of 56 public comments were received that commented on the proposed Amendment via the online comment response form, email, or letter, which are included in this document.

Responses

The following section provides SANDAG responses to the comments received organized by the following topic areas:

- Opposition to the Regional RUC
- Support for the Regional RUC
- Requesting Clarification on the Impacts of Removing the Regional RUC
- Social Equity
- Land Uses, Specific Transportation Network Elements, and Electric Vehicle Concerns
- Opposition to SANDAG
- Public Outreach Efforts
- Revenues and Costs

SANDAG also responded to selected questions received during the June 23, 2023, public hearing in a July 13, 2023, memorandum to the Board of Directors. The public hearing transcript and memorandum are included in this Attachment C.

Opposition to the Regional RUC

SANDAG received multiple comments expressing opposition to the regional RUC. Most of these comments opposed any additional fees associated with driving and several expressed concern over the potential financial hardship of a regional RUC. Some commentors also expressed concerns over tracking people's movements and the regional RUC limiting mobility and creating "15-minute cities."

SANDAG appreciates the feedback received on concerns about additional costs. At the direction of the SANDAG Board of Directors, the 2030 implementation of the regional RUC is proposed to be removed from the 2021 Regional Plan, and so these concerns are addressed by the Amendment itself.

In response to comments received about tracking people's movements, any program or policy with the potential for privacy impacts would need to satisfy California's extensive privacy laws and regulations. However, because this Amendment proposes to remove the regional RUC from the 2021 Regional Plan, these concerns are addressed by the Amendment

itself. Similarly, neither the 2021 Regional Plan nor the regional RUC were intended to confine residents to a limited geographical area. While 15-minute cities are a planning concept for creating convenient access to resources within a walkable or bikeable range of 15 minutes to expand access to resources, SANDAG did not use the 15-minute city concept in developing either the 2021 Regional Plan or the Amendment.

Support for the Regional RUC

SANDAG also received multiple comments in support of the regional RUC. These comments expressed concern over the VMT, GHG, and air quality implications of removing the regional RUC and that the Amendment was setting the region back in achieving GHG and air quality goals and creating future environmental and financial risks for our region. Other commentors expressed concern over how removing the regional RUC could limit the expansion of transit options in our region. Additional comments expressed support for a modified regional RUC that applied to electric vehicles but not gas-powered vehicles or for a means-based regional RUC that integrated personal privacy protections.

SANDAG appreciates the feedback received on concerns about the adverse environmental impacts of removing the regional RUC; these are disclosed in the SEIR that SANDAG has prepared for the proposed Amendment, and will be considered by the Board of Directors prior to their taking action on the proposed Amendment. As discussed in Section 4 of the Amendment, the removal of the regional RUC would decrease the cost to operate an automobile, resulting in an increase in single occupancy drivers. Consequently, the Amendment would result in an increase in VMT, GHG emissions, and air pollutants from tailpipe emissions compared to the adopted 2021 Regional Plan. Similarly, while the air quality impacts of removing the regional RUC do not rise to a level of regional significance, there are greater emissions of criteria pollutants and new or substantially more severe significant air quality impacts under the Amendment than under the 2021 Regional Plan. The Amendment would expose new receptors to substantial concentrations of toxic air contaminant emissions and increase the incremental area of threshold exceedance for new land uses. Although the Amendment has greater GHG and air quality impacts than the 2021 Regional Plan, the Amendment does still meet SB 375 regional GHG emissions reduction targets, and state and federal air quality standards. The SANDAG Board of Directors has proposed that the regional RUC be removed from the 2021 Regional Plan. However, there are many policies and programs to reduce VMT, GHG, and improve regional air quality, and SANDAG is committed to identifying the best policies for our region that will meet required state and federal standards in the 2025 Regional Plan. SANDAG will be holding multiple public outreach events throughout the County to ensure that interested members of the public can understand and provide feedback on the development of the 2025 Regional Plan.

Requesting Clarification on the Impacts of Removing the Regional RUC

SANDAG received comments requesting clarification about the impact of removing the regional RUC on implementation of the proposed state RUC, on funding opportunities for the region, and how removing the regional RUC impacts the 2025 Regional Plan.

SANDAG appreciates the feedback received requesting clarification on the impacts of removing the regional RUC. The proposed state RUC is entirely separate from the regional RUC. The proposed Amendment would remove the regional RUC from the 2021 Regional Plan but has no impact on the proposed state RUC, which is outside of SANDAG's authority. The adopted 2021 Regional Plan assumes the San Diego region will receive future revenues

resulting from a state RUC, which is still in the pilot program phase. Discussion of the state RUC remains unchanged from the adopted 2021 Regional Plan. The proposed Amendment assumes a state RUC of 0.7 cents ($2020) starting in 2030 and increasing to 1.2 cents by 2050 to cover the funding gap created as fuel taxes diminish over time due to greater fuel efficiency and a shift to zero emission vehicles. The State has not released a start date for the state RUC; however, 2030 is consistent with the assumption made by other California MPOs.. More information on the status of the state RUC can be found here: California Road Charge program.

At present, SANDAG is not aware of any risks to local or regional state and federal funding eligibility resulting from removing the regional RUC. Adequate funding sources have been identified to implement the adopted 2021 Regional Plan without funding from a regional RUC.

The 2025 Regional Plan is SANDAG's next major update of the region's long range transportation planning document and is separate from the Amendment to the 2021 Regional Plan. SANDAG will be holding multiple public outreach events throughout the County to ensure that interested members of the public can provide feedback on the development of the 2025 Regional Plan. A concept for the 2025 Regional Plan without the regional RUC will be presented later this year.

Social Equity

Comments were received expressing concerns over the broad social equity impacts of removing the regional RUC, the impacts associated with PM 2.5 emissions on disadvantaged communities specifically and San Diego residents generally, and the need to develop and fund affordable and accessible public transit.

SANDAG appreciates the feedback shared over the social equity impacts of removing the regional RUC. As discussed in Attachment 1 to the Errata: Amendment Social Equity Analysis, the proposed Amendment would not result in either a disparate impact or disproportionate effect on disadvantaged communities in the San Diego region. Additionally, the proposed Amendment would result in a less than 2 percent change in all social equity performance measures compared to the adopted 2021 Regional Plan. Specific to PM 2.5 emissions, there is less than a 1 percent change between the adopted 2021 Regional Plan and the Amendment (Attachment 1 to the Errata: Amendment Social Equity Analysis, Table SE4-20). The adopted 2021 Regional Plan also identified specific transportation strategies to reduce pollution exposure in disadvantaged communities, which are included in Appendix H: Social Equity: Engagement and Analysis of the adopted 2021 Regional Plan. These strategies remain unchanged with the Amendment.

As to suggestions for future transit projects, the 2025 Regional Plan is SANDAG's next major update of the region's long range transportation planning document and is separate from the Amendment to the 2021 Regional Plan. SANDAG will be holding multiple public outreach events throughout the County to ensure that interested members of the public can provide feedback on the development of the 2025 Regional Plan. There will be opportunities for the public to suggest measures for SANDAG and transit agencies to consider that would increase opportunities for affordable and accessible public transit.

Land Uses, Specific Transportation Network Elements, and Electric Vehicle Concerns

SANDAG received several comments on various planning assumptions, including land uses, regional housing issues, the need to provide greater funding for transit generally and for specific transportation network elements, and concern over potential risks associated with e-bikes and electric vehicle batteries.

SANDAG appreciates the feedback shared on land use, regional housing, potential transit investments, specific transportation network concerns, and e-bike and electric vehicle concerns as part of the Amendment public comment process. At the direction of the SANDAG Board of Directors, the Amendment is narrowly focused on removing the regional RUC while meeting state and federal requirements. The Amendment includes no other change to land use or to the transportation projects, programs, and policies identified in the 2021 Regional Plan. The 2025 Regional Plan is SANDAG's next major update of the region's long range transportation planning document and is separate from the Amendment to the 2021 Regional Plan. SANDAG will be holding multiple public outreach events throughout the County to ensure that interested members of the public can provide feedback on the development of the 2025 Regional Plan. There will be opportunities for the public to suggest changes to the adopted 2021 Regional Plan to address concerns that are outside the scope of the proposed Amendment.

Opposition to SANDAG

SANDAG received multiple comments expressing dislike for SANDAG generally as an agency, disapproval of the weighted vote, and dissatisfaction with SANDAG leadership. Other comments accused SANDAG of using the regional RUC specifically, and the regional planning process generally, to implement a United Nations-driven "globalist" agenda with the goal of restricting mobility, eliminating cars, and enslaving San Diego residents.

SANDAG is aware that there are multiple views in our community on the work SANDAG does and appreciates the public interest in providing feedback, regardless of whether it is supportive or critical.

SANDAG strives to optimize internal procedures with a goal of increased efficiency, transparency, and accuracy. These efforts have focused on our workforce (our people), along with the processes and technology used to complete agency work. SANDAG regularly undergoes required audits administered by our federal and state funding agencies. These audits are conducted in accordance with federal and state laws and often result in necessary process changes and improvements to ensure the agency meets our fiduciary responsibilities.

SANDAG's weighted voting process is the result of a state legislative reform under Assembly Bill (AB) 805, which was signed into law by Governor Jerry Brown in 2017. AB 805 modified SANDAG's weighted voting process for the 21-member board, which granted proportionally more votes for the most populated jurisdictions in the SANDAG region (California Legislative Information, 2017).

SANDAG does not act at the direction of the United Nations or the World Economic Forum or implement measures developed by these organizations. SANDAG, acting as both a metropolitan planning organization (MPO) and a council of governments, is required to comply with federal and state laws. Under federal law, SANDAG is mandated to develop and implement a long-range Regional Transportation Plan/Sustainable Communities Strategy

(RTP/SCS) every four years. That RTP/SCS process must be completed, including a demonstration that the RTP/SCS meets federal air quality standards and a federal social equity analysis, so that the San Diego region will remain eligible to receive federal transportation funding. Under state law, SANDAG is required to comply with Assembly Bill (AB) 805 and Senate Bill (SB) 375, both of which require RTP/SCSs to address GHG emissions reduction targets set by CARB and to include strategies that provide for mode shift to public transportation. The goal of the RTP/SCS is not to "price people out of their cars" or make it impossible for individuals to drive, it is to comply with state and federal requirements while also making our transportation system more convenient, safe, healthy, and equitable with various options for all users to travel to their destinations.

Public Outreach Efforts

SANDAG received comments requesting that meetings be scheduled at times when the public can attend. SANDAG appreciates the feedback received on the public outreach for the proposed Amendment. Several public meetings were held for the public to provide comments on the proposed Amendment. A public hearing was held on June 23, 2023, at 9:00 am during the Board meeting; Board meetings are regularly held on the 2nd and 4th Fridays of every month. The full year meeting schedule for the Board, Policy Advisory Committees, and Working Groups is published in advance on the SANDAG website. Committee meetings are recorded and published for public viewing on the SANDAG Meetings YouTube channel.

In addition, three virtual workshops were also held on July 18 at 12:30 pm, July 31 at 5:15 pm, and August 3 8:30 am. The virtual workshops were held via Zoom at different times of the day to accommodate the general public. Meeting-related resources including the presentation, meeting videos, and agenda are available to the public on the SANDAG website.

Revenues and Costs

SANDAG received comments related to the revenue estimates used to develop the proposed Amendment and implement transportation infrastructure throughout the region. Commentors expressed confusion over how the Amendment would fully implement the 2021 Regional Plan without regional RUC funds, and criticism of the explanation of revenues in the Amendment and the absence of updated project costs. SANDAG also received comments objecting to the cost to prepare the Amendment itself.

SANDAG appreciates the feedback shared on revenues and costs. The regional RUC was not intended to be implemented until 2030, and as such was only a revenue source for the final 20 years of the 2021 Regional Plan. The regional RUC was projected to generate $14.2 billion in revenues between 2030 and 2050 under the 2021 Regional Plan and was anticipated to support transportation expenditures between 2030 and 2050, in combination with several other revenue sources. These regional RUC revenues have been excluded from the revenue projections in the Amendment.

In updating revenue assumptions for the proposed Amendment, adequate funding sources have been identified to implement the adopted 2021 Regional Plan without funding from a regional RUC. SANDAG included funding from the Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law), which was signed into law in November 2021. The Infrastructure Investment and Jobs Act (IIJA) authorized $1.2 trillion for transportation and infrastructure spending with $550 billion of that figure going toward "new" investments and programs. The historic level of infrastructure investment from the

federal and state government in the early phase years of the 2021 Regional Plan was unknown and underestimated. The federal and state discretionary programs near-term estimates have been updated to assume the amount of federal and state dollars the region will receive for each local TransNet dollar based on prior years. The total estimate of near-term State and Federal Discretionary Programs resulting from IIJA is $6.35 billion.

Additionally, SANDAG has already received $650 million above what was anticipated between Fiscal Years 2021-2023 in the Amendment. The Amendment assumed $950 million in discretionary funding revenue ($507 million in state funding and $441 million in federal funding) between Fiscal Years 2021-2023. During that same period SANDAG has received $1.6 billion in discretionary funding revenue ($876 million in state funding and $766 million in federal funding).

Concern was expressed specifically over the assumptions for future New Starts/Small Starts projects. Those assumptions are based on SANDAG's historical success in receiving New Starts funding and on the pipeline of eligible projects over the 30-year planning period. Assumptions around New Starts/Small Starts projects were not revised in the Amendment.

Some commentors asked how SANDAG could be assured of funding for the 2021 Regional Plan and how projects would be prioritized for funding if there are funding shortfalls. Federal regulations require that SANDAG provide estimates of costs and revenues that are reasonably expected to be available, and may also include recommendations on new financing strategies and funding sources.[1] The revenue assumptions were updated to remove the regional RUC and because federal regulations require an amendment to reflect revenue sources that are subsequently removed or substantially reduced.[2] This also included the projected sales tax measure in the 2021 Regional Plan. These revenues were replaced by funding sources as described above.

Project prioritization under the Amendment remains unchanged from the 2021 Regional Plan. While funding shortfalls are not anticipated, it is worth noting that there will be more unknowns for revenues and costs in the outer years of the Regional Plan. SANDAG is typically required to update the Regional Plan every four years to account for the changes in funding outlooks, priorities, and planning assumptions, and will update priorities, costs, and revenues as part of the 2025 Regional Plan.

As to costs, these are reflected in 2020 and year of expenditure dollars in Attachment 1 to the Amendment: Errata to the 2021 Regional Plan. Generally, planning assumptions must be updated at least every five years according to FHWA Guidance for the Use of Latest Planning Assumptions in Transportation Conformity Determinations.[3] Consistent with the transportation conformity rules and regulations, SANDAG consulted with federal agencies early in the Amendment development process, and the latest planning assumptions have been used for the Amendment. The cost information from the 2021 Regional Plan was the latest available at the time SANDAG began its transportation conformity analysis for the Amendment.

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[1] 23 CFR 450.324(f)(11)

[2] 23 CFR 450.324(f)(11)(viii)

[3] EPA420-B-08-901

Project prioritization under the Amendment remains unchanged from the 2021 Regional Plan. It is worth noting that there will be more unknowns for revenues and costs in the outer years of the Regional Plan. SANDAG is typically required to update the Regional Plan every four years to account for the changes in funding outlooks, priorities, and planning assumptions, and will update priorities, costs, and revenues as part of the 2025 Regional Plan.

Related to the cost of preparing the Amendment, itself, certain technical work requiring consultant support was necessary for the Supplemental Environmental Impact Report. However, much of the remaining work was completed with existing in-house staff and resources to minimize the net cost to prepare the Amendment.

Memorandum to the Board of Directors

SANDAG

7/13/2023 File Number: 3102008

Memo to: SANDAG Board of Directors

From: Hasan Ikhrata, SANDAG Chief Executive Officer

Subject: Follow up from June 23 Meeting

On June 23, 2023, the SANDAG Board of Directors discussed the proposed Amendment to the 2021 Regional Plan. This memorandum is in response to several questions that arose during the meeting.

1. **What can SANDAG take credit for to meet the CARB greenhouse gas (GHG) emission reductions target?**

SANDAG can take credit for local and regional programs beyond State programs that reduce GHG emissions, such as development and implementation of regional transportation demand management programs (TDM), and regional EV charger and zero emission vehicle incentive programs.

SB 375 does not allow Metropolitan Planning Organizations (MPOs) to take credit for State programs that improve vehicle emissions standards, changes in fuel composition, and other State measures that reduce GHG emissions to demonstrate target achievement. (*See* Government Code Section 65080(b)(2)(iii)).

2. **Is a reduction target set for vehicle miles traveled (VMT) as well as GHG, and what will be required under the CARB updated 2022 Scoping Plan?**

There is currently no target for VMT reductions. SANDAG's current target, established in 2018, is a 19% reduction in per capita passenger vehicle GHG emissions relative to a 2005 baseline. Under SB 375, CARB is tasked to update the regional targets every eight years, with the option of revising them every four years. Under the current timeline, we expect CARB to set SANDAG's new target in 2026, which would apply to the 2029 Regional Plan.

On December 15, 2022, CARB approved its final 2022 Scoping Plan for achieving carbon neutrality concluding that *"the pace of change to reduce VMT must be accelerated."* The Scoping Plan outlines a strategy that includes *"VMT per capita reduced 25% below 2019 levels by 2030, and 30% below 2019 levels by 2045."* However, the Scoping Plan does not set a regional target for VMT. *(See* 2022 Scoping Plan, *p. 193).*

How this will translate into future targets established by CARB for MPOs is uncertain at this time, but it is likely that a new VMT target and a higher GHG reduction target for MPOs will occur in the future.

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3. How was the GHG emission reduction under the proposed Amendment determined, how does it compare to the 2021 Regional Plan, and where can the model that was used be found?

The GHG emission reductions under the proposed Amendment was determined using SANDAG's activity-based model (ABM 2+) and the State's Emission Factor (EMFAC) model. Detailed documentation describing the ABM2+ used in the 2021 Regional Plan is included as Appendix S of the 2021 Regional Plan and also publicly available at SANDAG's GitHub repository and wiki site: github.com/SANDAG/ABM/wiki. The methodology was rigorously peer-reviewed and approved by CARB early in the development of the 2021 Regional Plan and the same methodology was used for the proposed Amendment.

As discussed in Section 2 of the proposed Amendment and the Introduction to Attachment A, Errata to the 2021 Regional Plan, the proposed Amendment was run on an updated ABM 2+ model which accounted for low traffic counts at some large employment sites, slight changes in employment and population distribution figures, changes to cross-border fleet mix, and more accurate traffic volumes on State Route 11.

The 2021 Regional Plan that was submitted in December 2021 had a 20.4% GHG per capita reduction from 2005. The proposed Amendment, which was based on the updated version of ABM 2+ and the removal of the regional road usage charge (RUC), results in a total reduction of 18.6%.

Comparison of SB 375 Results			
	2021 Regional Plan (ABM2+ with RUC)	**2021 Regional Plan** (Updated ABM2+ with RUC)	**Proposed Amendment** (Updated ABM2+ without RUC)
Population	3,620,349	3,620,349	3,620,349
SB 375 VMT	79,725,7,10	80,166,669	81,418,476
SB 375 VMT/Person	22.0	22.1	22.5
GHG Per Capita Reduction from 2005	-20.4%	-19.9%	-18.6
	Approved Plan	**Due to ABM2+ Update**	**Due to Removal of Regional RUC**
Difference in GHG per Capita Reduction from 2005 compared to adopted 2021 Regional Plan	0.0	0.5	1.3

4. Does the model consider number of cars and not just vehicle miles traveled (VMT)?

Yes. ABM2+ simulates people's travel behavior. In addition to VMT and mode share, it also tracks traffic volumes (i.e., passenger vehicle trips, and medium and heavy-duty trucks) on the roads through simulated travel. These numbers are not reported as part of the Regional Plan primary or supporting performance metrics but are made available through the SANDAG's Transportation Forecast Information Center (TFIC) website after the adoption of the Regional Plan.

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5. What are the amounts of the state and regional RUC assumed in the 2021 Regional Plan and what is the status of the state RUC?

There is no regional RUC in the proposed Amendment to the 2021 Regional Plan. The proposed Amendment assumes a state RUC of 0.7 cents ($2020) starting in 2030 and increasing to 1.2 cents by 2050 to cover the funding gap created as fuel taxes diminish over time due to greater fuel efficiency and a shift to zero emission vehicles. The State has not released a start date; however, 2030 is consistent with the assumption made by other California MPOs.

California was first authorized to study a road charge pilot in 2014, which was ultimately funded through federal grant programs, to research the possibility of a state RUC as a sustainable and equitable gas tax replacement. More information on the status of this effort can be found here: California Road Charge program.

6. Does the Amendment show Revenues in year of expenditure dollars?

Yes, Appendix V Table V-4 (p. 34) of the proposed Amendment Errata shows the changes in the Major Revenue sources in year of expenditure dollars.

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Public Hearing Transcript

Chairwoman Nora Vargas:

Moving on to item number 16. This is a time and place set for public hearing on the draft amendment for the 2021 Regional Plan. Thank you to all the team that was here for all the other items. Appreciate that. So we're going to have a staff presentation that is going to be provided to all of us. And then we're going to have public comment. After public comment, we're going to hear comments from the Board. So if you have comments remember use your clicker, and then we're going to close the public hearing.

I want to just emphasize two things. This is the 2021 Regional Plan not the 2025 Regional Plan. There is no action to be taken today, and it's just an opportunity for us to be able to have comments and discussion to focus on the draft amendment in front of us. We're going to continue our conversation on workshops for the 2025 Regional Plan at our next board meeting. And then also a reminder for those of you who want to speak to submit your slips to the clerk of the board and raise your hand online before the end of the press staff presentation. And so with that I'll turn it over to Keith. Thank you.

Keith Greer:

Thank you, Chair, and good morning board. My name is Keith Greer. I'm one of the Regional Planning managers, and we have a very short presentation. So, last September, the board discussed options to remove the regional road user charge, otherwise known as the RUC, that would've gone in effect in 2030 from the '21 Regional Plan. The board selected option two, to prepare a focused amendment to the '21 Regional Plan without the regional road user charge and prepared a supplemental California Environmental Quality Act analysis.

As discussed at the board meeting, option two included the removal of the regional RUC, updated revenue assumptions resulting from the removal of the RUC, and other changes since the adoption of the '21 Regional Plan. And also, no changes to the transportation network, no changes in land use, and no changes to any of the programs, policies, or projects included in the Regional Plan itself.

The proposed amendment and supporting documents are completed and they've been posted to the SANDAG website for review. The amendment includes a 14-page narrative, in both English and Spanish, that describes removal of the road user charge and its effects on meeting our greenhouse gas targets, our revenues, our network transportation performance and transportation conformity.

Supporting documents and information includes a 37-page Errata, which shows in a strikeout underlying all the changes that need to be made in the '21 Regional Plan to remove the regional road user charge, and updated 19-page social equity analysis, and a 52-page air quality conformity analysis. The amendment is available for public review through August 8th, as well as supporting materials.

Moving forward onto the greenhouse gas targets and what happens when you remove the regional road user charge. So, the Sustainable Communities and Climate Protection Act better known as SB 375, is a state law that requires CARB to set greenhouse gas reduction targets for each MPO. For SANDAG, as the MPO for this region, our carbon-established target as 19% reductions of GHG per capita as measured against the 2005 baseline.

The '21 Regional Plan exceeded that target and achieved a 20.4% reduction. The removal of the RUC results in an increase of 1.3 million vehicle miles traveled per day, and the amendment result in 18.6% reduction. So the Regional Plan was higher, the amendment is lower. But when rounded up per CARB's own guidelines, it meets the 19% reduction target. In addition to the reduction target, CARB will look at the policy commitments made in the plan itself.

SANDAG staff have been keeping our CARB contacts up to date on the status of the amendment it proceeds, and to date, we have heard nothing that indicates that the CARB will not approve the amendment as proposed. According to revenues, we have both reductions in revenues and also increases in revenues, coming from, since last time the point when Regional Plan was adopted. For reductions, the removal of the regional road usage charge will result in $14.3 billion reduction in revenues.

In addition, local revenues from a sales tax measure envisioned to be occurring in 2023, in the Regional Plan, have been delayed to 2025. Increases includes TransNet. TransNet has been revised to reflect the board's own adopted April 22nd estimates, based upon higher than anticipated sales tax revenues. And the last two items are dealing with state and federal discretionary programs.

So since the adoption of the Regional Plan, there's been a tremendous increase in infrastructure funding coming out of Washington and Sacramento, coming from the infrastructure investment in Jobs Act or IIJA and other state sources that were not known at the time that the Regional Plan was adopted. The net result of all these increases in reductions is a $17.9 billion reductions in revenues for the amendment.

I should note that all these dollars are in 2020 dollars and are consistent with the '21 Regional Plan and reflect the revenues assumptions at the time the board direct us to move forward with the removal of the RUC. Revenues in the proposed plan would decrease by 7.9 billion, as I mentioned, to 165 billion. This is still sufficient to cover the 163 billion-dollar cost of projects and programs included in the Regional Plan as envisioned, with a $2.4 billion buffer.

There are few other considerations to the board should consider. The amendment to Regional Plan would be consistent with the ozone budgets established for the regions. In addition, the amendment result in minor changes to network performance measures established in the '21 Regional Plan, with differences being less than 1%. The amendment would not result in a disparity impact or disproportionate effect on disadvantaged communities.

Finally, moving to the timelines and next steps. The amendment and supporting information has been released for public review, which will end on August 8th. A supplemental EIR will be released in July for a 45-day public review. In addition today's public hearing, staff will be hosting outreach events in July and August to get more feedback on the amendment and the supplemental EIR.

In September, the amendment and supplemental EIR will be revised based on comments received from the public and finalized for board consideration. All comments received will be addressed in writing and provided to the board, along with a final amendment and final supplemental EIR for your consideration. We'd hope to get back to the board in September, but the air quality modeling required for the supplemental EIR has taken longer. Based upon the number, timing, and complexity of the comments that we receive, it's estimated the final amendment and supplemental EIR will be brought back to the board business meeting in October.

If the board approves the amendment, it would be submitted to federal and state agencies for approval and the transportation conformity determination, and for CARB's approval, the Sustainable Communities Strategy. CARB's approval of the Sustainable Communities Strategy, which includes that 19% reduction target, takes several months to complete and may involve back-and-forth questions between the staff. That concludes staff's presentation. We'd be happy to answer any questions. Thank you.

Chairwoman Nora Vargas:

Thank you for your presentation. We're going to turn it over to Francesca for a public comment. Then I'll just remind my colleagues if you want to speak on this item, feel free to click your clicker I guess.

Francesca Webb, Clerk to the Board:

Thank you Chairwoman. We have a total of 12 public comments on this item. We'll start with Consuelo and then go to Mary Davis.

Mary Davis:

Thank... There is a... any roads charge... want to impose them elsewhere. Did you hear the first part or could I start again?

Speaker 5:

Start her time.

Mary Davis:

Can you start where-

Speaker 5:

Start her time.

Mary Davis:

Okay. Thank you, I'll start again. Mary Davis here. First, no to any road usage charge, road charge, mile tax, whatever you want to call it, no, no, no. And no to any tolls or new fees or charges. You're openly advocating to retire the State Route 125 South Bay Expressway toll early, yet hypocritically, want to impose them elsewhere. So no to that. And we reject most of all the paradigm shift that both SANDAG and the state of California are trying to implement.

Going from a public benefit model of funding our roads to infrastructure to a user pay system, which inevitably will involve telematics and tracking, regardless of whether the government does it or it goes to some third-party platform. At its very core, the concept of tracking people's movements is antithetical to both our national and our state constitutions, as well as the core American principles of individual autonomy and privacy. Thank you.

Francesca Webb, Clerk to the Board:

Our next speaker will be Alan C., who will be followed by Paul Henkin.

Alan C.:

Hello. Being a Navy guy, I always show up early. I was downstairs about 7:00 this morning. I saw your caterer holding the truck downstairs. Now imagine if she has to pay a road use tax. How much more would them pastries cost me as a taxpayer to serve you guys your free donuts? How much more would that taco shop I mentioned last... couple weeks ago, now is $12 for a breakfast burrito. How well would his overhead be with the price of electricity, price everything else, price of gas, and now the delivery trucks to deliver the groceries, goods he needs to prepare that breakfast burrito.

No, the road use tax. And as he mentioned, you don't need the road use tax, it covers it. Now it meets your climate footprint, as the electric car takes over, that will meet your climate agenda, what do you want to call it, because nobody's going to take your empty bus. Just look out your window, empty bus, empty bus, empty bus. You put more empty bus, that idiot on the telephone said, "We need a bus every 10 minutes." How many more empty bus you going to put out there? What's the climate footprint of all them empty buses not transporting people, when my right to actually drive from my home to Costco, anywhere I need to go, I can do that. How many on board here took the bus? Nobody, huh? And yet, you're going to push buses? I yield back.

Francesca Webb, Clerk to the Board:

Our next speaker is Paul Henkin, who will be followed by Truth.

Paul Henkin:

This so-called amendment has no mandatory language, like add or delete. SANDAG is assuming it will get $165 billion in federal money from the Infrastructure Investments and Jobs Act, signed into law in November, 2021 from page four there. It's hard... and it still has a few other revenue sources. Since the plan needs 163 billion, it doesn't seem to need any kind of VMT or RUC.

It looks like SANDAG has been playing with us since 2021, claiming it needs some kind of tax, road user charge, or VMT, another reason not to trust it. Then it plans to disrupt our schools to put this agenda, saying reach out to families through K to 12 school functions or tap into local high schools and colleges, universities to involve youth, either directly or through awarded-

Francesca Webb, Clerk to the Board:

Time has expired.

Paul Henkin:

... [inaudible] tax and programs.

Francesca Webb, Clerk to the Board:

Our next speaker is Truth.

Paul Henkin:

Disband SANDAG. And-

Francesca Webb, Clerk to the Board:

Your time has expired. After Truth will be Dr. Timothy Bilash.

Truth:

Oh. All right. The fact that it costs $1.5 million just to amend this horrible Regional Plan is ridiculous. I demand a people's refund of the whole thing, especially since the 3.3 cents per mile road user charge was fraudulently suggested as necessary, but no matter what factor is used to tax people off the roads, whether it's hours traveled, distance traveled, per ride, or restricted vehicles, hours or zones, it's all to implement the totalitarian 15-minute city plan that just happens to be popping up all over the world at the same time.

Even this item says, "Percentage of residents that can access retail and parks within 15 minutes." And just as the World Economic Forum wrote in their Sustainable Road Transport and Pricing whitepaper, "As prices increase for road use, individuals will be forced to choose alternative paths or times, or walking and biking. Personal car usage and even public transport could quickly become for the elite few." And voting on charges with the vote center model corruption, forget compromising or voting. I just say no to all Regional Plans. Thank you.

Francesca Webb, Clerk to the Board:

Our next speaker is Dr. Timothy Bilash, who will be followed by Mark.

Dr. Timothy Bilash:

Good morning, Board. I will try to make this brief. I have two slides to share, if you could remote me. We're not doing enough. Kudos to the committee, to SANDAG for again taking the impossible and doing what was asked. But we're doing less, not more and what it was before is not enough, and so, I have two slides to share. To just to bring this, I'm a physician, OB-GYN, women's doctor, for 32 years, and a scientist. And I should do something?

Speaker 5:

Read his time.

Dr. Timothy Bilash:

Is my screen being shared? Yes. So a new paper, pulled it this morning. I'm sorry and this is the problem, the complexity of science, joint effect of ambient particle matter 2.5 micron exposure with vitamin B12 during pregnancy. And the slide I offer and I sent the link to the board this morning, shows a two to three times risk of diabetes in pregnancy when you combine particulate matter 2.5 with a vitamin B12 deficiency. Particulate matter comes from the tires in your car. You have to replace them every few years? Well, that goes into the air and that goes into our lungs and it goes into the babies. Thank you for listening.

Francesca Webb, Clerk to the Board:

Our next speaker will be Mark, who will be followed by Andres Wong.

Mark:

Mark. In this video, Katie explains what's happening in Oxford right now. Are they limiting people's movement? There's no excuse for limiting people's movement. It's literally a totalitarian gesture to enslave people. And when you've got people who are disarmed, like we are here in California, whose gun would be lucky to shoot accurately across the street at their neighbor's door, not that anyone would want to do that, and they can't travel freely, you can do anything to them, anything at all.

And they are in the UK. That's why the people revolted. You people need to see these videos. This is on BitChute. This one, you can just Google. Oxfordshire, and see on the city council's website what they're planning for you. Next, what they're doing there, right next to London. This is a worldwide movement. You need to see these videos. Rosa Corey is a Democrat. I'm not Democrat or Republican. Both sides screw us in different ways. They take turns. This one is about how they're replacing our government with unelected council-

Francesca Webb, Clerk to the Board:

Time has expired. Our next speaker is Andres Wong, who will be followed by The Original Dra.

Andres Wong:

Good morning. Thank you all for being here and thank you for this chance to hear my voice. I am from the supposedly beautiful city of Chula Vista and I speak now about the RUC, originally named mileage tax, because it is a tax. For the Union Tribune, earlier this week after the $4.50 we pay at the pump, $1.19 already goes to taxes and fees. We are already taxed to the hilt. I therefore ask all of you to remove and trash the RUC. This morning, there's obviously animosity towards all of you, please think why. I pray to our Lord Jesus that you listen to your constituents. Thank you.

Francesca Webb, Clerk to the Board:

And we're going to move on to Zoom where we have four remaining speakers. The first will be The Original Dra, followed by Carolina Martinez.

The Original Dra:

Amen brother. Yeah, so I love how you guys think that taking $14.3 billion from the people that are already in dire straights could ever have been a good idea. You have to be brainwashed to believe that, because if you just divide that by the amount of people in the county, that's $4,230 every year, which is $353 extra a month. That's if every person had a car, which isn't true. So that means those would be astronomical charges to people that can't even afford to buy food, to live in a house, to do all the things that you guys are forcing them into.

This is so ridiculous. And then you want to spend 1.5 million to amend this? You guys act... Man, it's so sad. You never listen to the people. You're listening to these globalists and you're pushing this down the pipe, and it's all to push us into a 15-minute city. It's clear as day. If you cared about the people, you would look at that astronomical amount and be like, "Oh, my gosh, we can't do this to the people." You better never do it to the people.

Francesca Webb, Clerk to the Board:

Our next speaker will be Carolina Martinez, followed by Mike Bullock.

Carolina Martinez:

Good morning. My name is Carolina Martinez, with the Environmental Health Coalition. Thank you for the report and all the flexibility. We're here to request trainings for concepts like the road user charge for our community members in Barrio Logan, National City, and City Heights. To be able to understand these concepts, they're very complicated and we want to ensure misinformation is not used against them when making decisions.

I support residents in Barrio Logan, National City, and City Heights in understanding policies that are impacting their transportation. And I've conducted at least five different workshops on the road user charge. I explained to them that folks with less fuel-efficient vehicles are the ones that are paying the most when it comes to the gas tax. So we request that both SANDAG and the state dedicate capacity to support our community members in understanding this concept so that information is not used against them. Thank you.

Francesca Webb, Clerk to the Board:

Your time has expired. Our next speaker will be Mike Bullock, who will be followed by Blair Beekman.

Mike Bullock:

Yeah, thank you very much, Board, and thank you, Board, for all the work that you do. It is very unfortunate that we went down this path, because this road use charge was not going to take place until 2030. And of course, there's the 2025 Regional Transportation Plan, which you're working on right now. And the Regional Transportation Plan could get this right. And admittedly, it was not done right in the 2021 Regional Transportation Plan.

It should be obvious to all of us now that the state gasoline tax should be replaced by a means-based road use charge that does protect our privacy. And that can happen. That's one thing Democrats, Republicans agree on that we don't want to live in a police state. We respect our privacy and that can be done. I say that as a retired satellite systems engineer, Lockheed and-

Francesca Webb, Clerk to the Board:

Your time has expired. Our final speaker on this item will be Blair Beekman. You can go ahead.

Blair Beekman:

Hi, Blair Beekman here. To note that we, public comment, we are headed towards a future where there's going to be a lot of biometric technology used on our buses and I think we have to be ready for that with really open, accountable, clear policies and not be afraid to have those conversations openly. I mean, obviously, they're creating a lot of fear and angst and worry, and we need to learn how to be open in those conversations and it's open public policies that can allow that good conversation to take place and decisions to be made.

I also, with the ideas around many more buses, it's just an idea to increase ridership. Good luck how to do that. And I wanted to offer that the electric bus issue really looked to the VTA for ideas on the future of electric buses. And good luck on housing to really consider low-income housing development as a very viable option. Don't be afraid to talk about that either. Thank you.

Francesca Webb, Clerk to the Board:

Chair, that concludes the public comments on this item.

Chairwoman Nora Vargas:

Hey, thank you. We have a couple of members who have comments. I'm going to turn it over to Councilmember Shu.

Councilmember Jack Shu:

Thank you. Keith, I'd like to ask you a few questions first before I make my comments. Keith, you mentioned that this amendment will reduce our ability to reduce greenhouse gas emissions, from 20 to 18 point something, about almost 2%. What's the current CARB scoping plans targets with regards to reducing greenhouse gas emissions?

Keith Greer:

CARB hasn't set targets for MPOs yet, so the current target for SANDAG is 19%.

Councilmember Jack Shu:

You didn't answer my question. What is the current CARB scoping plan, just passed in November or December of last year, with regards to greenhouse gas reductions?

Keith Greer:

So there's two things happening here. The CARB scoping plan, which is a guidelines for how much overall state needs to reduce greenhouse gas, overall state, 25%. The current SANDAG target established by CARB is 19%.

Councilmember Jack Shu:

Isn't that 25% by 2030? Five years early?

Keith Greer:

25% by 2030. That's correct.

Councilmember Jack Shu:

Correct. Do you think the CARB will set a target for MPOs that is going to be higher or less than 19% in the future?

Keith Greer:

I do not have a crystal ball. The trend is going up. It's going to be harder to get our greenhouse gas targets at 19%. More likely it's going to go up from that.

Councilmember Jack Shu:

Can you say that again? Do you think it's going to go higher than 19% in the future?

Keith Greer:

All signs are it's going to go higher. It's going to be harder to reach your target.

Councilmember Jack Shu:

So, just to be clear, by passing this amendment, we're going in the opposite direction than what we might have in the future.

Keith Greer:

So, I think there's two ways to look at this. Right now, your target is 19%. Pursuant to the CARB's guidelines, you're meeting that target. You will have a choice as a board in the future, as part of the '25 plan and future Regional Plans, for how you choose to meet future targets. But for right now, you are meeting CARB's targets pursuant to their guidelines.

Councilmember Jack Shu:

Thank you. So, as most of you know on board, I've been against making this amendment to the '21 Regional Plan for a variety of reasons. There are many states, many regions of this country, and others, that have looked into road use charge. In fact, the state of California did with a pilot program which showed that people who use the road use charge found it much better than the current road use charge, which is a gas tax. 75% favored it.

We know the gas tax is regressive, that poor people pay more than rich people. So again, by putting this amendment forward, we're going against this body's own equity policies. SANDAG said we were going to try to deal with equity issues, because we know the poor suffered more, not only in terms of pollution, but also in terms of not having adequate transportation options. So, to me, it was just a complete quandary for me why we would want to do something to punish the poor because of misinformation that this body was working with.

And I get information from other sources. A conservative body that deals with tax issues, the American Tax Foundation, have looked into road use charge. They favor it. They think we should move towards it sooner rather than later. And lastly, another piece of misinformation that the public has been working with is that this body has the ability to impose a tax. We don't. We can't do that. Even if all of us unanimously voted to impose a tax, we don't. We put it before the people.

By placing this item on the plan, it gives the people of this region the option to impose, it means to raise funding for transportation with a road use tax, with a road use charge. So, to me, by taking this out of the plan, we're taking the ability of our constituents to decide for themselves whether or not they want a road use charge to fund adequate transportation.

Keith Greer:

Thank you.

Councilmember Jack Shu:

So again, it's very undemocratic and we're being dictatorial by taking that option away from the people to make that choice. And lastly, by amending this plan to go backwards with regards to reducing greenhouse gas emissions, we're giving this burden to the next board, the next generation to have to come up with a plan to reduce greenhouse gas emissions even more. 25% reduction per capita by 2030 is the new goal. Not 19%, not 20% with our last plan. That's the science, and that many of you have told me that you believe in climate change. Well, if you believe in climate change, you have to believe in climate science and climate math.

So, to me, voting for this amendment going forward is just contradictory to what we need to be doing here at SANDAG. These are hard numbers. I don't like them. I don't like the idea that our transportation system is inadequate. There are means to deal with privacy issues, there are means to make sure that a road use charge is means-based, and that people who rely on transportation are able to continue to use it and to provide other subsidies or means to help those who need help financially.

We do that with other utility bills, we do that with a number of means and it's able to do that. Privacy issues can also be dealt with. And I get this from other studies that I've read with regards to how this can work well. Hawaii, Oregon, Washington, Pennsylvania, other states throughout the country are looking into it. California certainly looking into it. We should have the ability to go forward and think forward. So I hope all of you take that into consideration as we go forward on this issue. Thank you.

Chairwoman Nora Vargas:

Thank you. Councilmember Burkholder.

Councilmember Melanie Burkholder:

Thank you, Chair. In light of my colleague's comments, Mr. Greer, on the slide, I think it's number seven, where it talks about the result in disparate impact, can you please explain to the board how you came to that conclusion that removing the charge would not result in that?

Keith Greer:

So as part of our-

Councilmember Melanie Burkholder:

And I'm sorry, and then I have one comment and I'm done.

Keith Greer:

Sorry about that. And as part of our Regional Plan, we have to do a social equity analysis. So when the amendment comes along, we do look at the amendment and we have that same social equity analysis updated. So that's part of your attachments to Errata. It's attachment one. It's posted online. And what they look at in social equity analysis is disadvantaged populations and the difference between disadvantaged populations for both benefits and things that are not benefits against the non-discriminatory population. So it's comparison analysis.

Zero would mean there's no difference. For the majority of the items under the amendment, there is no difference. It affects both the disadvantaged populations and the non-disadvantaged populations the same. Some are actually a benefit to them. So, for example, a road use charge is a cost. So for disadvantaged population, that cost is a greater burden than for non-disadvantaged populations. So in that case, it's a more of a benefit for them not to have that. So it's a social equity analysis, it's attachment to the Errata and it's publicly online.

Councilmember Melanie Burkholder:

Thank you for that. And completely off of that topic, Carlsbad is very interested in partnering with SANDAG in the flexible fleet program, and I'm just asking staff to accelerate that program. Thank you.

Chairwoman Nora Vargas:

Thank you. Councilmember Gaasterland.

Councilmember Terry Gaasterland:

Great, thank you very much. Keith, thank you for the presentation. Could you bring up slide four, please?

Keith Greer:

[inaudible].

Councilmember Terry Gaasterland:

Okay, I'm going to assume that it's up there, because I can't see it from here. Oh, there we are. Okay, so I always check the math and when... This corresponds to table, ugh, I'm sorry, table 4.2, I think, in our report. On table 4.2, we are given the numbers 22.1 and 22.5 as the VMT projected, in the old versus the new. What we're not given is, at least I couldn't find it, maybe it's there, is the VMT in 2005 that we are comparing to.

So I do the math, and I take these percents, 20.4, and that means that the 22.1 is 79.67% of X. Calculate X, take it to three decimals and do the same with the 22.5, which is really 22.489 and the 22.1 is really 22.143. So you get a different X. And if I use the old X, so 22.1, and that number, and then ask what's the difference with the new projection? The number I get is 18.9598. So it's actually really, really close to that 19%.

So I bring this up, because we really are talking about two tenths of a percentage point difference here and there. Your numbers that are in the table come to a different X. My point being, we're really concerned about this VMT reduction and yet the math doesn't add up.

Keith Greer:

So, first of all, let me thank you for going through that math. I couldn't follow all of it, but we do have a program here where we do check our math and have a QA/QC process. It's part of our peer review process that Dr. Burke's in charge of. I can say that both the numbers shown up here are consistent with the report and there's also shown in the Errata. And Dr. Burke, would you like to add, adjust anything else?

Dr. Burke:

We do have Wu San online. He was unable to be here today. Wu, he was promoted panelist, if you want to explain anything quickly?

Dr. Wu Sun:

Sure. Can you hear me and see me okay?

Dr. Burke:

Yes we can. Thank you.

Dr. Wu Sun:

So I have to say there are a lot of numbers there. I don't follow hundred percent, but in terms of the to each difference, with and without RUC, is roughly 1.8. It's combination of the mode share change, which represented drive behavior change. So for example, driving alone for work trip increased by 0.3%, and also because driving is cheaper, the average trip events increase by 1% overall. So that's the combination of these two factors.

Councilmember Terry Gaasterland:

Okay. So I would urge all of us to really ask for accurate numbers. Precision to three decimal points isn't necessarily necessary, but I get 19% if I ignore the decimal points, and I'm going to tell you how I get it. 22.1 is the VMT number in the old. 22.5 is the VMT number in the amendment. If we take 22.1 and divide by 79.6%, we get the 2005 number, presumably. If we take 22.5 and divide by 81.46%, 0.4%, we get a different number. So that means that we're off a little bit. And my calculation of the off a little bit is 2/10 thousandths of a percentage point away from 19%. So I think by rounding, you're doing the calculation a slight disservice, that this is actually very, very, very close, a whisper close to 19%.

Dr. Burke:

If it would be acceptable, we'd be happy to follow up with you after this meeting to explain. We've done this consistently throughout, and we definitely want to do this to be compliant with CARB. So we'll definitely make sure that we can work through the numbers with you to explain how we've gotten there and we can return back to the board to let them know how that's worked out.

Councilmember Terry Gaasterland:

Yeah, that's good. That's fine.

Chairwoman Nora Vargas:

Thank you. The next person is Councilmember Duncan?

Councilmember John Duncan:

Thank you. I think my questions were answered by the other director's questions. The part of the point, though, is this, it's modeling, right? And all models are somewhat imperfect. We try to make them as perfect as possible, but I just wanted clarification. It seems to me that the two main factors that are going into the models that would lead to the conclusion of the greenhouse gas increase or not as much reduction are one, that the road user charge would have a suppressive effect on driving due to its cost, due to the increased cost.

And the other aspect appears to be that it may slow down some other mass transit or other projects that might lessen the desire to drive. I am interested in how heavily each of those factors weighed in the calculation. I know this may be too simplistic, but if you have any comments on that that may help me more, that would be great, but I appreciate the comments you've already made as well.

Keith Greer:

Just really quickly, I think Dr. Sun online explained it. So when you take out the road usage charge, it makes it cheaper to drive so people drive more and then drive further. And so, that's simplistically how it works.

Councilmember John Duncan:

Right. And that's what I just said. My question, I guess would be a little bit more specific, and if we don't have it right now, that's fine, would be the percentage impacts of those. I mean, if based on what you just said, if the change in the calculation for greenhouse gas reduction target would be based, based on what you just said, I believe 100% on the fact that there would be more driving, because it's not going to be increased the cost of it. But I think it was more complex also. It actually also included the other factor that I mentioned. I can look into it deeply separately. Thank you.

Chairwoman Nora Vargas:

Thank you, Mayor Jones?

Mayor Rebecca Jones:

Thank you, Chair. Okay, so I had a couple of comments and then a couple of questions. So, I have a little bit of heartburn about the $1.5 million that we are spending on this, only because eight of the original cities that voted on this were my city, Carlsbad, Coronado, El Cajon, Oceanside, Poway, Santee, and Vista. We originally voted no, because we did know about the, how close the reduction was, enough to almost meet the goal and round up.

Many of the board members that were on at the time have actually said, "Oh, the RUC is already out of the plan." It's not, and we have found today that it's moving forward. October, we should have board approval and then moving forward to submit to CARB. That would happen in November. So again, still not taken out, not out of it. But I do have some questions. And oh, one other thing, the road user charge does not pay or is not in lieu of the actual gas tax, it's on top of the gas tax. It does not replace it.

So the metrics, I did ask a question on Wednesday. I did get a response last night. The ABM travel demand, I'm not going to go through all of that right now today, but can I have that sent to me where that's located, because I haven't been able to locate that. You don't have to do that right now, but I would like to talk about... Oh-

Chairwoman Nora Vargas:

We'll send it to everybody so everybody has a copy of it.

Mayor Rebecca Jones:

Perfect. On page 188, we're talking about the revenue assumptions and we still talk about them in 2020 dollars. Which again, I have a little bit of an issue with that, because we do have the year of expenditure numbers. The item number one, which is the removal of the road user charge is 14.2 billion over the life of the '21 plan. However, the year of expenditure is 24.47 billion, which is quite a bit of a difference. It's 10 billion more. I would like for us to start talking in the dollars and year of expenditure, because that's actually more of what we actually will be paying.

And then also, I do have this question on number three of that same revenue assumptions. The update in the TransNet, we're figuring that'll be about two billion more, and I don't think that we actually voted on reallocating the TransNet dollars from what our residents have actually agreed to pay for. So if I missed that and somehow we voted on that and I didn't realize that, I would like to know. And if not, when are we planning on actually moving forward with the reallocation of TransNet dollars to the new Regional Plan?

CEO Hasan Ihkrata:

Let me, if I may answer the question of the mayor. The TransNet allocation is totally different from this amendment. This amendment is based on a request by this board to remove the RUC from the plan and we're doing that. I said many times before, and I'm going to say it again to you, that the TransNet money right now in the account is enough to pay the debt. There is no additional TransNet money to reallocate. We could BS you until, "Yeah, we'll do that, we'll bring..." But between now and 2030, more than 85% of the TransNet money is going in paying the debt we borrowed to build the project.

So Mayor, with all due respect, when you say reallocate, you have to have money to reallocate. There is no money in the TransNet, at least between now and 2030, and that's a different process than the amendment. This board requested to remove the road user charge from the plan. We did it. We're going to release it for public review as the modeler said, it's 18.6 rounded to 19%, and we'll let the state decide how to do about that, to go about approving it or not approving it. But I just want to make sure we're clear. There is nothing to reallocate and the fact that somebody at one point told you we have all this money, it's double what's actually is, I'm sorry. I apologize that you are under the impression that TransNet has more money than it actually does.

Mayor Rebecca Jones:

I'm sorry Mr. Ihkrata, so you're saying between now and 2030, but this is a... this would happen in 2030 anyway.

CEO Hasan Ihkrata:

Correct.

Mayor Rebecca Jones:

So you said 85% of TransNet would go toward debt service, so there was-

CEO Hasan Ihkrata:

Yes.

Mayor Rebecca Jones:

.... there's still 15%-

CEO Hasan Ihkrata:

Correct.

Mayor Rebecca Jones:

... at some point. Yeah.

CEO Hasan Ihkrata:

Yeah.

Mayor Rebecca Jones:

So the 15% we have not voted on reallocating that, correct?

CEO Hasan Ihkrata:

You did not prepare-

Mayor Rebecca Jones:

And the reason... Sorry, the reason I bring this up is because it's right here in the revenue assumptions on page 188 that we are counting TransNet dollars.

CEO Hasan Ihkrata:

Sure.

Mayor Rebecca Jones:

That's why I bring it up.

CEO Hasan Ihkrata:

Yeah. And the 15% has been allocated many times over to match the grant we're getting. So the bottom line is there is no money to reallocate. That's the honest answer. Now, if you want to go about debating why and how, that's fine.

Mayor Rebecca Jones:

No. No, I'm sorry. Maybe I'm not understanding, because we are counting income from TransNet to actually pay for this plan, which also bases on-

Chairwoman Nora Vargas:

[inaudible]

Mayor Rebecca Jones:

Okay.

Keith Greer:

We also have a chief financial officer here, but there's two things going on here. This is not about reallocation. The number in here is about an estimate in the future of what TransNet would bring in and it's updating that estimate based upon the board's own adopted 2022 estimate.

Mayor Rebecca Jones:

But if it's a revenue assumption to pay for the '21 plan, then it is being used for the '21 plan.

Keith Greer:

That same revenue assumption was built in the '21 plan, nothing's changed. All that's changed is the amount of the estimate in the future, based upon higher than anticipated sales tax.

Mayor Rebecca Jones:

Okay, but the TransNet was actually, sorry... Maybe I'm splitting hairs, but I want to understand this. I'm trying to get at it. I'm sure I'm probably not the only one. So when we're looking at TransNet, it was to pay for certain improvements, and what I'm trying to figure out is if it's paying for the new plan, where are those dollars actually going that are specific to the actual original plan? I'm sorry, the '21 plan?

Keith Greer:

Maybe Andre would be more helpful in this.

Coleen Clementson:

I can add something here, if I may.

Mayor Rebecca Jones:

Yeah.

Coleen Clementson:

So, remember that having a revenue scenario is a federal requirement to get this plan approved. And so, what we have to do is show the federal government that this is a possible way to pay for this plan. The only thing that's been done here is we've looked at the revenues and that was based on the board input. How much more do we think we're going to get from state and federal grants because there's a tremendous amount of money out there that we didn't anticipate? So we upped that piece.

Then we also looked at our latest revenue assumptions for TransNet and we built that up as well. That's what made up for the $14 billion shortfall once you take the road usage charge out. The critical thing here is that that additional revenue is not attributed to any particular project. It's really just getting that math problem right so we can take this amended plan and give it to the federal government and ask them to approve it so that we can continue to get federal funding. So that's how it's done.

It's not that this 1.2 billion is going to this project or that project. It's overall to meet that hole in the plan that comes as a result of pulling out the road usage charge, and-

Mayor Rebecca Jones:

Thank you, Coleen.

Coleen Clementson:

... that's all there is to it.

Mayor Rebecca Jones:

Yeah, I think you're understanding what I'm asking.

Coleen Clementson:

Yes.

Mayor Rebecca Jones:

So we haven't actually allocated it, but we're using it as an assumption that we will reallocate it at some point in time and it will be used for the new plan. Great, thank you for that clarification. I'm sorry to be splitting hairs. I'm really not trying to waste our time. I just want to understand it completely. Thank you.

Chairwoman Nora Vargas:

All right, Mayor? Deputy Mayor Goble?

Deputy Mayor Steve Goble:

Thank you, Chair. I think the public might be a little confused why we're making revisions to a historical document rather than modifying a future document. Can you help me understand that?

Chairwoman Nora Vargas:

Go ahead.

Coleen Clementson:

Certainly. So these plans are required to be updated every four years. That's a federal law and a state law. So the most recent plan that the board of directors approved was in December of 2021. Your next plan, the 2025 plan is due in the fall of 2025 to the state and federal agencies. What the board had asked staff to do as, a result of a lot of public input, take that road usage charge out of the 2021 plan. That's what's before you today is a proposed amendment to the plan that the board adopted in December of 2021. We recognize that some of your discussion here is important for the 2025 plan and we've got a full workshop planned for you all on funding for the 2025 plan coming up.

Deputy Mayor Steve Goble:

Great. Thank you.

Coleen Clementson:

Thank you for the question, because I know that can be really confusing for the public, too.

Deputy Mayor Steve Goble:

Thank you. My next question has to do with the 19% reduction by 2035. Does that include the benefit of conversion from gas to electric cars? CARB says that we will have 2.9 million less gas engines sold by 2030 and 9.5 million less gas engines sold by 2035, implying they'll be electric by then. Does the 19% reduction include the benefit of that conversion from gas to electric?

Keith Greer:

So the number that CARB gives us, it's against the 2005 baseline and it's very specific what we can count and not count, and it's already built into the model, including things like fleet turnover, which is what you're getting at. So the number we've given you, that 18.6, has all the built-in assumptions as we know right now already built into it.

Deputy Mayor Steve Goble:

So it's, answer sounds like yes-

Keith Greer:

Does include.

Deputy Mayor Steve Goble:

... it does include the conversion, gas to electric, is what you're saying.

Keith Greer:

Correct.

Deputy Mayor Steve Goble:

I understand. Okay, thank you. My point-

Coleen Clementson:

I think one clarifying point there. So the laws that we have to comply with and the math problem that we have to use to get to that 19%, the law doesn't allow us to count electric vehicles, unless it goes above and beyond what the state is already expecting this region to accomplish. So the measurement that we have to use looks at vehicle miles traveled per person, how long the trips are, how many trips I take on an annual basis. That's what we have to use and that's the proxy to get to this greenhouse gas reduction. I know it's super complicated and in the weeds, but that's the law that the state has for us and for everybody in the state of California to have to meet. So even if every vehicle today was electric, we wouldn't see a big increase there. So that, I just wanted to clarify that point in the law that makes this really complicated.

Deputy Mayor Steve Goble:

If you said every car today was electric, we wouldn't beat the 19%?

Coleen Clementson:

We still would have to meet our vehicle miles traveled. So it doesn't... the vehicle miles traveled, you may still drive even if your car is electric. So we're all accumulating miles, you may actually drive more.

Deputy Mayor Steve Goble:

So, it's really more about miles driven than-

Coleen Clementson:

That's the math problem that we have-

Deputy Mayor Steve Goble:

... GHG reduction is what I'm hearing you say.

Coleen Clementson:

That's true.

Deputy Mayor Steve Goble:

So really-

Coleen Clementson:

That's the math problem.

Deputy Mayor Steve Goble:

Really, this is about getting-

Chairwoman Nora Vargas:

Excuse me, hold on one second.

Deputy Mayor Steve Goble:

... out of CARB rather than what kind of car we're driving?

Chairwoman Nora Vargas:

Can you hold on one second? Give me a second. The members of the audience, can you please refrain from making any comments or clapping or anything? That we need to have this discussion as a board, so we ask that you are respectful of our time. Go ahead, sir.

Deputy Mayor Steve Goble:

So am I right in hearing you saying it's less about the kind of car we're driving gas for electric and more about the number of miles that we're driving?

Chairwoman Nora Vargas:

I think the important thing to mention here is that there's rules and formulas and regulations that the state has directed us. And so it's not necessarily what she's saying or what we're saying, it is the regulations that we have to follow. And so that's where the math is where it's at, but happy to have a conversation in terms of some of the laws.

If you remember when we did the Regional Plan for 2025, we had a whole briefing about what were the factors that we had to take in place so that we as we're trying to reach our goals, that we really understood what those were. I think we can go back and check so that everybody understands for the 2021 plan what those were in case you have any specific questions on that.

Deputy Mayor Steve Goble:

Yeah, I think the public would say what's really driving the 19%, the conversion to electric or fewer miles traveled?

CEO Hasan Ihkrata:

Vehicles miles traveled.

Deputy Mayor Steve Goble:

That's what the public would ask. Yeah, yeah.

CEO Hasan Ihkrata:

Vehicles miles traveled.

Chairwoman Nora Vargas:

Mm-hmm.

Deputy Mayor Steve Goble:

My final question, we took out the 3.30 cent road user charge from the regional charge. Page three of the staff report says separate from the regional RUC, the 2021 Regional Plan also assumes revenues resulting from the state administered RUC. What's the amount per mile of that and how much is in the plan, in terms of billions of dollars?

Keith Greer:

Let's get back to you on that. We might have an answer online in one second. The actual state charge. I do not know it right now.

Deputy Mayor Steve Goble:

It would have been 3.30 cents, plus the state charge, is what the staff report is implying. And I'm trying to find out 3.30 cents plus 4 cents? And since we took out 14 billion, it assumes there are several billion still in there from state RUC. I'm trying to figure that out, too.

Keith Greer:

You're precise that this removes the regional road usage charge. It doesn't affect anything the state's doing. We're trying to get that number for you, but this does not affect the state's regional road usage charge.

Deputy Mayor Steve Goble:

I understand. I think a public would say, "What's the total nut we're trying to crack?"

Chairwoman Nora Vargas:

We can get that number for you. We can get that number for you. And I think it's important and the good news is that that's why we're here today to have a discussion and to be able to address any questions that you have. And you have to remember there are things that we can do based on our jurisdiction and then there are other things that we must comply with because of the state. And if there's anything that we need to change with the state, I think is

working directly with our state legislators to be able to modify some of that. Any other questions, sir? All right, Mayor Minto.

Mayor John Minto:

All right, this is kind of interesting. I'm hearing about all these numbers and everything, and you mentioned the, complying with the state of California. And bottom line is, we're also trying and comply with the federal law, and so it's all getting passed down to all the jurisdictions to make us the bad guy. I guess what we're really talking about is this concept of climate change and the reduction of our greenhouse emissions by 19%, and that's an attempt to help reduce the rise in temperature, not just in San Diego County but the state and maybe across the world.

So, if we were actually to implement this road user tax, I see what the number is for money, but how many cars would it actually take off the streets? I don't know if you have this information today, but you can get it to us. I think that's important, because it goes to what Deputy Mayor Goble was saying, is it's really not about just about getting cars off the street, doesn't matter what they are. So then, to one end, do we know what the temperature change would be in milestone years?

For instance in 2030, '35, '40, maybe even 2050, are we talking about reducing the rise in temperature? Are we talking about there would be a lowering of a temperature worldwide, or would there be no change, which means we just stay where we're at today? And even if it went up 1% in temperature change, what's the real effect of that worldwide and how is it that we are, by what we're doing here in San Diego County changing the world? Because I can tell you right now, in my opinion, we're not changing the world with what we're doing here.

Some will say, "But it's a start." Yeah, well, you know what? I can't afford to pay more for driving, like a lot of people. I'm retired. I'm on a fixed income now. Always wanted to say that. So I don't know if you have any of those answers. I doubt it, because we're too busy. Everybody's too busy talking about reducing the greenhouse gas effects and preventing the worldwide temperature rise, but nobody seems to know what that worldwide temperature rise will be in 40 years even, or 20 years even. And so, I don't know, I guess the question is how can you justify, how can we justify it? How can the state justify it or the federal government justify it if they don't know the answer? So I just thought I'd throw that out for fun, if nothing else.

Chairwoman Nora Vargas:

All right, thank you. Councilmember Shu.

Councilmember Jack Shu:

Sure I have a... Well, let me address what Council... I mean, Mayor Minto's thing real quick, and have a question for Mayor Jones. We're going to have breakfast about this Minto and I, but that's similar to someone that would say, "I shouldn't pay any-"

Chairwoman Nora Vargas:

Give me one second. It's not a Q&A. This is a board discussion. And in board discussion members are able to have conversations with each other. That's what this process is all about. So no, it's not a Q&A, it's, a comment was made by one of my colleagues. My other

colleague was already in the queue and so I gave him the power to be able to ask anything he can. He can ask anybody in this room any questions that he has. So just for clarification.

Councilmember Jack Shu:

So Mayor Minto, when that issue was brought up to me by another elected person, I say, "Well, that's like the federal government's already what, three, $4 trillion in debt, how much is my little income tax to the federal government's going to make?" Wouldn't make any difference at all. Maybe I don't have to pay any taxes at all. Anyway, we'll leave that for our breakfast discussion. But Mayor Jones, you had mentioned that the road use charge would be in addition to the gas tax, not a replacement of the gas tax. I'm just wondering where did you get that from?

Mayor Rebecca Jones:

Councilmember Shu, right in the document, the funding document, it has the gas tax still in there, and then it also has the road user charge as not being able to be used for any road fixing or anything like that. It's on page V4 of the appendix, if you'd like to read that. Thank you.

Councilmember Jack Shu:

Sure.

Mayor Rebecca Jones:

And if you'd like to meet for coffee, I'd be happy to do that-

Councilmember Jack Shu:

I'd love it. I'll love it.

Mayor Rebecca Jones:

... anytime so we don't waste our board's time. Thank you.

Councilmember Jack Shu:

Thank you. That's really news to me, because all the documents I've read and information from the state and the other states, the road use charge is to replace the gas tax, which they believe is getting obsolete. We've had it for a hundred years and it's obsolete in the sense that I know you drive electric vehicle so you know your $200 per registration fee, per year is a fraction of what others are paying with the gas tax. So-

Mayor Rebecca Jones:

Page V4 Councilmember.

Councilmember Jack Shu:

Coffee's on me. I'll look forward to that. Thank you.

Chairwoman Nora Vargas:

Thank you. Councilmember Melendez.

Councilmember Katie Melendez:

Thank you. Great discussion, everyone. And I'm glad that we're at this point where we're looking at alternatives to our previous plan, but regardless of a discussion around a regional road usage charge, the state RUC is coming, and from my understanding, we have yet to be given a confident timeline of when the gas tax will be abolished. It has become less profitable of a revenue stream over the past several decades as cars have become more fuel efficient.

And now with the change to laws with the sale of internal combustion vehicles, we know that it will be essentially obsolete, but we haven't been given a confident timeline from the state. And I really believe that we need to, in addition to our planning regionally, we need to put ourselves in a position of education and advocacy, and has this body taken a position of legislative advocacy to abolish the gas tax?

In the City of Vista, I brought forward a resolution to insist on just that and I really believe that for the benefit of the public and for the working people that are going to continue to use gas-powered vehicles, because that is all that they can afford, I want to have full confidence for them that at no point will members of the public be suffering from a doubles taxation. And I really believe we need to put ourselves in a position of legislative advocacy, regardless of a state or regional road usage charge. We have to have a clear definition of when the gas tax is going to be abolished.

Keith Greer:

Thank you. Deputy Mayor Molina?

Deputy Mayor Luz Molina:

Yes, thank you, Chair Vargas. I would like to expand on Councilmember Melendez's comments. And absolutely, I completely understand the confusion that is out there, the facts and the other facts that the public seems to be catching. Of course, these are extremely complicated figures and methods and mechanisms by how we arrived at these figures. I would like to call for SANDAG to provide us board members, so that we can then disseminate the information to our, the people that we represent, in a way that is understandable.

Regarding the road usage charge that is coming from the state, this would not be the one that SANDAG or whoever's going to go and put on a voter ballot, right? That's completely different. There's one from the state that's coming. The one here from SANDAG or for the regional transportation plan is getting taken off 2021. What does that mean? People are still going to see a road usage charge from the state of California? I mean, there's a lot that needs to be explained clearly.

And I would like to request a way for me to explain that information to the people that come and ask me, "Is the road usage charge going to be on top of the gas tax?" Here, we're hearing... At this table, we're hearing two different things. So what is it? I need to know that information so that I can explain it to the people that I'm speaking with. Thank you.

CEO Hasan Ihkrata:

Hi, Mayor, Chairwoman. I think the councilwoman from National City is asking a great question and we are now getting into this philosophical discussion of it's a VMT or it's a greenhouse gas emission. Is it the temperature rising or falling? That's beside the point. We're a transportation agency. We have a state law and a federal law. The state law said that you have to meet certain targets. Don't ask us why this target, whether it's logical. We didn't

set those targets. If you want to change those target, like the chairwoman alluded to, talk to the legislators and change the law.

I think Councilmember Fisher was saying last time in the workshop, "Let's change the law." Change the law. But the law is this, in the regional transportation plan, and by the way, in every regional transportation plan in the state, there is the statewide assumption and that is either a gas tax or a replacement of the gas tax. We have nothing to do with that. That's a statewide assumption. On top of that, we assumed a road user charge. I think it's about two cents per mile and the board ask us to remove it and that's what we're doing. So let's not complicate these issues and make it philosophical discussion.

It's very simple, this board directed staff to take the road user charge on top of the statewide, which we have nothing to do with, out. We're taking it out. We're resubmitting the plan to the state. It's up to the state whether they're going to approve it or not, but we're following your direction. And look, you all smart people, but this is definitely beyond my pay scale to start solving the modeling problem here that require few PhDs that doing it right now, like Dr. Wu, to solve.

But this discussion is really about following your direction and taking the road user charge out and putting this for public review. There is no other discussion that been taken. There is no changes to the plan. We are following your direction and removing the road user charge. The statewide charge, we have nothing to do with it. And every plan in the state, San Francisco, Los Angeles, Sacramento, all the 18 MPOs have that statewide assumption. Now, the state now is doing a pilot to replace the gas tax with a different user charge. We don't know the result of that and we don't control it either, and I hope that answered your question.

Chairwoman Nora Vargas:

Yeah. But I do believe, Vice Mayor, that your request is not one that I don't know that necessarily is where you stand on the issue. What's you're asking is for a document with the facts. And I know that that's handy, because we have used the facts to have these conversations over and over again. I think there's absolutely an opportunity and that's why this discussion is so important. There are people who have very different perspectives and that's why we all run for office with our different perspectives, and our constituents elected into office and we all are sitting here having the discussion.

And there are going to be clear philosophical reasons of how we get to one place or another. Some of us may be leaning one way or another and that's okay. That's what this body is supposed to be doing. And in the retreat, all of you asked for opportunities to have further deep dives on some of these issues and that's what we're doing here today. It's taking this long because it's a process we have to follow. Because part of our responsibility and our job is to ensure that there is opportunities for public comment, et cetera, et cetera.

I know that it's been said, it has been since last December where the recommendation was done to take the road user charge out of this plan. I was on TV announcing that we were going to take it out. And then there was assumptions made that I said, "Oh, I'm taking it out." No, this is not the nor show. I never said that I was going to take it out. What I said is that that's the direction that the board gave us and that's the direction that we're going to be going under my leadership as chair, and that's what we're doing right now.

Could it happen faster? I wish government worked faster, I really do, every day of my life. And I've been a public servant for a couple of years now. It doesn't work that fast. But I think to

your point, it is extremely important that if it takes us longer to have these conversations, because if you have questions and you have access to all this data every day, imagine what the public is asking for. So, to respond to you, we will make sure that we have some sort of, I know that we have it already, because I've seen them, and we'll get that to you so that you can share with your colleagues and we'll get it to everyone else. All right, Councilmember?

Councilmember Andrea Cardenas:

Yeah. So first of all, I think the discussion is really great. I think part of what we're seeing right now, though, is there's two separate things that we're trying to get at. One of them being the item at hand, which is looking at the amendment that was requested from this board for something a previous board did. There are things that are just what we need to do to be in compliance, and please correct me at any point if I'm wrong, with both state and federal law, and that's the way that we must govern.

There is also a lot of discussion, though, on how we feel about those things and that's perfectly okay for us to have a conversation on. However, I genuinely believe that that's a conversation we must be having when we're talking about our legislative priorities and the things that we would like to change about the way that we must govern or we want to operate in here. I'm hearing, of course, it's not ideal that we're not taking into consideration several assumptions and whatnot, but we still have a formula that we need to input the data in that's going to give us the result, and that's the formula that's been handed to us.

That's a card that's been handed to us as what we must do until we are able to, either decide as a board we want to advocate as an agency to our state, federal legislators, that's perfectly fine. I just think that we're getting all of these things convoluted and that's why it gets so muddled in this conversation. They're two completely different conversations to have. One is, are we doing what we must do, per accordance with what our board is here to do? And the other is what do we want to see changed, right?

And I think we've had those conversations both at the retreat and in some of our workshops about, well, we just don't like that we have to do these things or we don't think that it's conducive to the work that we do in our region. And that's fair, but we must take that conversation on the action of what we can do about that policy rather than the overall of our philosophical or our ideas.

I do think we can be a stronger advocacy agency for the things that we believe don't work for our region. Because the reality is, our region is very unique in a lot of ways. We have not only the border but just, we are a very specific region that the needs that we have are different than other parts of the state or the country. And so, I just would like for us to, although I think this conversation is very great and fruitful, we must be able to differentiate that as we're moving forward, because if not, we get caught up in the, "Well, who's making us do this and why?"

And we need to be able to separate that in order for us to have some conclusion when we're trying to get, not just getting through the meeting, because of course, we want to hear what we all are thinking and what the public has to say, but that's when it gets also very confusing for the public, in my opinion, because there is that we're not differentiating between the legislative and policies that we would like to see changed and what we need to do as a board. And so, I just think that there is a lot of great conversation here. We just need to be able to direct it in an element where it makes sense.

Chairwoman Nora Vargas:

Mayor Kranz.

Mayor Tony Kranz:

Yes, thank you. I would point out that Mr. Irkhata's comments about this being a philosophical discussion. In reality what it is, writ large, is a political conversation and there's no question that for the last couple of years, this issue has been used as a tool to bludgeon this agency. And so, while the chair talks about government not being very fast, I'm reminded of the term government in action and depending on how you say that, I'm inclined to use the term inaction, because it has taken entirely too long to get to the point where we're able to consider this in a serious way. So I'm thankful that we're at that point.

I would also like to point out that we have a road usage charge. It is a gas tax that is as inequitable as you could possibly get. I office from home, I ride my bike to city hall. Unfortunately, I don't have a transportation system that allows me to come to these meetings by public transit or I would gladly do that. My son, a tradesman, works throughout the state, pays crazy money to drive his truck in order to transport his tools.

He recently had the opportunity with the company that he works with to get a company vehicle, with a company gas credit card, and it was like a huge pay increase for him. So while we have these conversations about the best way to pay for improvements to our transportation system, whether that's public transit, modes of public transit, modes of people getting from where they need to be to back home, et cetera, I think it is important that we remember that the impacts that these decisions have on the common man are pretty important. So I look forward to putting this to rest in the 2021 plan and actually relish the opportunity to have this conversation again with the 2025 plan.

Chairwoman Nora Vargas:

Thank you. Mayor Vasquez?

Mayor Racquel Vasquez:

I will make my comments very short and I hope sweet. I support a fact sheet regarding what a road use charge is, but also clarifying the difference between the state road use charge and SANDAG. I think that that would help to inform real people about what's going on here, and I think that would help to shore up what the future of transportation allocations of funding will look like.

Secondly, I'd like to say, wow, this is 2021. I'm really looking forward to working on the future Regional Plan and I am pleased to see that outlined in the key considerations that budgetary question, that budgetary shortfall has been met with the adjustments that are currently recommended in item number 16. So fact sheet number one regarding, and I'm talking about a one-page fact sheet, a nice and simple, provided to us that can be updated. And when updated, notifying us to let us know when it is updated, but also a one-page fact sheet regarding the upcoming Regional Plan. Thank you.

Chairwoman Nora Vargas:

Thank you, Mayor Vasquez. Mayor Jones?

Mayor Rebecca Jones:

Thank you so much, Chair. So we do have a fact sheet, though it's 26 pages, which is the funding for the Regional Plan. And it actually has out there, and actually, you had brought this up, Vice Mayor Molina. On V23, it has two billion dollars that is going to be... It's called city/county local gas taxes. So that, through 2050, is going to bring in revenue to pay for the Regional Plan. So anyway, I just want to bring that up, because we do actually have it. I read all these little details, I'm geeky like that. So anyway, thanks.

Chairwoman Nora Vargas:

No. I'm sure people are not saying that they haven't read it. I think what they're saying is how do we digest 26 pages into one document, so that the community who is not responsible for doing this work every day can actually absorb it. Right? I think that's what I'm hearing from my colleagues, but thank you for sharing that. Councilmember Duncan.

Councilmember John Duncan:

Thank you. So this matter is on the agenda today as a public hearing, correct? We're not taking action today? So-

Chairwoman Nora Vargas:

Nope. That's exactly what I said.

Councilmember John Duncan:

Yes, and that's exactly what I'm repeating rhetorically. The vast majority of the other directors' comments and questions, to me today, were totally appropriate with having a public hearing. So I felt that Mr. Ihkrata's comments about our conduct is inappropriate and very excessive in regard to chastising us for asking questions.

For me to ask a question about in the calculation of an increase in greenhouse gases based off of the amendment to the Regional Plan that we're having a public hearing about, and whether that's primarily about an increase in vehicle miles traveled, as whereas they may be suppressed if there's a road user charge, is exactly what I think we're here and we're supposed to do.

And I don't think that our CEO should chastise our fellow directors when they ask a question and want to try to understand something. I understand maybe he's frustrated with the fact that the road user charge is coming out or that it takes a long time or that it's been work to be done, and I appreciate that, but I don't appreciate being chastised publicly for doing what I think our job is.

Chairwoman Nora Vargas:

So Councilmember Duncan, I think we all take information differently, and as somebody who deals with microaggressions on a day-to-day basis in every hour, I can understand where people may have different interpretations of the information that is provided. I do believe that it's appropriate for executive director to try to guide us and to share with us where the different laws are in the state and the local level. His directiveness may not be something that you appreciate, but I don't think that, in my opinion. there was nothing that was chastising.

I do take your comment and I appreciate your comment, but I also think it's important that our CEO has an opportunity to be able to delineate where the rules are coming from and some of the feedback that he's getting. Which is why I also emphasized, with no intention of chastising anyone, that it was important to ensure. And I think Councilmember Cardenas, also Deputy Mayor Kat McGovern has also mentioned it, and a couple of other folks, that it's really about a lot of the discussions that are taking place are philosophical.

Because if you heard the passion the Councilmember Shu had around some of the goals, and Mayor Minto had a very different, separate discussion and I was, "Ah, okay, well climate change is real for me, but he's looking at it from a different lens." I think those are philosophical questions. And so, I apologize that you may be absorbing this information in a different way, but I do think it's important that our CEO has an opportunity to share information. We can work together to figure out how that information is shared and move forward. But I do think it's appropriate and I'm sorry that you took it a different way. Go ahead.

Councilmember John Duncan:

May I respond?

Chairwoman Nora Vargas:

Actually no, we'll keep moving. So go ahead. I mean, did you want to say, because I am happy to have a... If this is a personnel issue, we can have it separately, because I think it's important. I just wanted to address to you how I didn't see it that way, and I acknowledge that what you saw is your perspective and I think that's important. Is there anything else that you want to add?

Councilmember John Duncan:

Yeah, just very briefly. I think everything you said about what the CEO could do can be done by saying those things without the chastisement part, and we have spoken about that before. And the other just last comment I'll make is, when people make very lengthy comments about that they think that the meeting is taking too long, they don't seem to realize that they're very lengthy comments about the meeting taking too long is causing the meeting to last a lot longer and have people respond to those comments. Thank you.

Chairwoman Nora Vargas:

The meeting is going to take as long as we need it to happen and people can have their opinions. Go ahead, sir.

Caltrans Director Gustavo Dallarda:

Thank you Chair Vargas. I wanted to comment on two things quickly. One is on the importance of VMT reduction. And you may recall a year, but maybe it was two years ago, we had CARB here explaining why GHG and VMT reduction is important. And my recollection, and maybe if we can pull up that meeting and share the presentation with some of the new board members, was that even after the state has a very good program to change the fleet from gas or diesel-consuming vehicles to electric, and it's leading the rest of the nation and the world in that respect.

But even when those mandates come up, that's for new vehicles. And there's going to be many years where people don't change the vehicles every year and some people cannot afford to do that. Truckers sometimes they can't afford to buy a new truck overnight, so there's still going to be millions of gas and diesel-consuming vehicles and that's why it's important to continue looking at reducing VMT. So that was one comment.

The second comment was I want to echo what Mayor Kranz said, I'm not ashamed, but when I go to put gas in my car, I am paying a road user charge and we're all paying a different road user charge. If you're lucky enough to have an electric vehicle, you're not paying anything when you charge. None of the money when you charge is going to maintain and keep our transportation system in order. If you happen to have an old car that is not fuel efficient, you're paying a lot more than somebody that has a fuel efficient vehicle. That speaks to the inequality that Mayor Kranz talked about.

And with more zero-emission vehicles on the road, that means less revenue to be able to keep our transportation system in good order so that you can keep traveling on it. So that's why this state and many other states, and eventually the federal government, will have to look at a different way of collecting from people so that, because collecting at the pump is not going to yield enough money to be able to keep the system going. So I hope that that clarifies. Thank you, Mayor Kranz for bringing that up.

Chairwoman Nora Vargas:

Thank you. And there's a lot of discussions happening in the state about how we meet our goals, infrastructure needs funding. And I think the other piece of it is the amount of funding that's going to come from the federal government so that we can ensure. This is the first time that we're going to get that much funding for some of these initiatives and projects. And so, how do we make sure that that is being allocated to address some of these challenges that we have? Let me go ahead and Mayor... I mean, Councilmember... Yeah, yeah, White.

Mayor Dane White:

Thank you very much.

Chairwoman Nora Vargas:

Mm-hmm.

Mayor Dane White:

I just need some clarification on something that Mayor Jones had said, and that is the revenue collected from a road user charge cannot be put back into roads. Is that accurate? The region? Got it. So with that being said-

Chairwoman Nora Vargas:

Hold on, let me ask, can somebody respond to that question?

Keith Greer:

I'm not sure I can. So the revenue generated from RUC would go into implementing the Regional Plan.

Mayor Dane White:

Correct.

Keith Greer:

Yes.

Mayor Dane White:

Which is mostly public transportation.

Keith Greer:

It's all the policy projects and programs in there. It's a slew of things.

Mayor Dane White:

Okay.

Chairwoman Nora Vargas:

Where's our...

Mayor Dane White:

With that being said-

Chairwoman Nora Vargas:

Hold on one second. Hold on, hold on, because I'm hearing no over here. So, Coleen?

CEO Hasan Ihkrata:

No, it's not mostly public transportation, it's for the programs, right, Coleen?

Coleen Clementson:

Yeah. So the road usage charge, if there were a regional road usage charge which is being pulled out of this, it's pretty flexible and what it could be used for, because actually the people and the board would get to decide how to utilize that. So the state would set the rules for the state road usage charge. Any regional collection would really be up to the board and ultimately the people to decide how that money should be spent.

Mayor Dane White:

Understood. Can you clarify-

Mayor Rebecca Jones:

It says right on page V4 that the eligible uses are transit capital and ATP/programs. That's where the Xes are on that actual page. It has transit operations blank, highway capital blank, highway operations blank, local streets and roads blank, and then also debt service blank. It says specifically on that page, those two eligible uses, because that's what is called, eligible uses. [inaudible] source-

Chairwoman Nora Vargas:

Mayor Jones, I'm just going to ask you to use your clicker. I just want to be fair-

Mayor Rebecca Jones:

Sorry.

Chairwoman Nora Vargas:

... because there's other people-

Mayor Rebecca Jones:

Certainly he's fine. [inaudible]-

Chairwoman Nora Vargas:

... waiting in line.

Mayor Dane White:

It's okay. I asked her-

Chairwoman Nora Vargas:

I know. So if I can just ask, hold on one second. We need to have a process so that we are able to make sure that everybody who is asking to... When you get elected, you are happy to run this meeting. Okay. We're going to have a process and I want everybody to have discussion, but I have people waiting on the queue. If you have specific questions for anybody, we're going to have staff respond. If you have specific questions to a colleague, I'm going to ask the colleague to put yourself on the queue so we can follow a process. Is that cool with everybody?

Mayor Dane White:

That's fine. And moving forward-

Chairwoman Nora Vargas:

All right, fantastic. Go ahead and ask your question.

Mayor Dane White:

So my point is, with that being said, I represent the fourth-largest city in the county, where the average household income is $30,000 below the county average. If my residents, in large part, are construction workers traveling throughout the county are being charged for every mile that they drive and that money cannot be used to be reinvested back into those roads, that seems pretty inequitable to me. So I just wanted to make that point and hope we can find something that works for all cities, not just a few.

Chairwoman Nora Vargas:

Okay. [inaudible]?

Vice Chair Sean Elo-Rivera:

Thank you, Chair. I just wanted to pivot back. I appreciated your comments. Recognizing exactly as you said the way that different comments can land with different folks. I also did not hear a chastising of the board and I think it's really important that staff can speak directly with the board about when we are and are not staying on track with what we have to do. And if we respond in a way that makes them feel like every time they are direct with us, there's going to be blow back.

We're going to have staff that's walking on eggshells, and we are dealing with highly technical issues, with legal requirements, and this whole thing's going to get screwed up. And so I think that there's a necessity for decorum and for respect amongst the board, amongst the board to staff, to staff to board. I also don't want to create a culture or environment of folks not feeling like they can say, "Look, we're going... It's an important road that you're traveling down, but it's not the road that we need to in order to end up at the destination that we have to for this particular conversation."

I think that staff has done a really good job of that. And I haven't been here for that long, but I was here last year, and as Mayor Kranz mentioned, this issue was used to bludgeon this agency over the better part of, we're going on almost two years now. And so I think that's important context for any response from staff or other board members when this conversation is happening. Because while your questions and comments might be on the up and up, the reality is that not all of them have been.

And there has been a lot of... I won't even go down the rest of that path. But I just want to add that context, I want to support the chair's comments, and I really, really hope that we can appreciate staff's responsibility to be direct with us when we are talking about technical issues and legal requirements. The last thing that I'll mention, it's important to note what Coleen had said there. Ultimately, we are the board and we will have policymaking authority to determine how equitable the way any revenue that we bring in is utilized. I'll conclude there, Chair. Thank you.

Chairwoman Nora Vargas:

Thank you. With that, we're going to go ahead and close the public hearing. Thank you everyone for your feedback. Continue to process this and then we're going to go ahead and move forward. We have a focus in how we're going to go and do the next steps.

Web, Workshop and Email Comments

Web Comments	
Shannon Biggs	Thank you for getting rid of the Road Use Tax. I was worried about the impact it would have on our blue collar workers who have to use vehicles transportation.
Carla Pekin	please announce meetings well in advance. Please hold meetings at a time when people can actually attend. Not work day hours.
Paul Lindsey	The amendment states, "result in a net decrease in revenues from $173 billion identified in the 2021 Regional Plan to $165 billion. This revenue would still be sufficient to fund the anticipated $163 billion of planned transportation improvements included in the 2021 Regional Plan." If the income without the road usage charge was sufficient to pay for the 2021 Regional Plan without reductions, then why was the RUC even included? This calls into question the entire methodology used to calculate the funding requirements. Is SANDAG simply cooking the numbers to make it work?
Alejandro Ortega Jr	Removing the RUC is necessary, it seems that the organization has not taken into account, nor reviewed, data on the cost of living and how many residents within San Diego County commute for employment. While San Diego is not Los Angeles in size, we are still a vast area. I, myself, commute from Oceanside to Miramar and the initially proposed RUC would've added a significant strain to my situation on top of already high gas prices (which have always been historically higher than the rest of the nation), high rent/mortgage prices and for any parents, high cost of daycare expenses. You cannot add additional costs to residents by saying that they now have to pay a per mile tax to just go to work and for daily lives, that is unethical. My proposal that has always been a lingering question is why aren't county officials researching public transportation systems that are on the east coast. It's understandable that we cannot have subways due to our regional geographical setup, but rail systems that are above ground work. When say in above ground, not cutting traffic off on regular roads, but above the roads. Yes, ANY project is going to cost money, but, and this may be a personal rant, officials need to understand and estimate that while initial costs may be high, the long term effect is providing a reliable and sustainable public transportation system that will allow more residents to use public transportation and reduce traffic congestion and our carbon footprint. Making it easier for residents to get from North County to South County without having to take 4 hours is something many have been asking for years.

Web Comments	
Morgen Ruby	Page 7, titled "The Challenges" - it is unclear if these infographics represent regional or national data, such as stated in the pedestrian fatalities statistic. Can you add either a footnote or embed in the text, for example "only 12% of residents ~in the region~ live within..." to help put the numbers into perspective?
Public advocate, retired	As a prior activist for environmental oversight, I see San Diego unelected board making decisions for bureaucrats who prepare todays imagining for the future. There will be no future as Los Angeles and San Francisco with San Diego following in their footsteps. Failed leadership abounds as we look at tomorrow's vision of creating division among the people with some bureaucrat's opinion of equity. Having San Diego to carry the burden of Mexico's open cesspools who pollute our beaches when they have a Trillion-dollar budget, but they come beg for help while our leadership falls for it every time a meeting is held at Tijuana River Valley Regional Park. Mexico has yet to set a Net Zero target, Mexico is the second-largest greenhouse gas (GHG) emitter in Latin America and the Caribbean. The reduction of fossil fuels when there is no alternative but an ancient grid. The infrastructure of our streets are in decay and held together with patch work that fails as it rains. The homeless programs and shelters fail at accountability. As a native San Diegan and a once democrat supporter, Fix todays problems and not leave it for some bureaucrat in the future is there is any. It's all about money and following the tribe of destroy and rebuild, yet they never created anything themselves. So, what is our elected officials doing? But delegating their responsibilities to bureaucrats who are not held accountable of how they are destroying our once beautiful city piece by piece. They appear and disappear and deny during voting time.
Brooks Rogers	I think the proposed RUC would have been hard to implement and can see why it had so much pushback. I do agree, however, that everyone who uses our roads should be paying to maintain them and that can not happen purely through a gas tax. My suggestion is to achieve this through the use of more tollways in the region. Tollways are especially useful in the SNDAG region because so much of our traffic is just passing through between LA and Mexico. The addition of more tollways would allow us to charge those who use SANDAG region roads in direct proportion to how much they use those roads. Like Delaware we would be collecting a lot of toll money from people who are just passing through and would not normally have to stop at our gas stations to pay gas tax or skip out on a RUC if it did exist. An added benefit of more toll roads is that it would encourage people to use other forms of transportation such as busses, trolleys, and bikes.

Web Comments	
	---------- Completely unrelated, lets remove the 163 through Balboa park and replace it with a trolley line that would connect all the way to Convoy Street! Would give us a trolley stop in Balboa Park, rid the park of the road noise and pollution, connect convoys to better public transit options as that area is built up with more residential units.
Peter Adams	I am opposed to the Road User's Tax. Especially as it doesn't appear to fund road maintenance and expansion. I am also opposed to unelected bureaucrats pushing new fees/taxes on tax payers. Sandag and Carb should be disbanded/eliminated/reorganized. Their mission should be facilitate efficient movement in and about the region, not to milk the citizens to accomplish their misguided goals.
Sharon	Instead of imposing a mileage tax SANDAG should be pressuring the local and state governments to drop gas taxes and let federal taxes be used for new types of transportation infrastructure. Toll roads are better and less invasive of personal liberties. Plus they are not conducive to being hacked as individual devices in each vehicle.
Marc Hobelman	While I understand that the RUC was largely unpopular with the public and with regional leadership, I am disappointed that it's being replaced by measures that only barely still meet the GHG emissions goals of the state. We had a strong, ambitious, sustainable direction in the original plan! But the compromise will add years and years of additional car dependency and auto-oriented development pattern to our region. There isn't a suggestion I have that can make this amendment work better from my perspective on San Diego's future. The only thing I can suggest is to not include the amendment at all. I'm disturbed that the political pressure has resulted in this compromise where the projections now include more emissions, more VMT, worse air quality, worse transit ridership, and worse fiscal standing in the future. Those adjusted projections are explicit in the amendment, but they leave out crucial knock-on effects. Reducing VMT would not only make our region environmentally and economically more sustainable by the metrics listed here, but it would compound the benefits associated with less car dependency. Parking pressures, auto traffic, street noise, pedestrian safety, community connection, and local business foot traffic would all improve if we are bold enough to enact incentives to change travel mode behaviors. We can't acquiesce to only do popular, incremental, half-measure at a time moves in a climate catastrophe. We have to do as much as we can as fast as we can. I thought it was bold and impressive

Web Comments	
	when the initial plan asked our fellow citizens to step up and work together to achieve big things. This amendment reveals that we might not be the world leaders our generation is demanding us to be.
James Anderson	I think sandag should be dissolved. I don't think city mayor's should be deciding regional projects or assessing taxes and fees to a region. Getting elected to an office doesn't make them smart. As far as a use tax , that's unrealistic for this region. How will visitors from out of state be charged? There is no fair way to implement this. Get rid of sandag now.
Charlotte Kingston	I am against the proposed amendment for a mileage tax. As a senior, my social and lifelong learning events require independence to travel the county. On a fixed income, we are already feeling the effects of higher fuel costs that include more taxes than in most other states. It is imperative that we are able to pursue our interests until we are no longer able without more taxation.
Jacob Finnell	I oppose the removal of the road user charge. Adopting the charge will make San Diego a leader in 1) Disincentivizing driving & 2) Raising funds for transit projects Both of which are critical for achieving our climate goals, as well as advancing mobility for all San Diegans.
Nancy Goldstein	I appreciate the opportunity to comment about the proposed driving/road tax. I have lived in San Diego for 45 years after relocating from New York. It's been a wonderful city and I'm very proud to live here! However, this initiative to tax people for our given right to drive on the roads we already pay taxes for is absolutely ludicrous. It's already an extremely expensive city to live in and many people are leaving San Diego and California due to the cost of living and won't be able to retire here either. I'm totally against the idea of taxing our citizens and hard working people for something we're already paying taxes for in several was with the high gas tax, toll roads, etc. Also, we should be able to drive our vehicles without being tracked, or paying extra money! Please do the right thing for the people of San Diego and of California by NOT allowing this absurd RUC proposal to be voted into law. Thank you
Robert Scott	Please include in your long-term plans a bike and pedestrian undercrossing along Carmel Valley Road at Interstate 5, connecting the Carmel Valley neighborhoods east of the freeway to the Los Penasquitoe Lagoon and Torrey Pines reserve areas and beach west of the freeway. Without a direct connect from eastbound SR56 to northbound I-5, bicyclists and pedestrians effectively travel on a major highway between El Camino Real and the I-5, a very hazardous condition for the

Web Comments	
	bicyclists and pedestrians alike. The walk to the beach would otherwise be lovely except for this area of pending motorist-pedestrian conflicts. Kilroy was supposed to forward the design plans for an extension of the SR56 bike path under the I-5 as a condition of approval for the One Paseo project and I do not know the status or exact requirements of that condition. Please don't miss this opportunity, it looks like it could have happened with the I-5 widening project (like the new paths in Solana Beach and Encinitas) so let's not let that happen again. Thanks, Respectfully, Bob Scott, PhD
Alan Feingold	Cars are here to stay. Please stop pretending that people will give up their vehicles and take up biking. Not going to happen. To improve traffic flow, coordinate traffic signals. A red light at each intersection helps no one. Stop with the “road diets”. Keep lanes the proper width. Roundabouts may be engineers dreams but drivers hate them. Stop taking away traffic lanes to add bike lanes. We have enough. Maybe too many. Enforce traffic laws for bikers. They regularly run red lights and pay no attention to cars or pedestrians. We need age minimums (16?) for e-bikes. Bikers must be licensed and bikes-both electric and not-need easily seen license plates. To replace revenue lost from electric vehicles, they need an annual road-use fee or a per-mile fee or both. Gas/diesel vehicles pay a road tax with every gallon of fuel. Electric vehicles are getting a free ride. They need to pay their fair share.
Carla Pekin	I do not in anyway approve of the road usage charge. It must be removed
G. King	Stop increasing our taxes during this recession / depression. NO Mileage Tax!!! People are struggling to pay bills as Feds print unbacked currency & steal from our devalued savings through 4 to 9% inflation. WE DON'T HAVE MONEY TO SPARE!
G. King	YOUR CEO IS STEALING TAXES BY LAVISH DINNERS & BOOZE BILLS.

Web Comments	
G. King	“Taxpayers Pony Up for Transit Systems They'll Never Use, The median resident of Southern California takes zero transit trips annually, and only 2 percent of the region's population frequently uses mass transit.” STEVEN GREENHUT reason.com 7.7.2023 Lethal Danger from gangs, crazy homeless & aggressive dogs Unsanitary with homeless' & dogs' pee & poop Respiratory Viruses, TB, lice, Hepatitis, MRSA Strikes, walk-outs, & sick-outs by drivers & mechanics shut it down 20 minute drive becomes a 2 1/2 hr ordeal Need pre-purchased tickets or exact change "...'Road diets' that increase congestion by reducing the number of traffic lanes in a silly quest to prod us into abandoning our cars. 'equity platforms' to promoting affordable housing. ...The Caltrans future blueprint is more about battling greenhouse-gas emissions than creating bus systems that arrive on time and freeways that are less congested. It's a long mish-mash of politically correct goals, bolstered by legislation that treats customer concerns as a side issue."
G. King	You broke your commitment to build more single car freeway lanes when we passed the last county tax increase for roads. YOU LIE TO OUR FACES.
G. King	When epidemics, terrorists, gangs, homeless crazies, get on the bus, train or trolley, then I want my car. YOU DON"T GET ON THOSE EITHER!!!
G. King	NO TAXATION WITHOUT REPRESENTATION! San Diego & Chula Vista unfairly dominate SANDAG. North County gets nothing. Disband SANDAG!
G. King	Mileage tax requires you track our movements like a creepy stalker. My privacy is not any of your business. NO MILEAGE TAX, it makes you look like communist dictators.
Michael LaDouceur	Comment 1: It is inappropriate and irresponsible to update future revenue (Updated revenue assumption 3 in particular) while failing to update future costs. Cost estimates were based on costs in 2020 dollars. It is unclear whether inflation was factored into the cost estimates provided in Appendix U. Inflation over the last 2 years has been historically high and could have a large impact on whether the cost estimates from 2020 are still reasonable. As such, it is inappropriate to compare updated Transnet revenue (updated with the most recent data) with outdated cost estimates. Therefore, it is unsupported and

	incorrect to state that revenues would exceed costs under the proposed amendment. It is also unsupported and incorrect to state that "no changes to projects listed in the 2021 Regional Plan would result from the proposed Amendment", because no such analysis has been completed. SANDAG has the fiscal responsibility to update the 2020 cost estimates to ensure that both revenues and costs are using similar projections. Comment 2: SANDAG has not provided reasonable justification for updating the State Discretionary Program estimates and Federal Discretionary Program estimates. SANDAG should provide justification for the estimates. Has SANDAG or other local or regional transit agencies received increased funding since the Bipartisan Infrastructure Law (BIL) was passed? Are there reasonably foreseeable dollars that will be coming from BIL and how is SANDAG certain of this? Appendix V of Attachment A to the Errata states that Federal funding "assumes one large New Starts eligible project and three Small Starts eligible projects per decade…", but it is unclear how these assumptions were made and whether they are reasonable. These assumptions are critical to balancing revenues and cost and implementing all aspects of the 2021 Regional Plan. Future transportation plans could be significantly altered if these assumptions are incorrect, which would lead to other calculations being incorrect, such as the projected decrease in Green House Gasses.
Alex Wong	I commend SANDAG for removing the road user charge from the RTP. While I support SANDAG's continual quest to invest more on transit instead of on freeways, a road user charge could actually prematurely drum up NIMBY opposition against mass transit when road user charges are levyed before massively improving San Diego's frankly low-frequency, inconvenient transit. Consider this: Canadian cities like Vancouver and Calgary do not have VMT taxes or congestion pricing but have achieved over quadruple the per-capita transit ridership of San Diego. These cities realize that it's important to first optimize transit service to maximize ridership, to give motorists a great alternative to driving before levying road user charges. I never expect transit to be profitable. I support sales taxes like Let's Go San Diego's initiative to raise funds for transit. These sales taxes, unlike road user charges, do not involve data/location privacy issues and therefore are much less controversial.

Web Comments	
Stephanie Kaupp	SANDAG's Regional Plan does not provide realistic options for decreasing the traffic to and from Coronado or the other military bases in San Diego. SANDAG needs to work more closely with City officials and the military to create more viable, cost effective transportation plans that include the health and safety of residents and our military personnel. One solution for Coronado would be for the Navy to provide additional single room housing units on base, at NASNI, the Amphibious Base and Training Center for active duty military personnel. The Navy currently provides shuttle services on base at NASNI, and could expand services between the other two bases in Coronado. This would help relieve at least a small percentage of the volume of traffic impacting Coronado and the lives of our military personnel, Additional options and better use of taxpayer funds would be to build several parking structures for all military personnel and contractors working at the shipyards and San Diego bases with continuous electric shuttle services to and from. And additional ferry services to NASNI and the shipyard from San Diego, and new services from Pt. Loma, Chula Vista and National City. The use of mobility hubs and MTS buses won't reduce the use of vehicles due to conflicts with schedules and requirements for the need of a personal vehicle. More than 100,000 cars every work day continue to cross the Coronado bridge with the majority of vehicles traveling to and from the military bases located in Coronado. And with the Navy's plans to increase the pier-side maintenance for three aircraft carriers being in port at the same time from 29 days per year to an "average" of 180 days per year the volume of traffic will increase exponentially. Coronado residents respect the work and demands placed on our military and also want to reduce the traffic gridlock, and protect the safety of drivers, bike riders and pedestrians sharing our streets. Additional options in the Regional Plan need to be explored, and foolish and dangerous options such as adding a bike lane on the Coronado bridge need to be removed from the Regional Plan. Health and safety must be the number one priority along with more realistic and creative ways to spend our taxpayer dollars on transportation plans that work with our current roadway systems, landmass restrictions, protect our environment, public health and welfare.
Truth	Getting rid of the Road User Charge Tax out of the SANDAG 2021 Regional Plan was great. But here's why the entire SANDAG Regional Plan is still horrible: • It cost $1.5 million just to remove the Road User Charge. • The 3.3 cents Per Mile Road User Charge was fraudulently suggested as necessary, when it wasn't. • Even without the "Regional" Road User Charge, there is still a State Road User Charge coming. • There is No guaranteed funding for this plan, and SANDAG is already operating with over $2.4 billion in Long-Term Debt. • The original 2021 Regional Plan met the California Air Resources Board's 19% GHG reduction target, but the SANDAG Board of Directors was told it didn't just because a select few didn't want to round up the

18.6%.
• There has never been discussion as to the details of why there is a GHG reduction goal. Is it to reduce warming temperatures? If so, by how much? If not, then is the goal cleaner air? If so, what is the measuring tool?
• The Real goal of this Regional Plan has always been about Controlling Mobility – it doesn't matter if it's a traditional car or a new expensive and combustible lithium-based electric car. The admitted goal of this Regional Plan, via the State of California and funded by the Federal Government, is to reduce Vehicle Miles Traveled.
• TransNet Taxes on drivers are being used towards bike lanes and pedestrian projects. That's taxation without representation.
• There are going to be 800 miles of Managed Toll Lanes.
• Hasan Ikhrata admitted that there will not be any new highways or lanes when that's what would actually help trip times, congestion, and air quality.
• SANDAG talks about "Shorter Boarding Times, Faster Travel Times, and More Frequent Transit", but only 1-3% of people even use public transit! And according to SANDAG Deputy CEO Coleen Clementson, the trolley only goes 20MPH, and there's not even enough public transit drivers as it is!
• The 2021 Regional Plan approved on December 10, 2021 reads:
"[Smart Cities with]…a High Concentration of people…
…Microtransponder ownership of 100% by 2035.
Converting existing…lanes to Managed [Toll] Lanes. … Substantially Increasing the Price of Parking [and] the Cost of Driving.
The system…[means no] No new highways or general…lanes.
More than 93% of housing…will be Multi-Family [stack-and-packs]…
Residential Parking Permit…
…[Our] GHG Reduction Goals will Require…Fundamental Transformations in the Economic, Social, Technological, and Political Fabric of Life in California and Beyond…
Government…Regulating Economic Activities and Personal Behaviors…"
• Based on that above information, there will still be microtransponders in everyone's cars to track their trips for "Vehicle Miles Traveled" fee or "Vehicle Hours Traveled Fees".
• Hasan Ikhrata, who admitted to blocking the Audit, had a charge of over $300 worth of taxpayer money on a dinner with Lorena Gonzalez and Nathan Fletcher at Donovan's Steakhouse, while getting paid over $580,000 a year, and now finally resigning, is the one who pushed this Totalitarian Regional Plan, openly admitting that it's about "Behavior Change" – not saving the environment from GHGs.
• SANDAG is working to implement the Totalitarian United Nations' 2030 Agenda, as overtly expressed in the joint February meeting with SANDAG, Mexico, and UN Habitat. This agenda includes making sure people are stacked-and-packed into high-density Smart Cities away from suburban and rural areas,

Web Comments	
	discouraging what the UN calls “sprawl” and “human settlements”. Based on that joint meeting, there seems to be an idea to create a “Bi-National Association of Governments” in order to further Consolidate and Expand power over Americans’ and Mexicans’ lives. These are a just a few reasons why this SANDAG 2021 Regional Plan – and the future 2025 Regional Plan – need to be disposed of into the hazardous waste bin. Short and sweet of it: Expensive, Unrealistic, Inequitable, Invasive, and Totalitarian.

Virtual Workshop July 18, 2023	
Unknown	I’m just wondering if this process has any effect on the planning for the 2025 Regional Plan.

Virtual Workshop July 31, 2023	
Alex Wong	Yeah, can you hear me? I would just like to make it clear that, I thought that the difference between the Draft 2021 RTP and the 2021 RTP final version was the purple line frequencies would increase from every 10 minutes to every 5 minutes during the peak hours. I just wanted to confirm if that was true, and if so, I would strongly recommend reverting back to 5 minute frequencies because I believe that the purple line, you know, put that there. I mean, we definitely need to. Hi everybody. I thought that the purple line now had a 10 minute frequency rather than a 5 minute frequency.
Original Dra	I am curious to know if you guys are aware of the UN agenda plan to enslave the people in 15 minute cities?
Original Dra	I find it interesting that you guys don't want to answer that question when Nora Vargas is going to the UN and getting awards for UN Habitat BS. And then you have Hasan who is going and getting awarded for attending some metropolis stuff. And they're all pushing this stuff in the community listening to globalists tell them what's best for the people in San Diego. And when I am asking you a question, that is not a comment. That's a question that you, if you're not aware of what you're pushing, you need to find out because there are 15 min cities coming down the pipe that they are pushing. And all of the things that you are going on with SANDAG and their whole, you know, push for al of this climate BS. Because you guys won't even look at stuff that is going on with the environment like you're sitting here claiming that you want to protect the environment and your plans and doing all these things. Yet at the end of the day, the things that you're pushing are actually not good for the environment and they aren't healthy for people. Like electric vehicles have these lithium batteries that are combustible and can recombust just from fumes and they're not recyclable just to make them. They're totally toxic to the environment and the people and nobody wants to acknowledge that. That's why when you guys are

sitting here selling people that you're pushing some kind of plan. You need to be honest with the people and tell them what agenda this is, because it's the UN's agenda, the World Economic Forum agenda, all of these globalist elites who don't care about the people and are pushing them into 15 minute smart city enslavements. And it's all under the guise of like protecting the environment. And all we do is sit here and push that, but then it's like, we don't talk about the radiation that comes from these changing stations that are going to be set out to be everywhere. Or the vehicles that emit as well. SO as you're sitting here and you're telling me that you can't answer a question like that or that it's just a comment. It's not a joke. You should know what you are pushing. The people that you are letting push you to do these things. I mean, cause do, do you know that Nora got an award for engaging with the UN? I mean, and that's sad. So if you don't know that, you need to be doing your own due diligence and either listening to the people that come forward and tell you things that may seem crazy, but you need to look into. Because it's very serious, and this is a totalitarian takeover and you may think oh she's crazy and I don't really care because I'm here to blow the whistle and tell people what's really going on and not just like go along to get along. Because what's happening in this county is very, very disturbing. And people are so asleep. Because of what happened with COVID, they think that that's just it and you guys are coming in hot, you're taking away all of these freedoms that people have been acting like we're progressing when we're actually regressing and like going back in time. Because if we were like moving forward in the future, you know, it would be flying in cars. We wouldn't go back to walking and biking. And making sure that people are within a 15 min zone of everything, you know, just for the climate. We were building metropolises around all these areas and it's very sad that people don't see it and it's sad that you guys don't even know who you are engaging with, yet you're pushing this agenda. And then when somebody comes out and ask you if you know anything about it. You want to shut them up and be like, well, that's just a comment, and I can't answer. Well, you should be able to answer it. And if you don't know what I'm talking about, you need to go and do some research. Because the United Nations ain't no joke, you know the real. And what they have planned for the people ain't no joke either. And they're in bed with some really nefarious people. And so if you don't want to be under the same light, then you need to get out of that umbrella under them and start thinking on your own instead of pushing their agenda.

Alex Wong	Ridership reduce emissions and reduces traffic, and San Diego's airport needs the people mover on an airport trolley branch. Actually, between today and the little town at the bottom, that's both the green and blue line. NPS proposes to keep piggy backing on on their airport trolley branch and grant all protectors in the blue and green lines between Penn State and Middle Town. The problem is that [unintelligible] past the 20 minutes per hour. The blue and green lines need to have 8 trains per hour per directive or 15 trains combined with about 7.5 minute frequency. Within Valley and University City. These communities at least 15 trains per hours. Well, at least the airport trolley only 4 trolleys per hours can make that 15 minute frequency. There's the next slide. We need people movers like in the downtown that provide a 4 minute frequency. Travelers can be to the airport in 15 minutes. It's not what's supposed to happen in the airport trolley branch. Because operation costs for higher drivers and simple probably to use automated company for drivers. That's why we need to connect the airport and downtown with an automated people mover. By people mover I do not mean speculative technology. I mean proven, high tech that could carry over 300 people. Think the APM not that the airport peoplemover, but just as in our system and in the system of light rail. My group is even for being perfectly a lot more people needed. And APM will run every 4 minutes versus calling every 15 [unintelligible]. And this one is a space for both pedestrians and the car. If you know, I would accept more only by taking that step up. First of all, APM would not disrupt existing airport service. Compared to the Poly, the aerial, and the APM would at least be built on much better operations. That's why I strongly support APM and recommend an aerial people mover only. It's the most cost effective option, it's the lowest cost per mile. And yes, there, of course, some people may, they complain that aerial structures block views. And poly will probably block even more views because they have directory systems and those or, usually [unintelligible] overhead wires.
Francisco Ortiz	How will the likely conversion of the state gas tax to a RUC mileage tax affect the region's decisions to remove the RUC from the Regional Plan? Could it impact the region and the local jurisdictions eligiblity to see federal and state funding?

Email Comments	
Debbie Bergquist	I would like to respond to the 2021 Regional Plan. I am not in agreement with the road tax. I do not feel we need huge improvements in mass transportation. We do not need four bike lanes and only one car lane per direction on a street. I do not feel safe on mass transportation. This is a car driven society and always will be. Think about improvements for the freeways and street improvements for traffic flow. We already increased taxes in Solana Beach for road improvements and pot holes. What has happened to that money? Why are there individuals at super markets trying to get individuals to sign a petition for repairs on pot holes when it is really for another new tax?

Steven Smith	I am on your email list and received an announcement about a virtual meeting regarding the regional plan. I am unable to attend but have some thoughts about how best to spend my tax money on transportation. First, I would like for you spend the money on projects already promised regarding freeway and highway improvements. I do not use public transportation, I do not want to use public transportation, I desire to be able to continue driving my own vehicle on roads that are maintained and improved to first class standards. I certainly don't think it is asking too much for you to construct the projects promised with revenues previously collected that will improve our streets and highways. Second, I have a problem getting my head around construction of more public transportation projects that do not pay for themselves with the fares charged users. I understand there are some State laws mandating certain efforts to address climate change but I don't think you should just roll over and figuratively "throw under the bus" those of us desiring to continue to use our own vehicles and force us onto public transportation. Finally, I absolutely reject any idea of a mileage tax for persons choosing to drive on existing roads and highways. That is one of the most preposterous proposals I've ever heard. Find some way for electric vehicle drivers to pay their fair share. They certainly are not paying gas tax. I most certainly pay gas tax. On some level it is unfair for EV drivers to avoid this cost of operating a vehicle on public roads funded with gas tax.
Steve, Chair of NPPC	Good morning, The North Park Planning Committee is in the process of updating its CIP priority list for North Park. We would love to work with sandag on this update to ensure we are aligned. If you could provide input or a point of contact to work with that would be outstanding.
John Wotzka	A recent look at fires in shipping of EVs from Far Eastern manufactures, should be looked at by the Port Authority and the consequences on insurance companies and training of firefighters in fires involving Li-ion batteries will also be an issue. Hydrogen fueled cars will need to be reviewed too.
John Wotzka	The new Navy headquarters looks good. There are a lot of new high rise buildings going up downtown and we should see how higher speed rail will feed into the Harbor Drive and high rise building culture in the downtown future too, which is in the long term planning. Mayor Todd Gloria is hoping for a new city hall too. Offshore wind is picking up some interest and we should see if there will be any of it south of the border or into the Bay Front area. These are all long term and will need to be planned into the new city look.
Dwight Worden, City Councilmember, City of Del Mar	I have reviewed the draft Amendment to the 2021 RTP and offer the following comments, speaking only for myself and not necessarily for my city or my council colleagues: 1. I believe it was and is a mistake to remove the Regional RUC from the RTP, but I also understand that its removal was the direction given by the SANDAG Board. In that context the staff and draft Amendment do a good job of backfilling the Regional RUC removal. The Regional RUC only accounts for a bit less than 9% of the total estimated RTP cost of $163 billion and the Amendment shows how the Plan can still proceed.

	2. I note that the RTP Amendment acknowledges that a state RUC is still in the works, and I hope that SANDAG will follow that process and that the Plan can be further adapted to accommodate a state RUC if one is enacted, or a resurrected Regional RUC. 3. I am attaching a copy of an op/ed I wrote in the U.T in December of 2022 explaining my reasons for supporting inclusion of the Regional RUC in the RTP. This is still my position
Mary Davis	1. NO TO *ANY* ROAD USAGE CHARGE, ROAD CHARGE, MILEAGE TAX, ETC. - EVER! Both SANDAG and the State of California need to find other mechanisms to fund our roads (i.e., vehicle registration surcharge, Point-of-Sale or Point-of-Charge system, etc.) 2. WE REJECT THE PARADIGM SHIFT THAT BOTH SANDAG AND THE STATE OF CALIFORNIA ARE TRYING TO IMPLEMENT - going from a Public Benefit model of funding our roads & infrastructure to a 'User Pays' system which inevitably will involve telematics and tracking (regardless of whether the government does it directly or uses a 3rd-party entity.) #PrivacyJustice 3. NO TO ANY TOLLS OR NEW FEES, CHARGES, ETC. You are openly advocating to retire the SR-125 Southbay Express toll early, yet hypocritically wanting to impose them elsewhere. NO NO NO to any tolls anywhere! 4. RESTRUCTURE/GET RID OF THE WEIGHTED VOTE. No matter how many Retreats you hold with feel-good exercises, the weighted vote is a cudgel to wield control. You can utilize your 'Thumbs up/Thumbs down/Thumbs sideways' gimmick all you want, but as long as you have & use the weighted vote, you're saving the covert but most telling gesture for last … middle finger(s) up as you flip the bird to most of the other members. 5. FIRE HASAN IKHRATA & REPLACE HIM WITH A MODERATE EXECUTIVE DIRECTOR WHO TRULY KNOWS HOW TO (& ACTUALLY WILL) BUILD RELATIONAL BRIDGES TO WORK WITH *ALL* PEOPLE.

Letters

San Diego County
Air Pollution
Control District

August 8, 2023

San Diego Association of Governments

401 B Street, Suite 800

San Diego, CA 92101

RegionalPlanAmendment@sandag.org

Re: 2021 Regional Plan Amendment

The San Diego County Air Pollution Control District (District) appreciates the opportunity to comment on the 2021 Regional Plan Amendment (Plan). The District understanding of the Plan Amendment is that it consists of the removal of the Road User Charge (RUC) and updated revenue assumptions, but the projects and timelines remain the same as in the original 2021 plan. It is also the understanding of the District that the Conformity determination of the Plan is not changed.

Although the District understands the need to re-evaluate the RUC, it is unfortunate for the region that it will result in decreased transit boardings (page 10), decreased physical activity for the region's population (page 11), and increased exposure to particulate matter (PM) (page 11), potentially impacting the health of residents. There is an increased need to further reduce PM emissions to the extent possible in anticipation of the Environmental Protection Agency (EPA) review and likely lowering of the primary annual $PM_{2.5}$ standard.

The 2035 regional growth modeling for the amendment shows removal of the RUC will contribute to more driving in the region, which will impact communities, particularly low-income communities in El Cajon and Escondido, with higher levels of particulates compared to the original plan. The increased PM in El Cajon and Escondido is due primarily to road dust from increased freeway driving from the removal of the RUC. These higher exposures translate to increased health risks for residents in those communities, and according to the Plan's Environmental Impact Report are significant and unavoidable, even with the proposed mitigation measures.

While overall emissions of criteria pollutants like reactive organic gases and nitrogen oxides (NOx) are reduced by the Plan, the emission reductions in the amendment are not as large as the original plan in the near term (increased daily emissions of NOx between 0.1- 0.3 tons per day between 2023-2026). These increases will contribute to ozone generation in the region (4.1 Air Quality Analysis Table 4.1-1)). These impacts do not rise to the level of significance for the regional analysis, but any increase in pollutants makes it more difficult to meet the region's air quality goals. The San Diego Region is currently non-attainment for both the 2008 and 2015 National Ambient Air Quality Standards (NAAQS). In our 2020

San Diego County
Air Pollution
Control District

Plan[1] to meet the NAAQS the San Diego region was reclassified to severe non-attainment for both the 2008 and 2015 standards because of our inability to attain the standards in accordance with the requirements of the previous classifications. These reclassifications to severe non-attainment require the San Diego Region to meet the 2008 standard by 2027 and the 2015 standard by 2033. The increase in short term NOX will make achieving these goals more difficult.

Although the District acknowledges implementation of a RUC has generated equity concerns on the fairness of road pricing, we encourage SANDAG to continue evaluating alternatives through careful planning, phased implementation and ongoing public outreach to achieve emission reductions. We welcome the opportunity to continue working with SANDAG and other member agencies on this Plan and upcoming efforts to create a 2025 Plan that is making our transportation system faster, more equitable, and protective of air quality and the health of residents in the region.

Should you have any questions about these comments please contact Eric Luther, (858) 586-2893 or eric.luther@sdapcd.org.

Sincerely,

Eric Luther

Eric Luther

Supervising Air Resources Specialist

[1] https://www.sdapcd.org/content/sdapcd/planning.html

City of Carlsbad

Aug. 8, 2023

San Diego Association of Governments
401 B Street, Suite 800
San Diego CA 92101
Via: RegionalPlanAmendment@sandag.org

RE: City of Carlsbad Comments on the Amendment to the 2021 Regional Plan

To Whom it May Concern,

The City of Carlsbad appreciates the opportunity to provide comments on the proposed amendment to the 2021 Regional Plan ("Plan Amendment"). This is an important plan for this region and guides the next phases of growth for the member agencies of the San Diego Association of Governments ("SANDAG"). An effectively designed and implemented regional transportation plan ensures improved transportation options for area residents, businesses and other community members; meaningful reductions in greenhouse gas ("GHG") emissions; and improved quality of life as we grow our communities.

The City of Carlsbad ("city") is submitting the following comments based on the policies, projects, programs and other improvements included in the Plan Amendment. The city reserves the right to add, amend, change or replace comments and recommendations based on additional review and understanding of the Plan Amendment and the environmental analysis provided under the California Environmental Quality Act ("CEQA").

SECTION 1: LAND USE

1. Alternatives included in the approved 2021 Regional Plan assumed housing in locations that were inconsistent with the city's land use plans; this was discussed in detail in the city's August 6, 2021/September 30, 2021, comments on the draft 2021 Regional Plan (Attachment 1). Consistent with those comments, city staff recommend the Plan Amendment:
    a. Consider the city's land use plans, including the General Plan, Habitat Management Plan, and Local Coastal Program.
    b. Consider the McClellan-Palomar Airport Land Use Compatibility Plan (adopted by the county Airport Land Use Commission and amended Dec. 1, 2011) and the constraints identified therein.
2. City staff are encouraged by recent conversations with SANDAG staff that the proposed 2025 Regional Plan will consider the city's land use documents. Doing so is recommended and expected and will help ensure better accuracy of data and assumptions.

SECTION 2: COMMENTS AND RECOMMENDATIONS

City staff remain concerned that there is not enough detail on the feasibility of implementation of this significant shift in transportation strategy. On specific content in the plans, we outline our recommendations and comments below:

Transportation & Community Development Departments
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2710 t

1. *Paying for the Plan:*

   The 2021 Regional Plan sets out an ambitious plan to build and operate a region-wide system of transportation projects, programs and other improvements. This is a substantial role for SANDAG to play in supporting both the construction and operation of these projects, programs and other improvements. SANDAG should set annual revenue targets to directly fund everything and should approve any recommended sustainable revenue tools to help meet these targets. Many of the funding strategies will require legislative changes, or voter-approved taxation. SANDAG should clarify what will occur if the funding is not available, if opposition to projects stops them from construction, and if General Plans in the region are not modified to implement the Plan/Plan Amendment.

2. *Appendix D: Sustainable Community Strategy Documentation:*

   Appendix D includes the Sustainable Communities Strategy, which outlines assumptions included in the Activity Based Model 2+ ("ABM 2+"). This model will be necessary for use by publicly and privately initiated land use projects preparing documents for consistency with VMT/CEQA Guidelines and Traffic Impact Analysis ("TIA") Evaluations. City staff respectfully request direction from SANDAG on how to conduct modeling with the service bureau and how to factor in these assumptions applied to ABM 2+. Specifically, the addition of pricing, parking costs for coastal communities, 10% teleworking and micromobility. SANDAG should provide direction on how this could be worked into General Plans that are updated every 5-20 years.

   The plan should provide a process for implementing all phases of the Build North County Corridor (NCC) managed lanes project and the supporting active transportation infrastructure projects. It is also recommended that the plan pivot from the existing low ridership fixed routes transit services to flexible fleets along the I-5 and SR-78 corridors to maximize the objectives of the plan. As stated in the Regional Plan, priority Flexible Fleet will help make the region more accessible, equitable, and environmentally friendly.

3. *Appendix A: Transportation Projects, Programs, and Phasing:*

   Trips to and from school sites result in a significant congestion, VMT generation, and peak hour delay throughout the region. Additional funding and projects should be recommended with a specific focus on improving safety and multimodal access in and around school sites along with programs to incentivize non-single occupancy vehicle trips to schools.

   Table A.11: Given the proven success of the Carlsbad Connector microtransit pilot program, the city agrees with the Plan/Plan Amendment's recommendations to provide similar on-demand microtransit systems throughout North County at all mobility hub sites and major transit centers.

   The preferred Interstate-5 freeway alternative identified in the North Coast Corridor ("NCC") Final EIR/EIS is the refined 8+4 Buffer alternative, with four freeway lanes and two managed lanes in each direction and completion by 2035. Appendix A, Table A.5 describes NCC project IDs CC004, 007 - 009 as "8F to 6F+4ML" with completion by 2050. While this might lead to further study, it is not clear why there is a different freeway configuration (i.e., reduction in freeway lanes) proposed. How does a reduction in lanes continue to meet NCC potential project benefits of maintaining or improving traffic operations and improving the safe and efficient regional movement of people and goods?

4. *Active Transportation:*

   The city appreciates the Plan/Plan Amendment's overall approach of providing a connected network of high-quality bicycle facilities throughout the region. Regional bikeways are recommended throughout the city including along Palomar Airport Road which will provide a key east-west connection and El Camino Real which will provide a new north-south bikeway connection through the city. Both roadways are proposed to include "on-street bikeways". Due to the high traffic volumes and vehicle speeds experienced along most of both corridors, the city recommends considering "off-street bikeways" or Class I facilities where feasible in order to stimulate the shift from personal motor vehicle use to people choosing to bike.

   It is extremely important that municipal transportation plans align with regional transportation plans to achieve regional goals for land use and transportation and to promote the region working together to build a cohesive regional transportation network. Considering there are currently no mechanisms in place to ensure municipalities coordinate local transportation plans with regional planning documents, the Plan should provide an approach on how SANDAG plans to engage with municipalities, especially in areas of potential disagreement or conflict (as aforementioned in this subsection and others). It is also recommended that the Plan Amendment provide additional direction regarding the application of protected bikeways in a variety of applicable contexts. While vertical measures such as soft hit posts may be appropriate in lower volume and lower speed roadways, arterial roadways with high traffic volumes and high speeds warrant much more substantial physical protection from vehicles. In addition, special consideration should be given at intersections and driveways which may be impacted due to the additional width and visibility impacts created by protected bikeways.

City staff look forward to working with SANDAG on improving mobility and land use access in the region and building sustainable, equitable and healthy modes of transportation, and we appreciate the opportunity to comment on the Plan Amendment that will help the region realize these goals.

If you have any questions related to comments on the transportation network, please contact Tom Frank, Transportation Director/City Engineer, at Tom.Frank@carlsbadca.gov or if you need additional information related to comments on the land use assumptions, please contact Eric Lardy, City Planner, at Eric.Lardy@carlsbadca.gov.

Sincerely,

JEFF MURPHY
Community Development Director

TOM FRANK
Transportation Director/City Engineer

Attachment:

1. City of Carlsbad comments on draft 2021 Regional Plan dated August 6, 2021

cc: Scott Chadwick, City Manager
Cindie McMahon, City Attorney
Geoff Patnoe, Assistant City Manager
Ron Kemp, Senior Assistant City Attorney
Robby Contreras, Assistant City Attorney
Gary Barberio, Deputy City Manager, Community Services
Paz Gomez, Deputy City Manager, Public Works
Mike Strong, Assistant Director, Community Development
Eric Lardy, City Planner
Nathan Schmidt, Transportation Planning and Mobility Manager
Jason Geldert, Engineering Manager
Robert Efird, Principal Planner
Scott Donnell, Senior Planner
Nicole Morrow, Assistant Planner

Attachment 1

City of Carlsbad

Sept. 30, 2021

San Diego Association of Governments
401 B street, Suite 800
San Diego, CA 92101
Via: SDForward@sandag.org

RE: City of Carlsbad Comments on Draft 2021 Regional Plan

To whom it may concern,

This letter serves to inform SANDAG that the City does not wish to remove project CB32 from the Regional Arterials Project list.

Please disregard the comment regarding project CB32 from the attached letter sent to SANDAG on Aug. 6, 2021.

Thank you for bringing this to our attention, and please contact me if you have any other questions regarding the 2021 Regional Plan comment letter.

Best Regards,

Tom Frank, PE
Transportation Director/City Engineer

Attachment A: Letter to SANDAG dated Aug. 6, 2021

cc: Scott Chadwick, City Manager
Celia Brewer, City Attorney
Geoff Patnoe, Assistant City Manager
Ron Kemp, Assistant City Attorney
Robby Contreras, Assistant City Attorney
Gary Barberio, Deputy City Manager, Community Services
Paz Gomez, Deputy City Manager, Public works
Mike Strong, Assistant Director, Community Development

Public Works Branch – Transportation Department
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2766

cc: Don Neu, City Planner
Nathan Schmidt, Transportation Planning and Mobility Manager
Jason Geldert, Engineering Manager
Eric Lardy, Principal Planner
Scott Donnell, Senior Planner
Corey Funk, Associate Planner

Public Works Branch – Transportation Department
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2766

Attachment A

City of Carlsbad

Aug. 6, 2021

San Diego Association of Governments
401 B Street, Suite 800
San Diego CA 92101
Via: SDForward@sandag.org

RE: City of Carlsbad Comments on Draft 2021 Regional Plan

To Whom it May Concern,

The City of Carlsbad appreciates the opportunity to provide comments on the draft 2021 Regional Plan ("Plan"). This is an important plan for this region and will guide the next phase of growth for the member agencies of the San Diego Association of Governments ("SANDAG"). An effectively designed and implemented regional transportation plan would help ensure improved transportation options for area residents, businesses and other community members; meaningful reductions in greenhouse gas ("GHG") emissions; and improved quality of life as we grow our communities.

The City of Carlsbad ("city") is submitting comments based on the policies, projects, programs and other improvements included in the Plan. Our agency's comment letter is divided into two sections. The first section seeks clarity and other considerations that pertain to our agency's review of the Plan. The second section identifies the city's preliminary comments and recommendations.

Implementing the regional transportation network outlined in the Plan requires municipalities to support the regional vision and deliver on local infrastructure and services like the priority bus routes, local bus services, and pedestrian and cycling connections to major transit infrastructure. These components, which are delivered by municipalities, are essential to creating a coherent and comprehensive local transportation network that feeds into regional services. For that reason, an effective public review of the Plan should involve a transparent and thorough process for identifying and evaluating potential hazards, physical changes to the environment and indirect (off-site and cumulative) impacts that might result from implementation activities that may reasonably occur with the Plan.

The city's residents, businesses and other community members will greatly benefit from the involvement and technical assistance from the prospective Draft Environmental Impact Report ("EIR"). Therefore, what follows in this correspondence represents our agency's preliminary comments and recommendations. The city reserves the right to add, amend, change or replace comments and recommendations based on additional review and understanding of the Plan and the environmental analysis provided under the California Environmental Quality Act ("CEQA").

The city thanks SANDAG staff for meeting with city staff on Aug. 2, 2021, to discuss some of these comments in advance of this letter. Following that meeting, SANDAG provided language that they may recommend adding to the Regional Plan for additional clarification on land use authority. The language is, "Land use authority is reserved to local jurisdictions because they are best positioned to effectively implement the objectives outlined in the Plan through understanding of the unique needs of their communities and geographies." This language will be helpful to clarify that land use authority rests with

Transportation & Community Development Departments
1635 Faraday Avenue | Carlsbad, CA 92008 | 760-602-2710 t

the local jurisdiction. The city still offers the following comments with the intent to support development of a defensible and realistic regional plan.

SECTION 1: CLARITY AND OTHER CONSIDERATIONS

City staff have attended the series of workshops that SANDAG hosted during the public review period, and respectfully starts this section with several questions related to the process of the Plan and the Draft EIR. By way of introduction, a jurisdiction's General Plan, such as the city's General Plan, identifies the expected population of the city and any lands outside of the city limits but within their Sphere of Influence where future growth is anticipated to occur. The city's General Plan identifies the subject area adjacent to the McClellan-Palomar Airport for development under the designation for limited and light industrial use.

For future land use planning, land use assumptions must reasonably proxy and be generally consistent with local planning standards and programs, to be considered growth accommodating rather than growth inducing. SANDAG has the authority under Government Code Section 65584 to determine existing and projected housing needs, as well as the share of housing needs to be allocated to cities and counties, but it is unclear if SANDAG has jurisdiction to allocate new housing growth to areas in a manner not consistent with Government Code Section 65584. Attachment 1 includes additional information on the applicable Government Code and standards. Therefore, and as indicated above, the build-out of properties within the Business Park and flight activity zone must be done in accordance with the city's General Plan Land Use Diagram, as amended, in accordance with city approval.

The initial questions on the planning process associated with developing the Plan are provided below:

1. The SANDAG website states, "The SANDAG Sustainable Communities Strategy and Final EIR from its 2015 Regional Plan will remain valid and in compliance for purposes of state funding eligibility and other state and federal consistency purposes until the SANDAG Board of Directors adopts a new Regional Plan and EIR, provided those actions are completed by the end of December 2021." SANDAG needs to clarify how the Draft EIR, Response to Comments and Adoption will be completed this year and what will occur if they are not completed by the end of this year. Additionally, please clarify when the Draft EIR will be available; it is difficult to completely assess the full impacts of this plan when the public review of the documents is piecemealed.
    a. SANDAG should clarify how public comments on the Plan are going to be addressed in the Draft EIR prior to its release.
    b. In the Draft EIR, SANDAG needs to clearly articulate the impacts to land use and if the Plan will cause a significant environmental impact due to a conflict with any land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Appendix F: Regional Growth Forecast and Sustainable Communities Strategy Land Use Pattern appears to be inconsistent with the city's General Plan and rezone program to accommodate the Regional Housing Needs Assessment, as well as the general plans of other jurisdictions such as the cities of Coronado, Del Mar and the County of San Diego. The Draft EIR should clarify how implementation of this Plan can occur if those changes are not made.

2. The city has three mobility hubs, associated with the Employment Centers Published supporting the SANDAG Regional Plan.[1] McClellan-Palomar Airport is the fifth largest employment center in the region, with Carlsbad State Beach and Carlsbad Village as "Tier 3 and Tier 4" employment centers. The city thanks SANDAG for providing data for analysis to determine impacts and provide for accurate comments on the Plan. Attachment 2 shows a summary of the Mobility Hubs and housing units assumed in the Series 14 Growth Forecast for the year 2050. In summary:
    a. The assumptions in the updated Series 14 Growth Forecast contain inconsistencies with the city's General Plan. The Carlsbad Palomar Major Employment Mobility Hub does include increases in density beyond what the citywide numbers appear to show when they are looked at in more detail.
        i. There are three locations in which density is shown to be inconsistent with good planning principles, the city's General Plan and the Airport Land Use Compatibility Plan. The three most problematic areas (shown in Attachment 3) are:
            1. 736 units on parcels immediately adjacent to the McClellan-Palomar Airport runway. The location of the airport within this mobility hub was shared with SANDAG staff multiple times at workshops. This is inconsistent with the regulations provided by the San Diego County Regional Airport Authority and conflicts with standard planning principles for siting housing away from hazards.
            2. 2,755 units on existing developed resort properties and open space dedicated lands adjacent to Legoland.
            3. 65 units in a preserved open space area.
        ii. SANDAG should provide additional detail why units were assumed in these areas, what planning principles those decisions were based on, and how SANDAG expects this to be implemented.
        iii. Concentration of units in the mobility hubs alone appears to conflict with the direction received from the California Department of Housing and Community Development ("HCD") to implement new Affirmatively Furthering Fair Housing ("AFFH"), which seeks to combat housing discrimination, eliminate racial bias, undo historic patterns of segregation, and lift barriers that restrict access in order to foster inclusive communities and achieve racial equity, fair housing choice and opportunity for all Californians. The allocations of land use provided by SANDAG seem to focus all the higher density housing into one area of the city. (This is one of the largest points of analysis that each jurisdiction in the region needs to respond to in order to receive a certified Housing Element.)
    b. Additionally, looking at the detailed data provided by SANDAG, it is now clear why the citywide numbers only show moderate increases in population. Our analysis has shown that there is an assumed reduction of population by 2,310 persons in the areas within the city but outside of the mobility hubs. This is likely due to assumed reductions in persons per household over time, but SANDAG should clarify the source and reasonableness of this assumption. If housing is not provided consistent with these areas, is it still reasonable to assume persons per household will be reduced in 2050?

[1] SANDAG Website: Employment Centers SANDAG :: PROJECTS :: San Diego's Regional Planning Agency

c. Furthermore, this reduction in population is not limited to the City of Carlsbad. There is an approximately 85,000 reduction in population assumed outside of mobility hubs regionwide. SANDAG needs to address if that is a reasonable assumption and if this will result in other impacts to public and private projects that will rely on this growth forecast, and the associated Activity Based Model (2+) to project future impacts to transportation, GHG, air quality and noise.
d. The forecast has decreased in future population based on current trends, but it is not clear if there is enough housing provided with reductions and increases in some jurisdictions. Will the reduced amount of housing that will be provided result in an increased exacerbation of the affordability crisis?
e. There is a lack of clarity about how the Plan would be implemented at the municipal level. SANDAG should develop an approach for engaging with municipalities to ensure local support for delivering the regional transportation network. Staff from local jurisdiction have the knowledge and ability to share where there are land use assumptions that conflict with planning and zoning laws. Our analysis focused on the City of Carlsbad, but if these types of assumptions are made regionwide, it presents flaws in the overall analysis. These flaws put the assumed reductions in vehicle miles traveled ("VMT") and ability to implement the Regional Plan into question.

3. The area designated is controlled for use and activity density and intensity through its spatial association with the McClellan-Palomar Airport. The McClellan-Palomar Airport is defined by the Federal Aviation Administration ("FAA") as a commercial service airport that, in addition to private aircraft, has regularly scheduled commercial flights to Los Angeles International Airport ("LAX"). The McClellan-Palomar Airport Land Use Compatibility Plan ("ALUCP") is prepared according to FAA requirements and adopted by the San Diego County Regional Airport Authority acting as the Airport Land Use Commission for the County of San Diego.
    a. The ALUCP provides measures to minimize the public's exposure to excessive noise and safety hazards within areas around the airport and identifies areas likely to be impacted by noise and flight activity created by aircraft operations at the airport. These impacted areas include the Airport Influence Area ("AIA"), the Clear Zone and the Flight Activity Zone.
    b. Within the AIA, the ALUCP establishes six safety zones for the purpose of evaluating safety compatibility of new/future land use actions. The safety zone boundaries depict relative risk of aircraft accidents occurring near the airport and are derived from general aviation aircraft accident location data and data regarding the airport's runway configuration and airport operational procedures. The ALUCP limits development intensities in these zones by imposing floor area and lot coverage maximums, by incorporating risk reduction measures in the design and construction of buildings, and/or by restricting certain uses altogether. For example, all residential and virtually all non-residential uses are considered incompatible land uses in some zones, while considered to be either compatible or conditionally compatible with the airport in other zones. Attachment 4 shows the McClellan-Palomar Airport, noise contours and SANDAG's proposed housing units.
    c. If the proposed SANDAG land use assumptions are endorsed, an amendment to the city's General Plan would be required to change the land use designation to Mixed-Use Commercial or residential land uses within the existing Business Park in order to effectuate the underlying assumptions of SANDAG staff. This is not a realistic

assumption. Further, the protected airspace referenced in the AIA and the ALUCP must also be amended based on SANDAG's regional planning assumptions. (The FAA establishes airspace protection zones in the airspace above and surrounding airports in order to protect aircraft from obstructions such as buildings, towers, etc. in navigable airspace.)

d. When a General Plan is adopted or amended, the allowable growth pattern of an area is identified and the expansion or updating of the various land uses as specified in the General Plan can occur throughout the planning horizon. Without such growth considerations, the expansion or intensification of existing land uses could be considered "growth inducing." Unplanned and uncontrolled growth may have significant adverse impacts on the environment. CEQA requires a discussion of how a "project" could increase population, employment or housing growth in surrounding areas and the impacts resulting from this growth. The CEQA Guidelines indicate that a "project" would normally have a significant effect on the environment if it would induce substantial growth or a substantial concentration of population.

4. At this point, it is not clear if SANDAG's assumptions adequately contemplate the development patterns included in the Sustainable Communities Strategy ("SCS")/Regional Transportation Plan ("RTP"), and Regional Air Quality Strategy ("RAQS"), local climate action planning business-as-usual estimates, sub-regional traffic modeling, or the airspace assumptions of AIA and the ALUCP.
5. The city seeks clarity on the Plan's underlying assumptions made to justify the proposed extensive high-speed rail network considering the significant changes in travel behavior which have occurred throughout the region as a result of the COVID-19 pandemic and due to the advancements in disruptive technologies such as telecommuting, autonomous vehicles, microtransit, etc.
    a. Recent North County Transit District ("NCTD") Coaster ridership data show riders are not returning to riding the Coaster in comparison to other modes of travel as shown in Attachment 5.
    b. This question is consistent with comments made by SANDAG's panel expert Bob Poole regarding the impact of the COVID-19 pandemic on transit ridership and mega-transit projects. (See comments by Bob Poole during the March 12, 2021 presentation to SANDAG starting at timestamp 1:30 p.m.: https://youtu.be/q-e6bNY5J_8?t=5410)
6. The city seeks clarity on why an alternatives analysis was not conducted with consideration of other transit alternatives such as automated /shared vehicle technologies and personalized zero emissions transit programs that are capable of utilizing the existing regional freeway infrastructure in response to these recent developments explained in the above comment.
7. The city seeks clarity on why the Plan does not incorporate policies to promote roundabouts over signalized intersections and include a budget line item under the Complete Corridors to fund the construction of roundabouts at new locations and to replace signalized intersections when found feasible. This clarification would support the Federal Highway Administration ("FHWA")'s project for *Accelerating Roundabout Implementation in the United States* and the County of San Diego Air Pollution Control Board's support for implementing roundabouts to address GHG and reduce fatalities.
8. The city seeks clarity on the project phasing proposed within the Plan. Specifically, the city is seeking to understand the timing of implementation of unfunded TransNet projects related to

the new projects presented within the Regional Plan. To support this, the city is requesting that SANDAG input the information requested in Table 1 (Attachment 6).

9. The city seeks specific data on the proposed 200 miles of rail service contemplated in the Plan. To support this, the city is requesting that SANDAG input the information requested in Table 3 (Attachment 7). Specific questions:
    a. Please provide more information about the scope of the high-speed rail alignments, potential vehicle technologies and their cost estimates.
    b. Will the Coaster keep the same rail alignment?
    c. What funding is programmed or planned for the Carlsbad Village railroad trench and the other projects along the current NCTD/Coaster Service right-of-way?
    d. Will some of the tracks be at grade with fencing and trains traveling at 110 miles per hour speeds?

SECTION 2: COMMENTS AND RECOMMENDATIONS

In addition to the comments on process and the Draft EIR provided above, city staff remain concerned that there is not enough detail on the feasibility of implementation of this significant shift in transportation strategy. On specific content in the plans, we outline our recommendations and comments below:

1. *Paying for the Plan:*

   The draft 2021 Regional Plan sets out an ambitious plan to build and operate a region-wide system of transportation projects, programs and other improvements. This is a substantial role for SANDAG to play in supporting both the construction and operation of these projects, programs and other improvements. SANDAG should set annual revenue targets to directly fund everything and should approve any recommended sustainable revenue tools to help meet these targets. Many of the funding strategies will require legislative changes, or voter-approved taxation. SANDAG should clarify what will occur if the funding is not available, if opposition to projects stops them from construction, and if General Plans in the region are not modified to implement the Plan.

2. *Appendix D: Sustainable Community Strategy Documentation:*

   Appendix D includes the Sustainable Communities Strategy, which outlines assumptions included in the Activity Based Model 2+ ("ABM 2+"), updated for this. This model will be necessary for use by publicly and privately initiated land use projects preparing documents for consistency with VMT/CEQA Guidelines and Traffic Impact Analysis ("TIA") Evaluations. City staff respectfully request direction from SANDAG on how to conduct modeling with the service bureau and how to factor in these assumptions applied to ABM 2+. Specifically, the addition of pricing, parking costs for coastal communities, 10% teleworking and micromobility. SANDAG should provide direction on how this could be worked into General Plans that are updated every 5-20 years.

3. *Appendix A: Transportation Projects, Programs, and Phasing:*

   Trips to and from school sites result in a significant congestion, VMT generation, and peak hour delay throughout the region. Additional funding and projects should be recommended with a specific focus on improving safety and multimodal access in and around school sites along with programs to incentivize non-single occupancy vehicle trips to schools.

Table A.11: Given the proven success of the Carlsbad Connector microtransit pilot program, the city agrees with the Plan's recommendations to provide similar on-demand microtransit systems throughout North County at all mobility hub sites and major transit centers.

Table A.13: The segment of El Camino Real between Poinsettia Lane and Camino Vida Roble is proposed to be widened from two to three lanes to prime arterial standards. With the adoption of the city's General Plan, the city has determined that the widening of this portion of El Camino Real is not feasible due to constrained right-of-way and would result in negative impacts to other travel modes. City staff recommend removal of this proposed project recommendation CB32 (that is, a 'do nothing' scenario, or appraise and evaluate different mobility projects and/or alternative designs).

The preferred Interstate-5 freeway alternative identified in the North Coast Corridor ("NCC") Final EIR/EIS is the refined 8+4 Buffer alternative, with four freeway lanes and two managed lanes in each direction and completion by 2035. Appendix A, Table A.5 describes NCC project IDs CC004, 007 - 009 as "8F to 6F+4ML" with completion by 2050. While this might lead to further study, it is not clear why there is a different freeway configuration (i.e., reduction in freeway lanes) proposed. How does a reduction in lanes continue to meet NCC potential project benefits of maintaining or improving traffic operations and improving the safe and efficient regional movement of people and goods?

4. *Active Transportation:*

The city appreciates the Regional Plan's overall approach of providing a connected network of high-quality bicycle facilities throughout the region. Regional bikeways are recommended throughout the city including along Palomar Airport Road which will provide a key east-west connection and El Camino Real which will provide a new north-south bikeway connection through the city. Both roadways are proposed to include "on-street bikeways". Due to the high traffic volumes and vehicle speeds experienced along most of both corridors, the city recommends considering "off-street bikeways" or Class I facilities where feasible in order to stimulate the shift from personal motor vehicle use to people choosing to bike.

It is extremely important that municipal transportation plans align with regional transportation plans to achieve regional goals for land use and transportation and to promote the region working together to build a cohesive regional transportation network. Considering there are currently no mechanisms in place to ensure municipalities coordinate local transportation plans with regional planning documents, the Plan should provide an approach on how SANDAG plans to engage with municipalities, especially in areas of potential disagreement or conflict (as aforementioned in this subsection and others). It is also recommended that the Plan provide additional direction regarding the application of protected bikeways in a variety of applicable contexts. While vertical measures such as soft hit posts may be appropriate in lower volume and lower speed roadways, arterial roadways with high traffic volumes and high speeds warrant much more substantial physical protection from vehicles. In addition, special consideration should be given at intersections and driveways which may be impacted due to the additional width and visibility impacts created by protected bikeways.

City staff look forward to working with SANDAG on improving mobility and land use access in the region and building sustainable, equitable and healthy modes of transportation, and we appreciate the opportunity to comment on the Plan that will help the region realize these goals.

If you have any questions related to comments on the transportation network, please contact Tom Frank, Transportation Director/City Engineer, at Tom.Frank@carlsbadca.gov or if you need additional information related to comments on the land use assumptions, please contact Eric Lardy, Principal Planner, at Eric.Lardy@carlsbadca.gov.

Sincerely,

MMS

For

JEFF MURPHY
Community Development Director

TOM FRANK
Transportation Director/City Engineer

Attachments:

1. Government Code 65020 (S.B. 375) Summary
2. City of Carlsbad Mobility Hubs
3. City of Carlsbad – Palomar Airport Road Mobility Hub Analysis
4. Palomar-McLellan Airport Flight Paths
5. Recent NCTD Coaster Ridership Data
6. Table 1 - Project Data Request
7. Table 3 - Detail of Proposed Rail Lines

cc: Scott Chadwick, City Manager
Celia Brewer, City Attorney
Geoff Patnoe, Assistant City Manager
Ron Kemp, Assistant City Attorney
Robby Contreras, Assistant City Attorney
Gary Barberio, Deputy City Manager, Community Services
Paz Gomez, Deputy City Manager, Public Works
Mike Strong, Assistant Director, Community Development
Don Neu, City Planner
Nathan Schmidt, Transportation Planning and Mobility Manager
Jason Geldert, Engineering Manager
Eric Lardy, Principal Planner
Scott Donnell, Senior Planner
Corey Funk, Associate Planner

Attachment 1: Government Code 65020 (S.B. 375) Summary

Government Code section ("GOV §") 65080, also referred to as California Senate Bill 375 (Steinberg, 2008) ("SB 375"), is one area of law that provides SANDAG with guidance to which a regional transportation plan must be developed.

Among other things, the regional transportation plan that is developed "shall be an internally consistent document" (GOV § 65080 (b)) and shall include a "sustainable communities strategy prepared by each metropolitan planning organizations as follows" (GOV § 65080 (b)(2)(B)):

> *Each metropolitan planning organization shall prepare a sustainable communities strategy, subject to the requirements of Part 450 of Title 23 of, and Part 93 of Title 40 of, the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors. The sustainable communities strategy shall (i) identify the general location of uses, residential densities, and building intensities within the region, (ii) identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth, (iii) identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65584, (iv) identify a transportation network to service the transportation needs of the region, (v) gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01 , (vi) consider the state housing goals specified in Sections 65580 and 65581, (vii) set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board, and (viii) allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. Sec. 7506).*

The 2021 draft Regional Transportation Plan includes a Sustainable Communities Strategy ("SCS"), as required by SB 375 for the San Diego region (herein after called "draft Regional Plan"). The draft Regional Plan indicates that "SB 375 requires the SCS to include a pattern for forecasted growth and development that accomplishes the following: 1) When combined with the transportation network, the SCS will achieve the regional GHG emission–reduction targets; 2). The SCS accommodates the Regional Housing Needs Assessment ("RHNA") Determination; and 3) The SCS utilizes the most recent planning assumptions. (Reference p. 19 of the 2021 Regional Plan.)

Predicting the effect of transportation plans or projects on land uses and land use planning is critical to developing context sensitive solutions for transportation projects. Therefore, utilization of the most recent planning assumptions is not only necessary but is required as specifically stated therein GOV § 65080. If inconsistencies are found in the land use assumptions or adverse impacts are anticipated, SANDAG should be actively engaged in the development of measures to address these issues.

The SANDAG Board of Directors approved the final RHNA plan with the final housing unit allocation on July 10, 2020, which was based on the most recent land use planning assumptions and an adopted methodology to allocate housing in accordance with GOV §§ 65584.04(d and m). The City of Carlsbad received a total RHNA allocation of 3,873 units as a result of RHNA plan adoption. The adopted April 6, 2021 city's Housing Element accommodates its housing needs through current zoning and other programs

as needed to meet the city's RHNA obligation at all income levels. The land use inputs derived from this local planning document constitutes the most recent land use assumptions. On July 13, 2021 the Department of Housing and Community Development found "the adopted housing element is in substantial compliance with State Housing Element Law (Article 10.6 of the Gov. Code).

The most recent planning assumptions are critical for the development of the draft Regional Plan as the document must comply with other specific state and federal mandates including a SCS per California Senate Bill 375, which achieves GHG emissions reduction targets set by the California Air Resources Board and compliance with federal civil rights (Title VI) requirements, environmental justice considerations, air quality conformity, and public participation. To monitor compliance and attainment of state reduction goals in GHG, GOV § 65080 (b)(2)) requires that:

> *(H) Prior to adopting a sustainable communities strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy and set forth the difference, if any, between the amount of that reduction and the target for the region established by the state board.*
>
> *(J)(i) Prior to starting the public participation process adopted pursuant to subparagraph (F), the metropolitan planning organization shall submit a description to the state board of the technical methodology it intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and, if appropriate, its alternative planning strategy.*

There is inevitably some uncertainty regarding the use of projected future conditions. However, what is certain is that the project will not operate under the conditions that exist today. There will be new residential and employment growth in the intervening years between now and the proposed build-out of the draft Regional Plan. Nonetheless, projections utilized should represent the best available information assembled by the local agencies with jurisdiction and expertise. Judgments about land use assumptions utilized in the draft Regional Plan should be based on and supported by facts, adopted plans, and "most recent planning assumptions," rather than speculation and personal opinions. The land use assumptions for "uses, residential densities, and building intensities within the region" (as required by GOV § 65080 (b)(2)(B)(i)) should also be the same, as that provided to the state board (as required per GOV §§ 65080 (b)(2)(H and J) in estimating and analyzing GHG from the SCS and the effect on growth and whether the effects of that growth would be significant in the context of the region's plans, natural setting, and growth patterns. Ultimately, the SCS must demonstrate whether SANDAG can meet the per capita passenger vehicle-related GHG emissions targets for 2035 set by the California Air Resources Board ("CARB").

SB 375 directs CARB to accept or reject the determination of SANDAG that its SCS submitted to CARB would, if implemented, achieve the region's GHG emissions reduction targets. CARB's technical evaluation of SANDAG's draft Regional Plan would be based on all the evidence provided, including the models, the data inputs and assumptions, the SCS strategies, and the performance indicators.

The transportation and planning assumptions are also extremely important as it is relied on for other master planning exercises. The Regional Air Quality Strategy ("RAQS") relies on information from CARB and SANDAG for information regarding projected growth in the cities and San Diego County. This in turn is utilized to address other state requirements, including the San Diego portion of the California State Implementation Plan ("SIP") and promulgating their own rules and regulations regarding air quality in the region or to address federal requirements.

Attachment 1: Government Code 65020 (S.B. 375) Summary

The analysis of land use impacts for transportation projects is guided by FHWA Technical Advisory T 6640.8 and the CEQA Guidelines.

Under the FHWA Technical Advisory T 6640.8 (G)(1), Guidance for Preparing and Processing Environmental, states:

> *This discussion [of land use] should identify the current development trends and the State and/or local government plans and policies on land use and growth in the area which will be impacted by the proposed project. These plans and policies are normally reflected in the area's comprehensive development plan, and include land use, transportation, public facilities, housing, community services, and other areas.*
>
> *The land use discussion should assess the consistency of the alternatives with the comprehensive development plans adopted for the area and (if applicable) other plans used in the development of the transportation plan required by Section [23 U.S. Code §] 134. The secondary social, economic, and environmental impacts of any substantial, foreseeable, induced development should be presented for each alternative, including adverse effects on existing communities. Where possible, the distinction between planned and unplanned growth should be identified.*

There is also a requirement to analyze the land use planning inconsistencies per CEQA Guidelines § 15126.2(a), which specifies that an EIR for a proposed project include:

> *The Significant Environmental Effects of the Proposed Project. An EIR shall identify and focus on the significant effects of the proposed project on the environment. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, the human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause or risk exacerbating by bringing development and people into the area affected. For example, the EIR should evaluate any potentially significant direct, indirect, or cumulative environmental impacts of locating development in areas susceptible to hazardous conditions (e.g., floodplains, coastlines, wildfire risk areas), including both short-term and long-term conditions, as identified in authoritative hazard maps, risk assessments or in land use plans addressing such hazards areas.*

Since the new land use assumptions are being utilized, as described by this letter, the EIR that is prepared shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected. The following are the basic steps in analyzing land use impacts as part of the community impact assessment process:

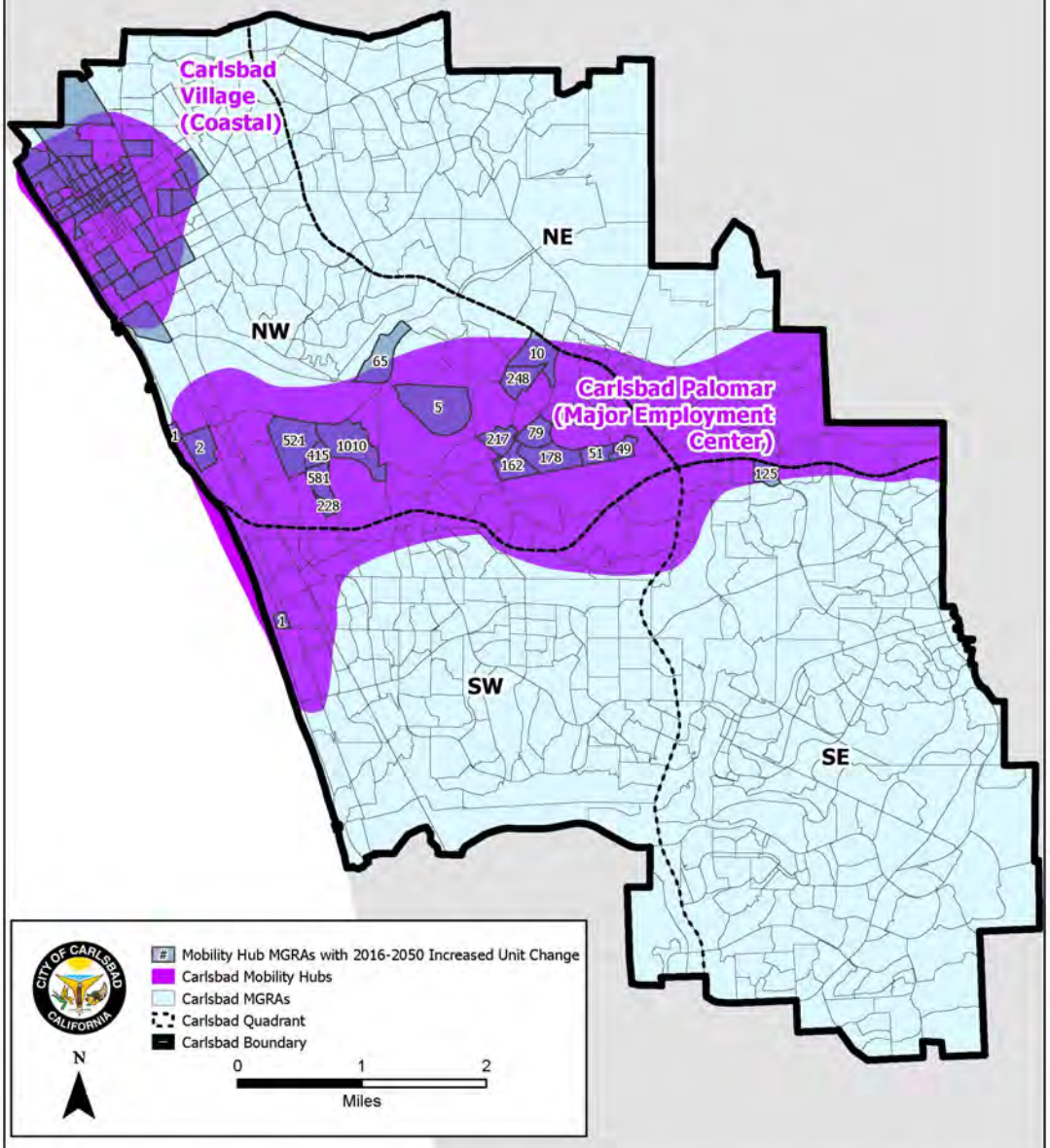
Attachment 1: Government Code 65020 (S.B. 375) Summary

1. Inventory the existing land use patterns (including undeveloped land), development trends, and transportation systems. The inventory of existing land uses should include the following land use types: residential, commercial, industrial, recreational, institutional, public services, community services, emergency services, transportation, utilities, agriculture, and undeveloped land in the study area. The study area should include the surrounding community that is generally associated with the project area within which community impacts could occur. The inventory should also address development trends and identify recent developments in the study area to include the development's name, size, status (planned, built, under construction), and the jurisdiction in which it is located. A map showing the location of existing and planned land uses in the area should also be prepared.
2. Determine whether the project is consistent with local and regional policies that govern land use and development. For the consistency analysis, the policies and programs considered in the analysis should include: transportation plans and programs (MTPs/RTPs and MTIPs/RTIPs), regional growth plans, local General Plans that establish land use and growth management policies for the study area, and any specific or pipeline development proposals. This analysis should also include a discussion of consistency with the Coastal Zone Management Act of 1972, California Coastal Act of 1976, the National Wild and Scenic Rivers Act (16 USC 1271) and the California Wild and Scenic Rivers Act (Pub. Res. Code § 5093.50 et seq.). After preparing a preliminary list of relevant plans to be considered in the analysis, the SANDAG planner should meet with the staff of the various agencies to review the list to determine if it is complete and revise the list as necessary.
3. Assess the changes that would occur in land uses and growth with and without the project.
4. The draft Regional plan and each project alternative should be considered separately since the results may be different.
5. Develop measures to avoid, minimize, and/or mitigate potential adverse effects.

The resulting environmental analysis should identify the current development trends and the State and/or local government plans and policies on land use and growth in the area which will be impacted by the proposed project. These plans and policies are normally reflected in local General Plans. If found to be consistent, then the findings in the EIR should be documented in the report and no further analysis or action is necessary. When found not to be inconsistent with a policy or program, then consideration must be given to modifying the draft Reginal Plan alternative to make it consistent, or measures to address the inconsistency must be developed. SANDAG should be actively engaged in the development of measures to address these issues and be prepared to assess the consistency of the draft Regional Plan and alternatives with the comprehensive development plans adopted for the area and (if applicable) other plans used in the development of the transportation plan required by Section 23 U.S. Code § 134. For any new land use growth assumptions, the secondary social, economic, and environmental impacts of any substantial, foreseeable, induced development should be presented for the draft Regional Plan and each alternative, including adverse effects on existing communities. The results should be shared with the public during the public involvement process, e.g., at community meetings, etc. Public input should be considered by SANDAG and if necessary, the findings of the analysis should be revised to reflect information gained through the public involvement process.

Attachment A

SANDAG Mobility Hubs



Hub Name	Hub Type	Total Population 2016	Total Houses 2016	Total Population 2025	Total Houses 2025	Total Jobs 2025	Total Population 2035	Total Houses 2035	Total Jobs 2035	Total Population 2050	Total Houses 2050	Total Jobs 2050
Carlsbad Village	Coastal	14087	6430	15095	6539	9290	16177	7075	9667	17293	7607	10044
Carlsbad Palomar	Major Employment Center	12853	5475	12275	5461	61074	19465	8503	67005	21080	9265	72900
N/A	Outside of Hubs	86239	34247	88793	35855	13896	84039	35855	14345	83929	35855	14900
N/A	All of Carlsbad	113179	46152	116163	47855	84260	119681	51433	91017	122302	52727	97844

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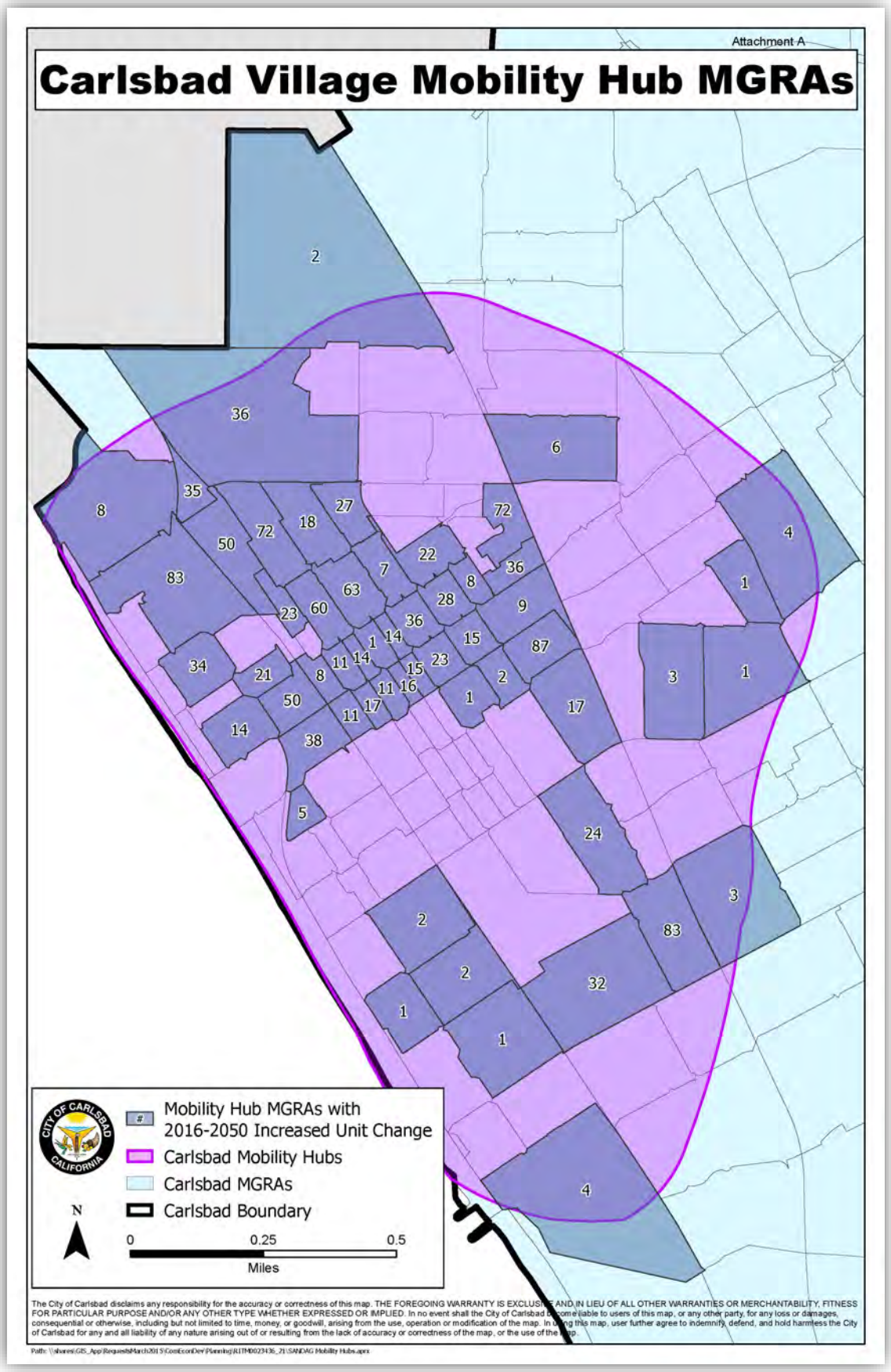
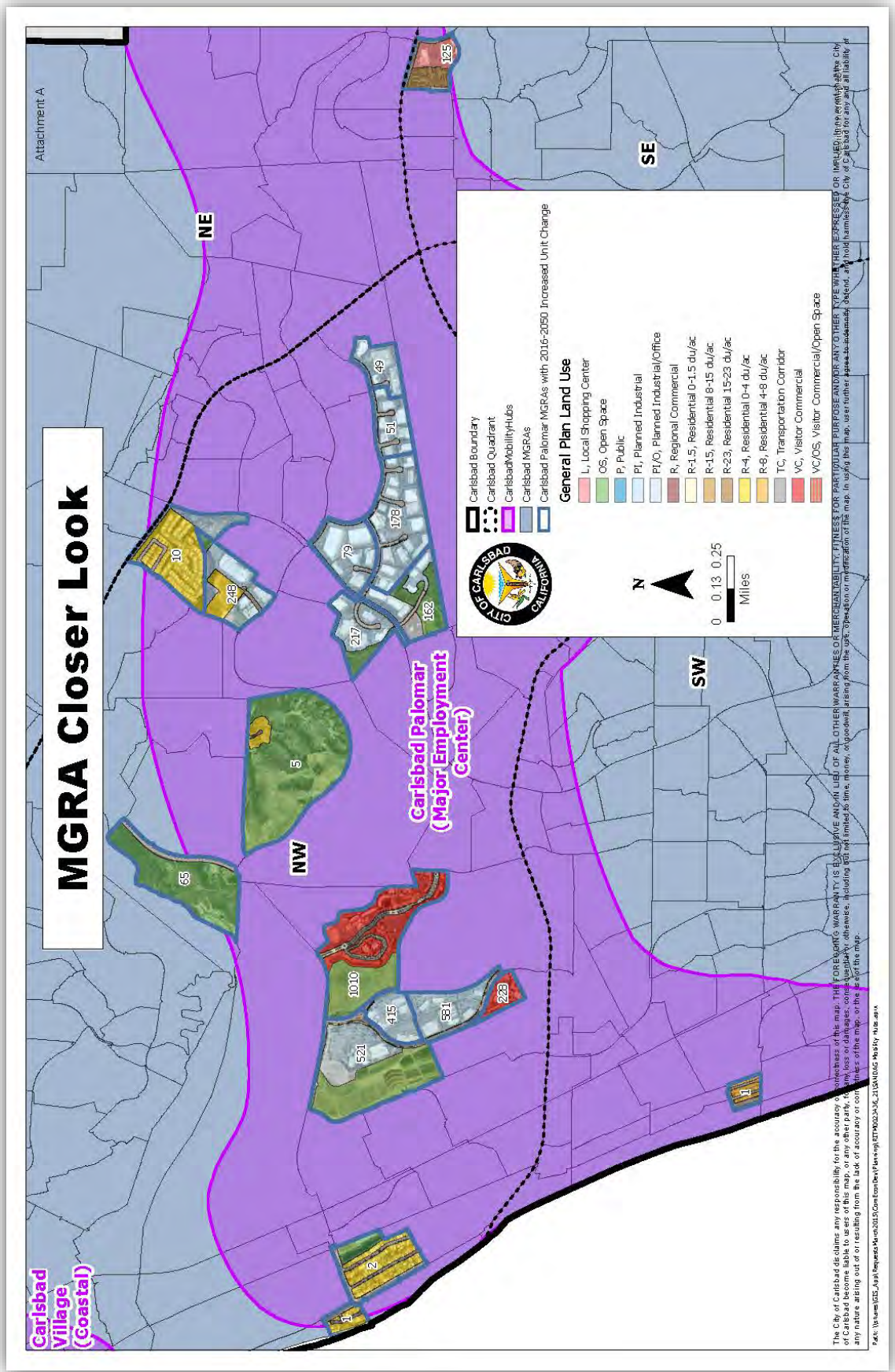
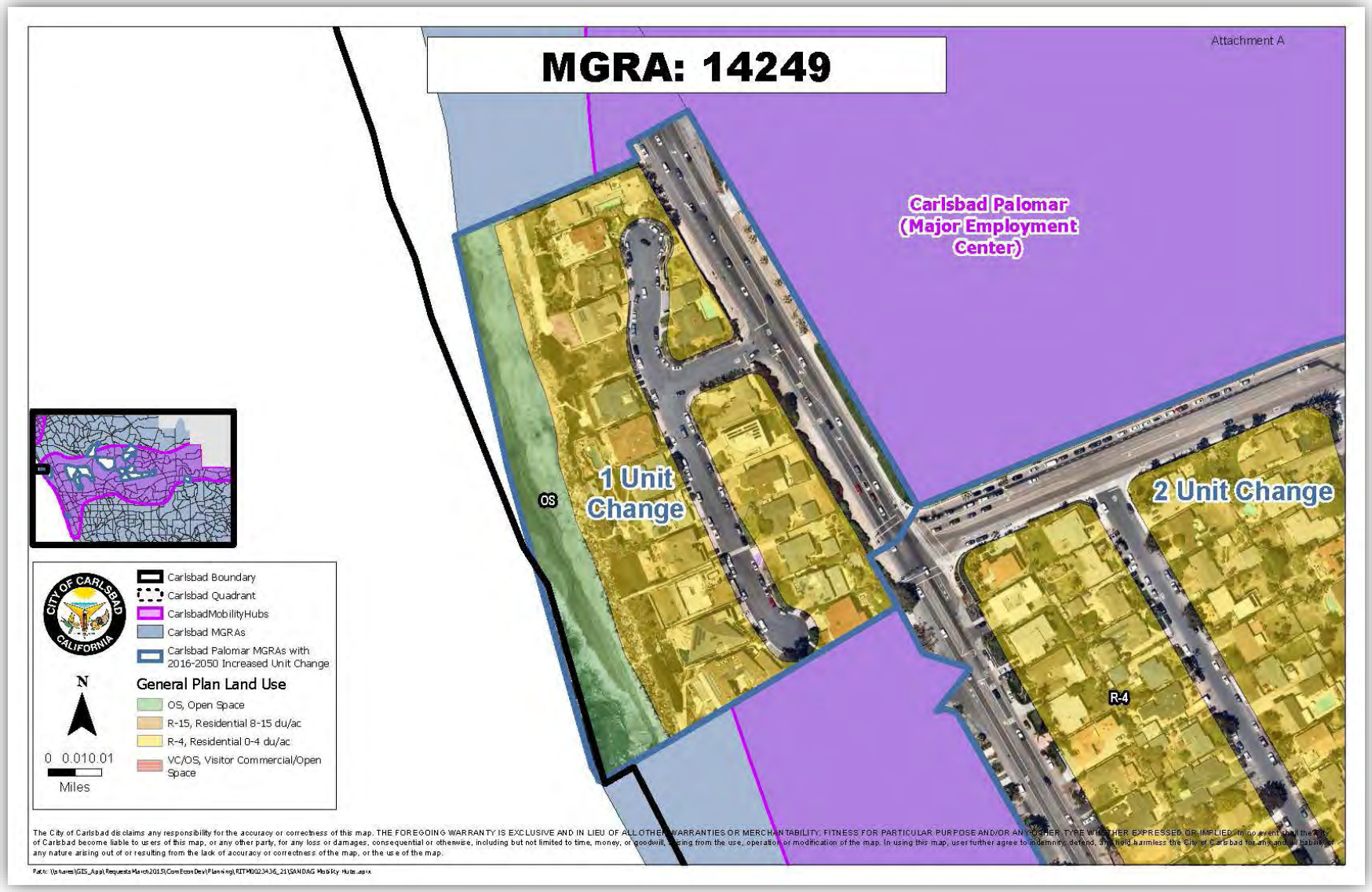

Attachment A
Carlsbad Village Mobility Hub MGRAs
Mobility Hub MGRAs with 2016-2050 Increased Unit Change
Carlsbad Mobility Hubs
Carlsbad MGRAs
Carlsbad Boundary
N
0
0.25
0.5
Miles
The City of Carlsbad disclaims any responsibility for the accuracy or correctness of this map. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND/OR ANY OTHER TYPE WHETHER EXPRESSED OR IMPLIED. In no event shall the City of Carlsbad become liable to users of this map, or any other party, for any loss or damages, consequential or otherwise, including but not limited to time, money, or goodwill, arising from the use, operation or modification of the map. In using this map, user further agree to indemnify, defend, and hold harmless the City of Carlsbad for any and all liability of any nature arising out of or resulting from the lack of accuracy or correctness of the map, or the use of the map.


Attachment A
MGRA Closer Look
Carlsbad Village (Coastal)
Carlsbad Palomar (Major Employment Center)
NE
NW
SE
SW
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
L, Local Shopping Center
OS, Open Space
P, Public
PI, Planned Industrial
PI/O, Planned Industrial/Office
R, Regional Commercial
R-1.5, Residential 0-1.5 du/ac
R-15, Residential 8-15 du/ac
R-23, Residential 15-23 du/ac
R-4, Residential 0-4 du/ac
R-8, Residential 4-8 du/ac
TC, Transportation Corridor
VC, Visitor Commercial
VC/OS, Visitor Commercial/Open Space
N
0 0.13 0.25
Miles


Attachment A
MGRA: 14249
Carlsbad Palomar (Major Employment Center)
1 Unit Change
2 Unit Change
OS
R-4
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
R-15, Residential 8-15 du/ac
R-4, Residential 0-4 du/ac
VC/OS, Visitor Commercial/Open Space
N
0 0.010.01
Miles
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Attachment A
MGRA: 14251
Carlsbad Palomar (Major Employment Center)
1 Unit Change
2 Unit Change
OS
R-4
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
R-15, Residential 8-15 du/ac
R-4, Residential 0-4 du/ac
TC, Transportation Corridor
VC/OS, Visitor Commercial/Open Space
N
0 0.02 0.04
Miles
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Attachment A
MGRA: 14265
VC
TC
R-8
1 Unit Change
Carlsbad Palomar (Major Employment Center)
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
R-8, Residential 4-8 du/ac
TC, Transportation Corridor
VC, Visitor Commercial
N
0 0.010.01
Miles
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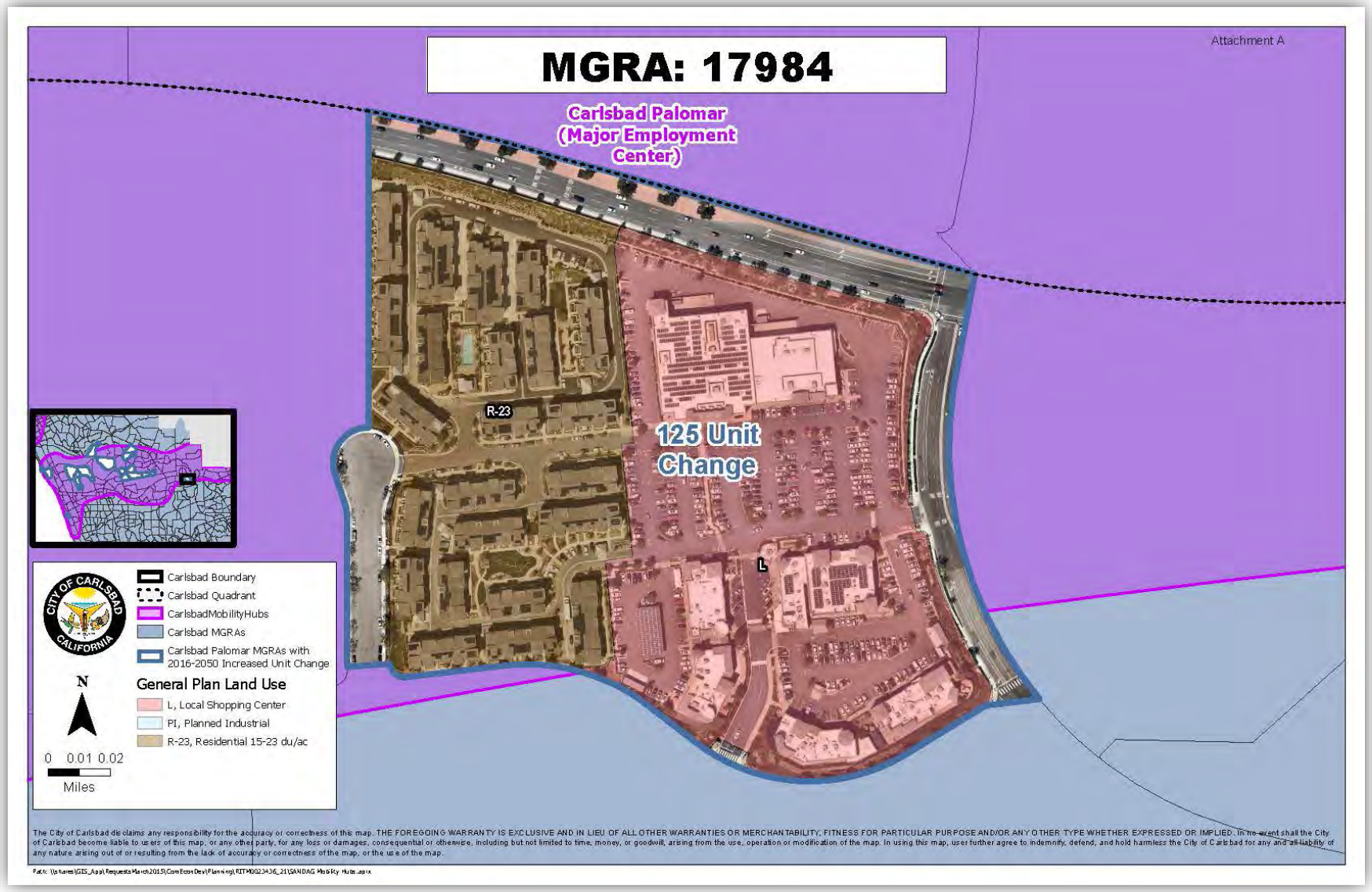
Attachment A
MGRA: 17984
Carlsbad Palomar
(Major Employment
Center)
R-23
125 Unit
Change
L
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with
2016-2050 Increased Unit Change
General Plan Land Use
L, Local Shopping Center
PI, Planned Industrial
R-23, Residential 15-23 du/ac
N
0 0.01 0.02
Miles
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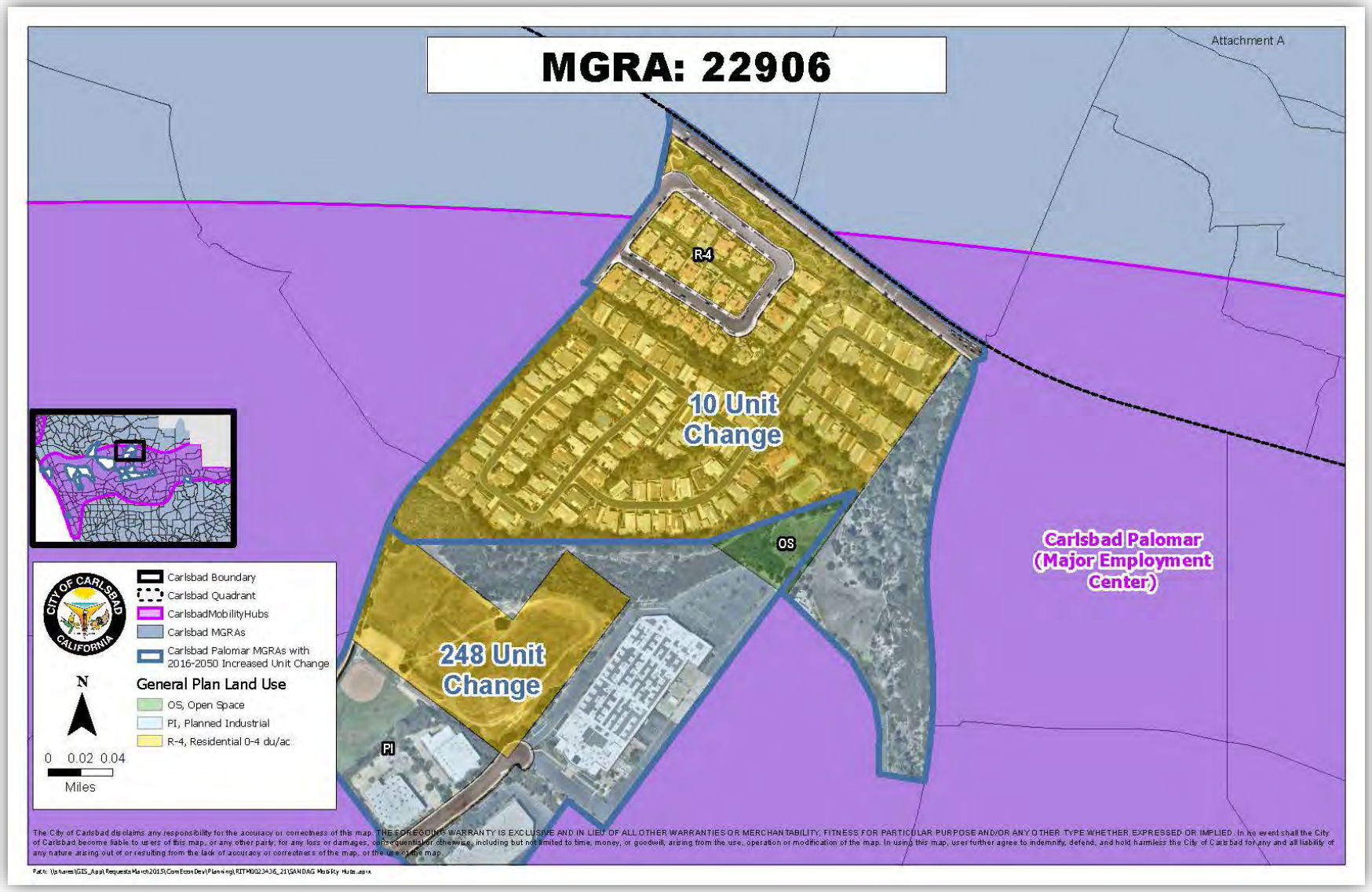
Attachment A
MGRA: 22902
Majority owned by State of CA
65 Unit Change
OS
Small portion owned by Kelly Land Co. and Agua Hedionda Lagoon Foundation
Carlsbad Palomar (Major Employment Center)
5 Unit Change
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
R-15, Residential 8-15 du/ac
N
0 0.02 0.04
Miles


MGRA: 22906
Attachment A
R-4
10 Unit Change
OS
Carlsbad Palomar (Major Employment Center)
248 Unit Change
PI
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
R-4, Residential 0-4 du/ac
N
0 0.02 0.04
Miles
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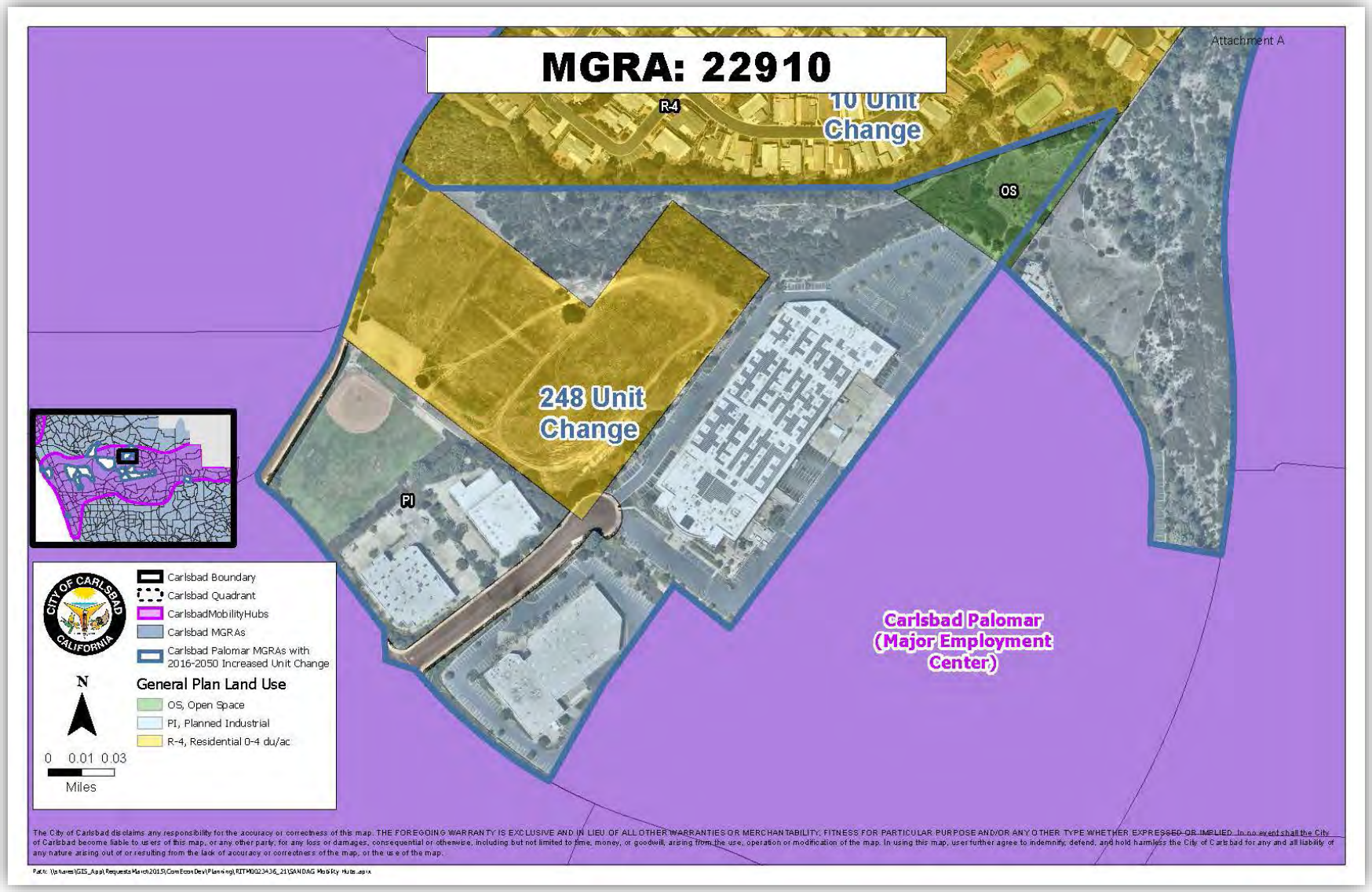
MGRA: 22910
Attachment A
R-4
10 Unit Change
OS
248 Unit Change
PI
Carlsbad Palomar (Major Employment Center)
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
R-4, Residential 0-4 du/ac
N
0 0.01 0.03
Miles
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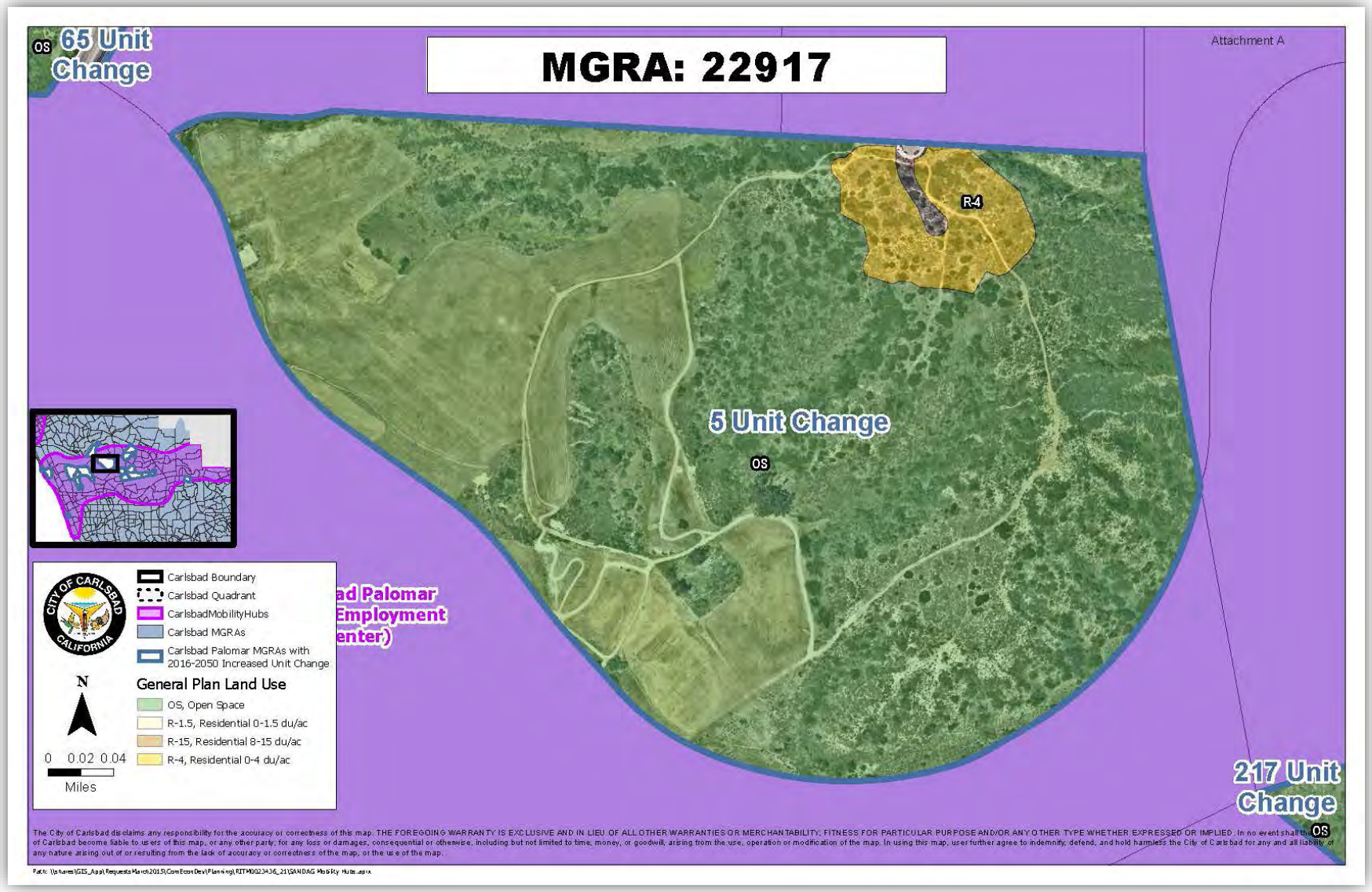
MGRA: 22917
Attachment A
65 Unit Change
OS
R-4
5 Unit Change
OS
ad Palomar
Employment
enter)
217 Unit Change
OS
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
R-1.5, Residential 0-1.5 du/ac
R-15, Residential 8-15 du/ac
R-4, Residential 0-4 du/ac
N
0 0.02 0.04
Miles
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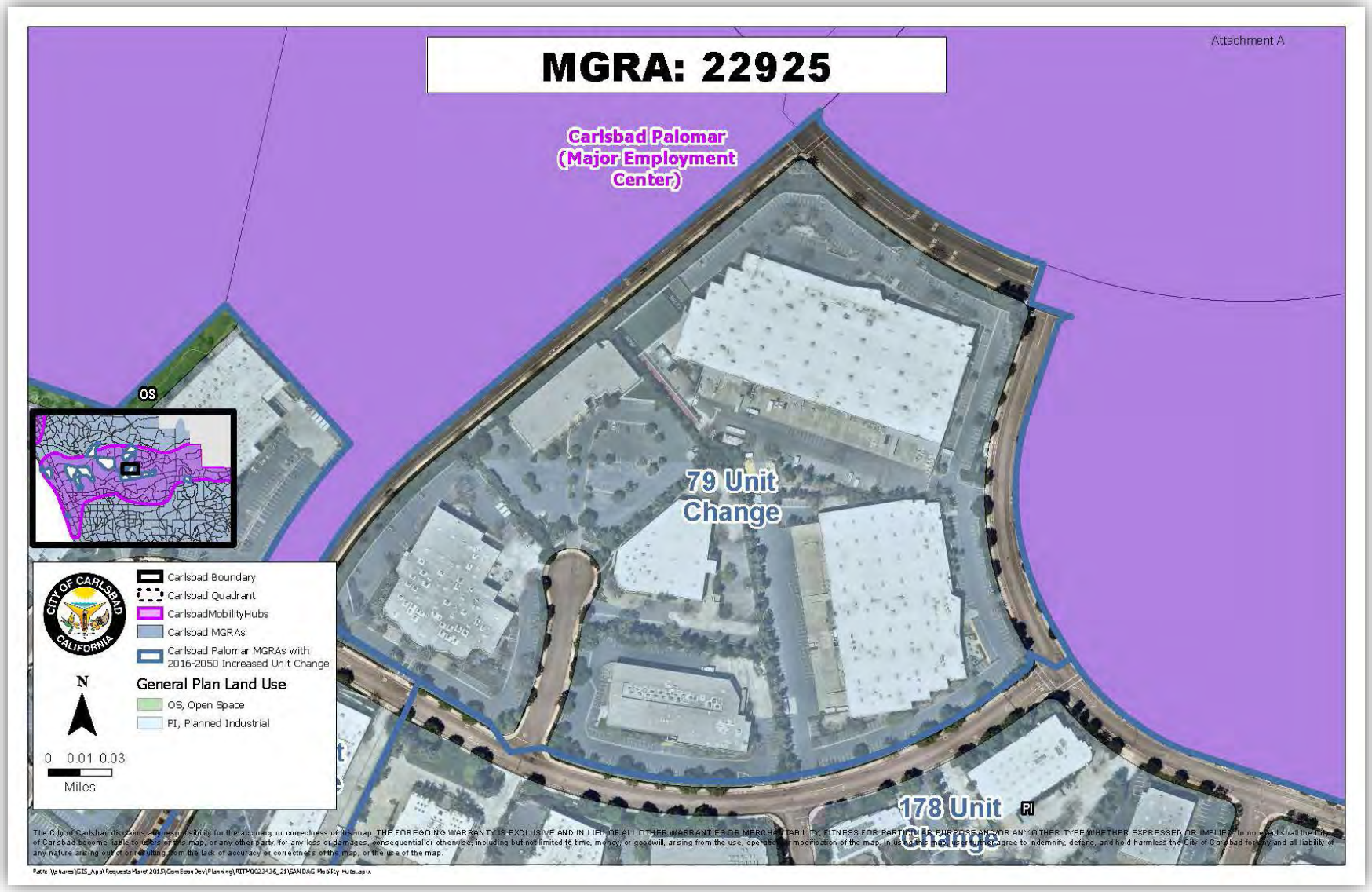
MGRA: 22925
Attachment A
Carlsbad Palomar
(Major Employment
Center)
79 Unit
Change
178 Unit
Change
PI
OS
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with
2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
N
0 0.01 0.03
Miles
CITY OF CARLSBAD
CALIFORNIA
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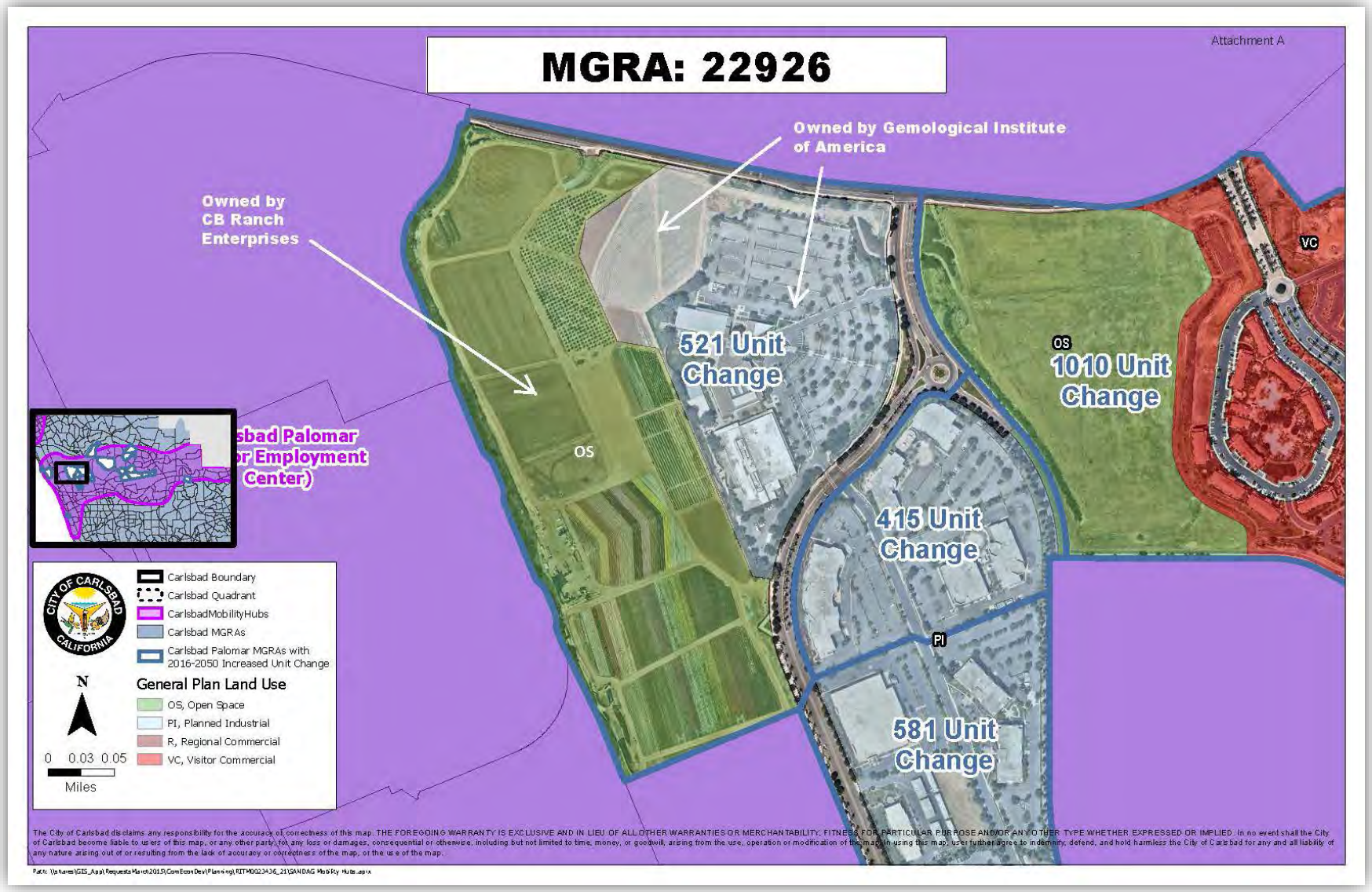
Path: \\sharesGIS_Appl\Requests\March2015\ComEconDev\Planning\RTM002436_21\SANDAG MobilityHubs.aprx


MGRA: 22926
Attachment A
Owned by Gemological Institute of America
Owned by CB Ranch Enterprises
521 Unit Change
1010 Unit Change
415 Unit Change
581 Unit Change
OS
VC
PI
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
R, Regional Commercial
VC, Visitor Commercial
N
0 0.03 0.05
Miles
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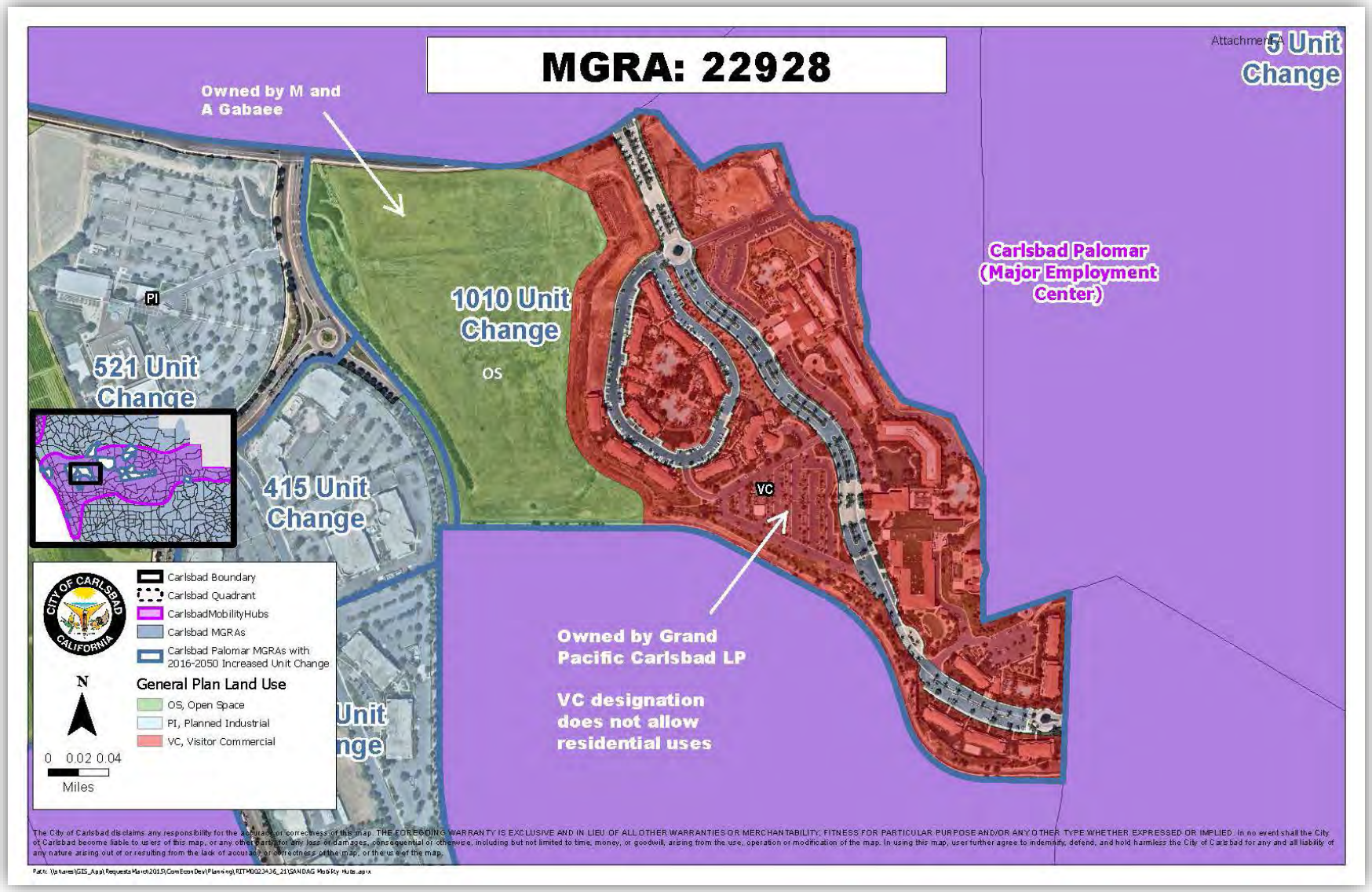
MGRA: 22928
Attachment A
5 Unit Change
Owned by M and A Gabaee
1010 Unit Change
OS
Carlsbad Palomar (Major Employment Center)
PI
521 Unit Change
415 Unit Change
VC
Owned by Grand Pacific Carlsbad LP
VC designation does not allow residential uses
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
VC, Visitor Commercial
N
0 0.02 0.04
Miles
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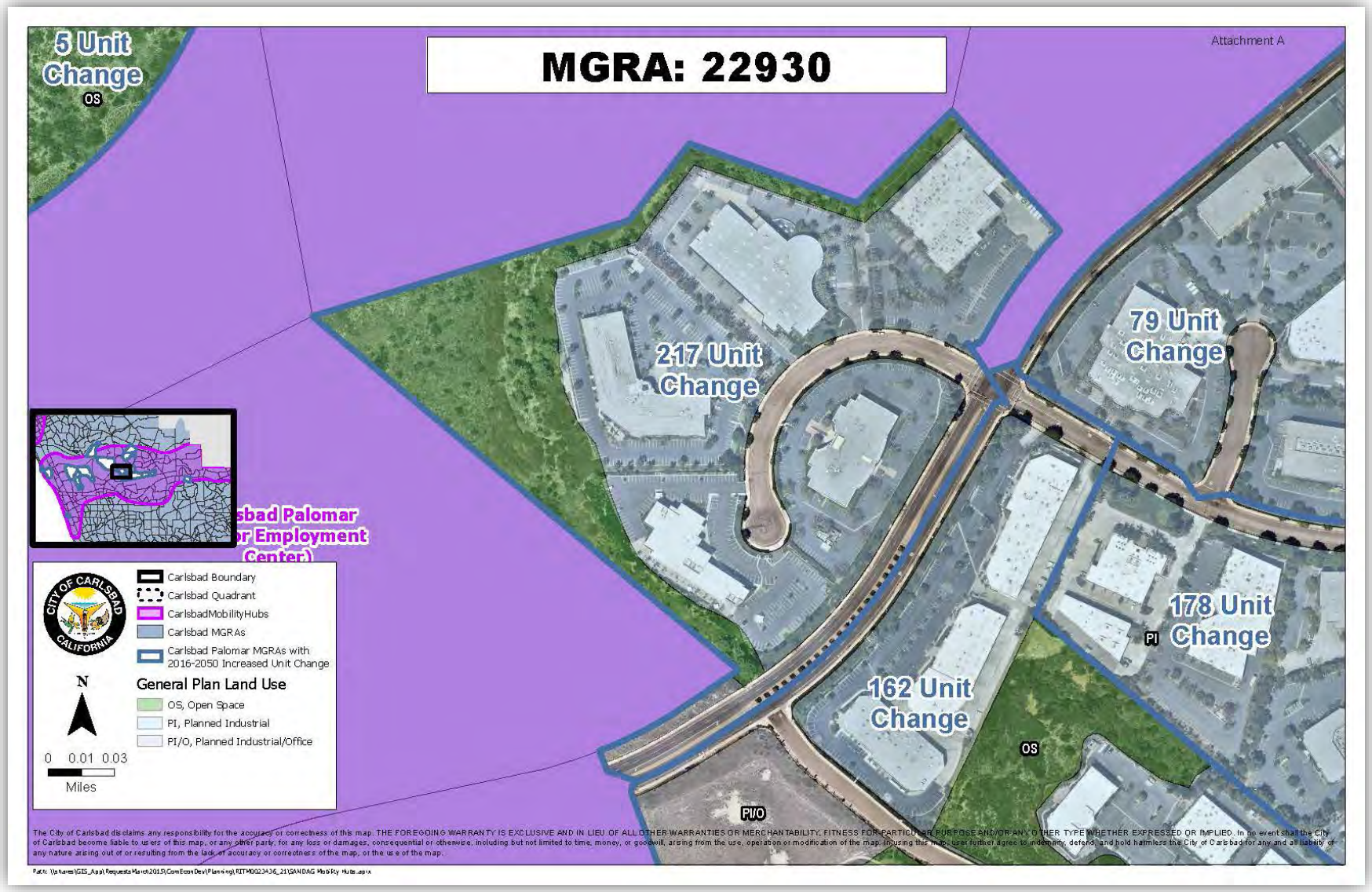
MGRA: 22930
Attachment A
5 Unit Change
OS
217 Unit Change
79 Unit Change
178 Unit Change
PI
162 Unit Change
OS
PI/O
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
PI/O, Planned Industrial/Office
N
0 0.01 0.03
Miles
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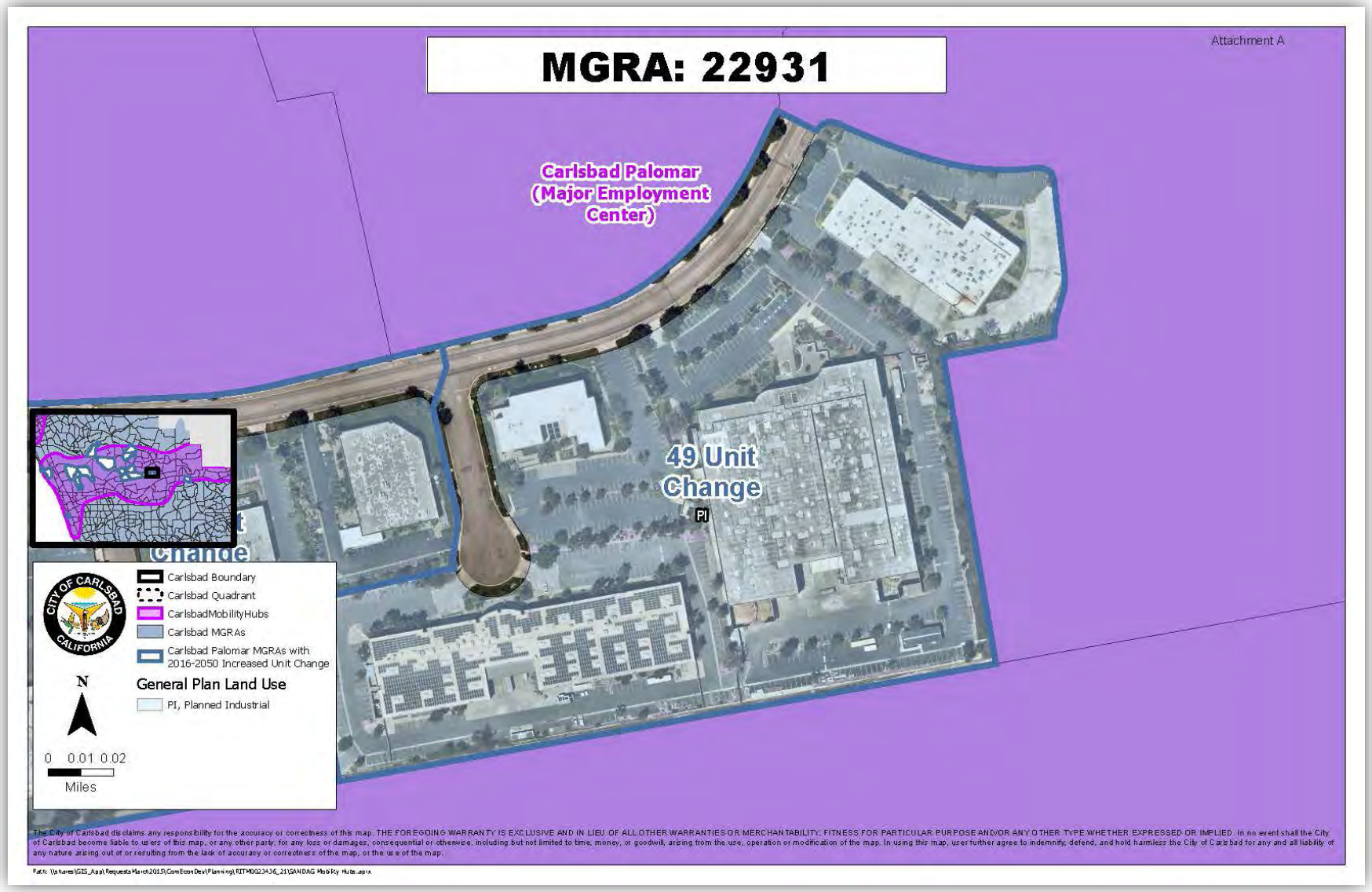
MGRA: 22931
Attachment A
Carlsbad Palomar
(Major Employment
Center)
49 Unit
Change
PI
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with
2016-2050 Increased Unit Change
General Plan Land Use
PI, Planned Industrial
N
0 0.01 0.02
Miles
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MGRA: 22933
Attachment A
217 Unit Change
79 Unit Change
162 Unit Change
178 Unit Change
PI
PI/O
OS
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
P, Public
PI, Planned Industrial
PI/O, Planned Industrial/Office
N
0 0.01 0.03
Miles
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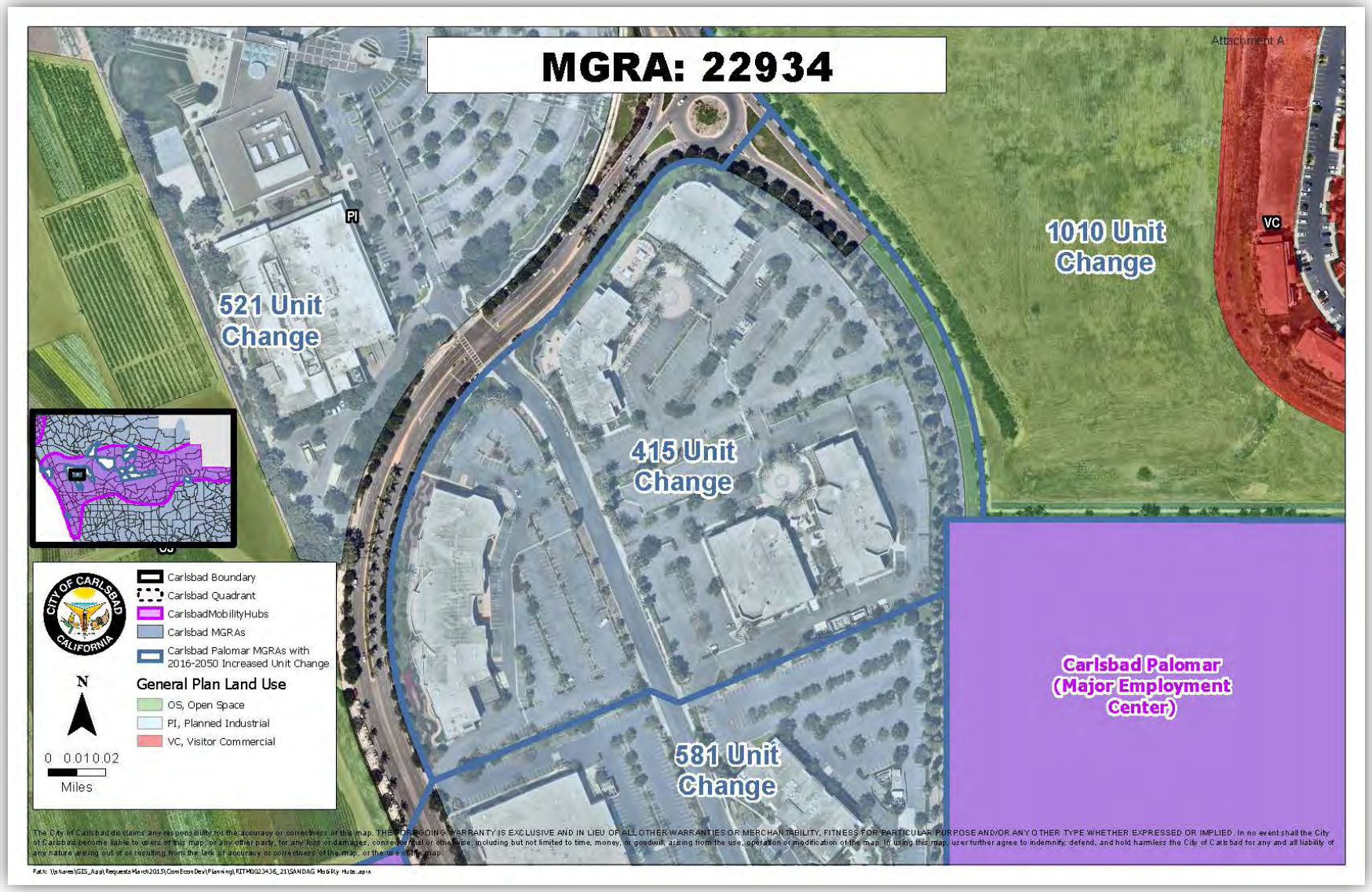
MGRA: 22934
Attachment A
521 Unit Change
1010 Unit Change
415 Unit Change
581 Unit Change
Carlsbad Palomar (Major Employment Center)
PI
VC
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
VC, Visitor Commercial
N
0 0.010.02
Miles
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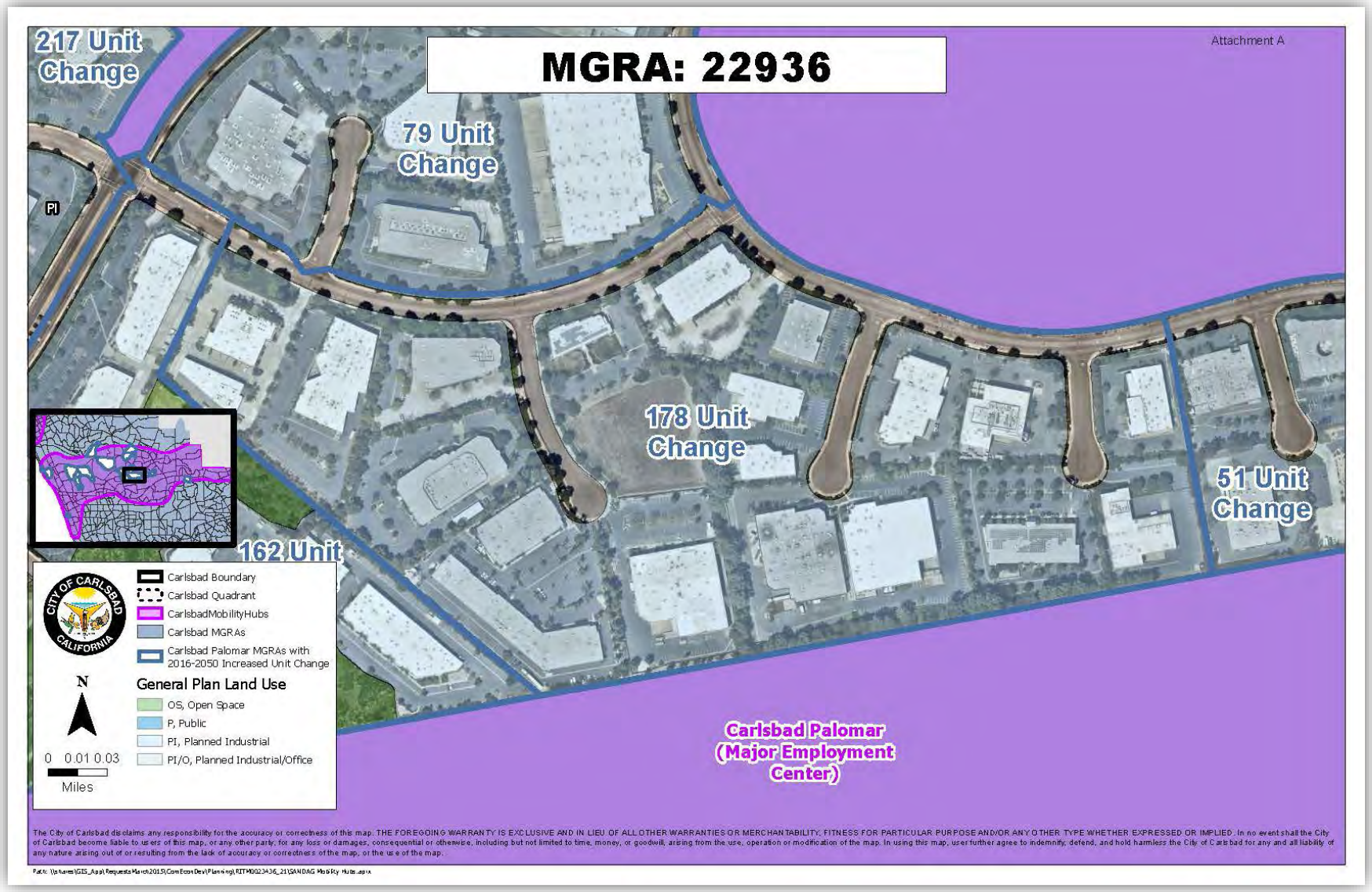
MGRA: 22936
Attachment A
217 Unit Change
79 Unit Change
178 Unit Change
51 Unit Change
162 Unit
Carlsbad Palomar (Major Employment Center)
PI
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
P, Public
PI, Planned Industrial
PI/O, Planned Industrial/Office
N
0 0.01 0.03
Miles
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MGRA: 22937
Attachment A
51 Unit Change
49 Unit Change
PI
Carlsbad Palomar (Major Employment Center)
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
P, Public
PI, Planned Industrial
N
0 0.010.01
Miles
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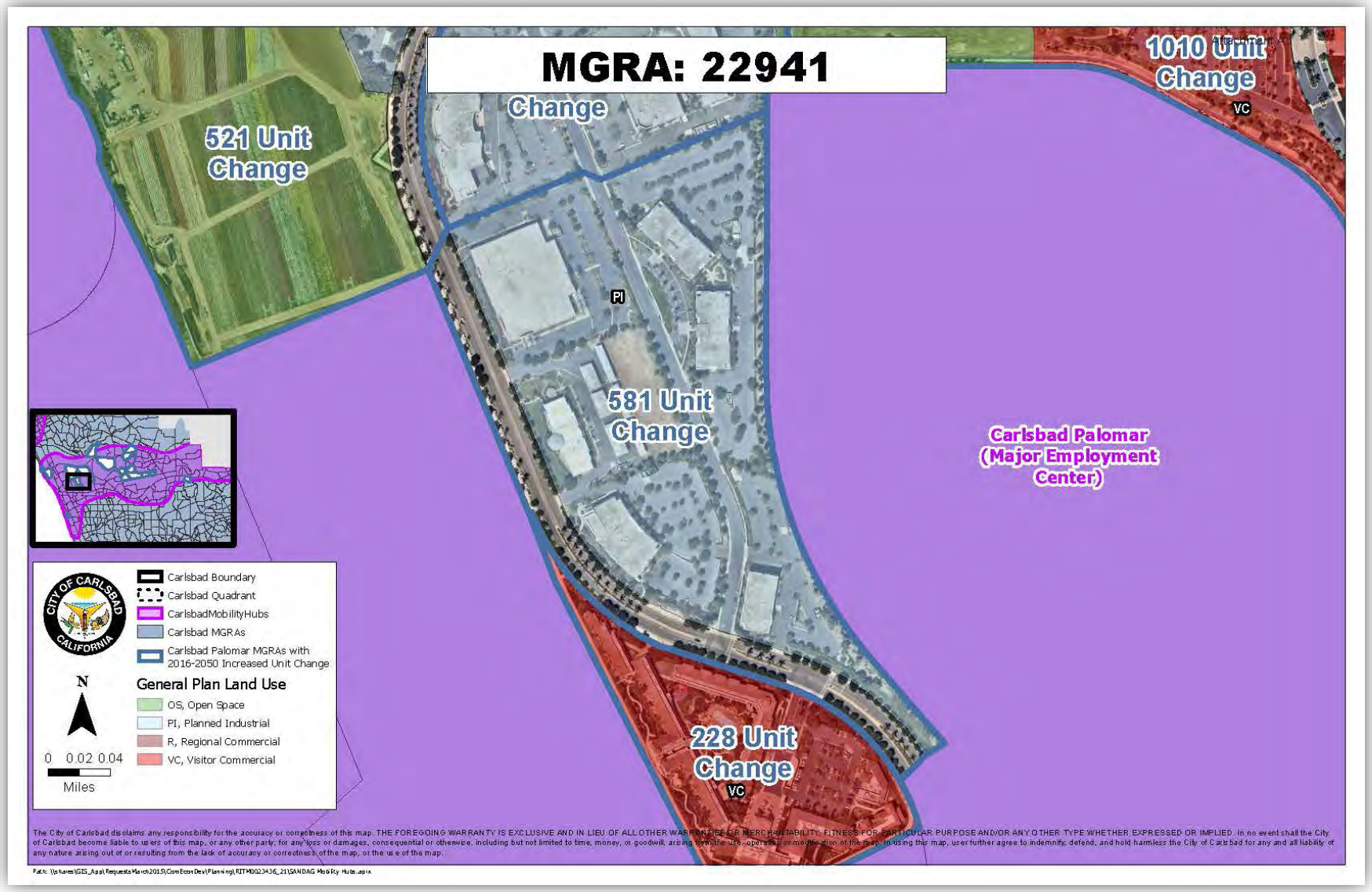
MGRA: 22941
Change
521 Unit Change
581 Unit Change
1010 Unit Change
VC
PI
Carlsbad Palomar (Major Employment Center)
228 Unit Change
VC
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
R, Regional Commercial
VC, Visitor Commercial
N
0 0.02 0.04
Miles
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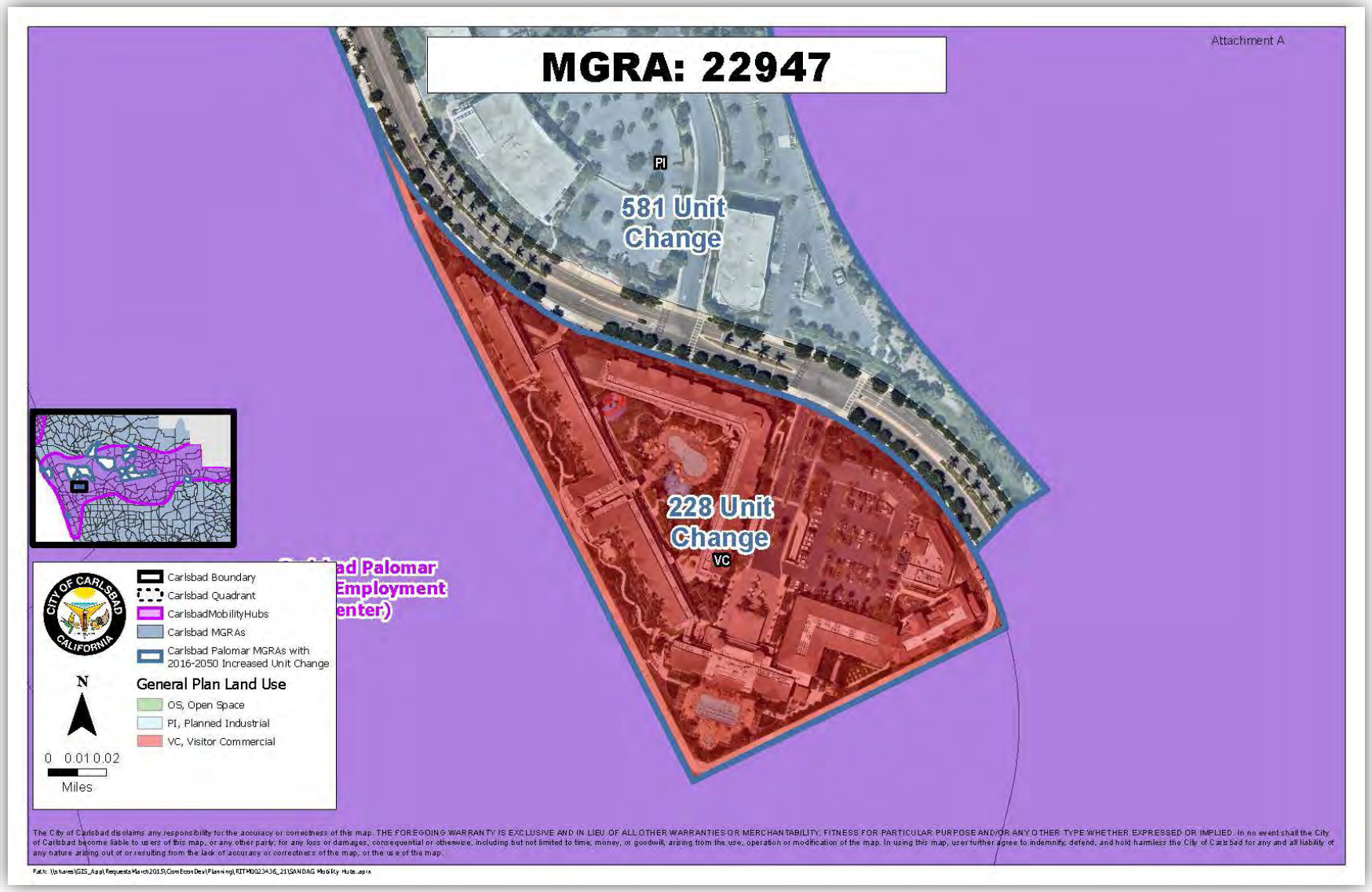
Attachment A
MGRA: 22947
PI
581 Unit Change
228 Unit Change
VC
Carlsbad Boundary
Carlsbad Quadrant
CarlsbadMobilityHubs
Carlsbad MGRAs
Carlsbad Palomar MGRAs with 2016-2050 Increased Unit Change
General Plan Land Use
OS, Open Space
PI, Planned Industrial
VC, Visitor Commercial
N
0 0.01 0.02
Miles
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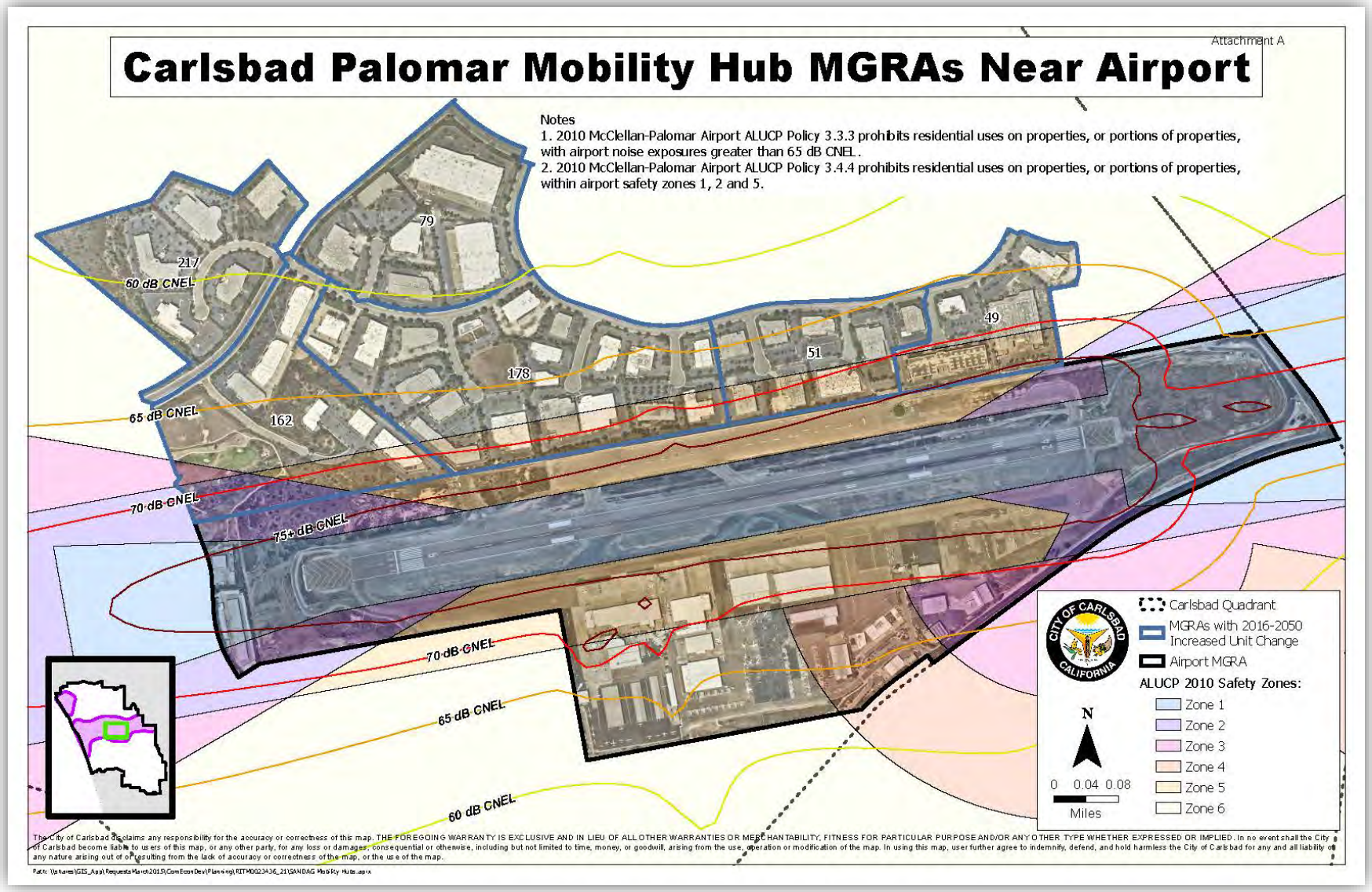
Attachment A
Carlsbad Palomar Mobility Hub MGRAs Near Airport
Notes
1. 2010 McClellan-Palomar Airport ALUCP Policy 3.3.3 prohibits residential uses on properties, or portions of properties, with airport noise exposures greater than 65 dB CNEL.
2. 2010 McClellan-Palomar Airport ALUCP Policy 3.4.4 prohibits residential uses on properties, or portions of properties, within airport safety zones 1, 2 and 5.
79
217
50 dB CNEL
49
51
178
65 dB CNEL
162
70 dB CNEL
75+ dB CNEL
70 dB CNEL
65 dB CNEL
60 dB CNEL
CITY OF CARLSBAD CALIFORNIA
Carlsbad Quadrant
MGRAs with 2016-2050 Increased Unit Change
Airport MGRA
ALUCP 2010 Safety Zones:
Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6
N
0 0.04 0.08
Miles
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PLEASE NOTE: PRELIMINARY RIDERSHIP DATA - UNAUDITED AND SUBJECT TO ADJUSTMENTS

Month	COASTER - TOTAL RIDERSHIP			
	FY21	FY20	Variance	%
July	10,263	149,515	(139,252)	(93.1%)
Aug	9,412	133,482	(124,070)	(92.9%)
Sept	10,020	114,233	(104,213)	(91.2%)
Oct	10,968	111,045	(100,077)	(90.1%)
Nov	9,232	94,551	(85,319)	(90.2%)
Dec	7,519	83,951	(76,432)	(91.0%)
Jan	6,848	98,791	(91,943)	(93.1%)
Feb	7,866	91,845	(83,979)	(91.4%)
Mar	11,203	46,510	(35,307)	(75.9%)
Apr	15,184	5,244	9,940	189.5%
May	19,214	6,207	13,007	209.6%
June**	44,978	8,734	36,244	415.0%
YTD Total	162,707	0	(781,401)	
FY Total	162,707	944,108		

**Not final as of July 19, 2021

Month	COASTER - WEEKDAY			
	FY21	FY20	Variance	%
July	10,263	131,218	(120,955)	(92.2%)
Aug	9,412	112,100	(102,688)	(91.6%)
Sept	10,020	92,159	(82,139)	(89.1%)
Oct	10,968	105,601	(94,633)	(89.6%)
Nov	9,232	80,912	(71,680)	(88.6%)
Dec	7,519	75,534	(68,015)	(90.0%)
Jan	6,848	89,920	(83,072)	(92.4%)
Feb	7,866	84,613	(76,747)	(90.7%)
Mar	11,203	44,368	(33,165)	(74.7%)
Apr	15,184	5,244	9,940	189.5%
May	17,221	6,207	11,014	177.4%
June**	35,192	8,734	26,458	302.9%
YTD Total	150,928	0	(685,682)	
FY Total	150,928	836,610		

**Not final as of July 19, 2021

Month	COASTER - SATURDAY			
	FY21	FY20	Variance	%
July	-	9,415	(9,415)	(100.0%)
Aug	-	14,348	(14,348)	(100.0%)
Sept	-	8,449	(8,449)	(100.0%)
Oct	-	3,247	(3,247)	(100.0%)
Nov	-	8,385	(8,385)	(100.0%)
Dec	-	4,387	(4,387)	(100.0%)
Jan	-	3,218	(3,218)	(100.0%)
Feb	-	5,181	(5,181)	(100.0%)
Mar	-	665	(665)	(100.0%)
Apr	-	0	0	
May	1,387	0	1,387	
June**	5,881	0	5,881	
YTD Total	7,268	0	(50,027)	
FY Total	7,268	57,295		

**Not final as of July 19, 2021

Month	COASTER - SUNDAY			
	FY21	FY20	Variance	%
July	-	8,882	(8,882)	(100.0%)
Aug	-	7,034	(7,034)	(100.0%)
Sept	-	13,625	(13,625)	(100.0%)
Oct	-	2,197	(2,197)	(100.0%)
Nov	-	5,254	(5,254)	(100.0%)
Dec	-	4,030	(4,030)	(100.0%)
Jan	-	5,653	(5,653)	(100.0%)
Feb	-	2,051	(2,051)	(100.0%)
Mar	-	1,477	(1,477)	(100.0%)
Apr	-	0	0	
May	606	0	606	
June**	3,905	0	3,905	
YTD Total	4,511	0	(45,692)	
FY Total	4,511	50,203		

**Not final as of July 19, 2021

ATTACHMENT 6 – Project Data Request

Table 1: Project Information Request

Project	Estimated Total Project Cost	Current Planned Year of Construction	Draft RTP Assumed Year of Construction	Assumed Federal/State Matching Funding (%)
San Dieguito Lagoon Double Track and Platform				
Batiquitos Lagoon Double Track and Bridge Replacement				
Eastbrook to Shell Double Track				
Carlsbad Village Trench				
La Costa to Swami Double Track				
San Onofre Bridge Replacements				
Rose Canyon Bridge Replacements				

ATTACHMENT 7 – Detail of Proposed Rail Lines

Table 3: Detail of Proposed Rail Lines

	Rail Mode (CR, LR, HSR, Hybrid)	Directional Miles	% of Directional Miles Grade Separated/Tunnel	Number of Stations	Average Distance Between Stations	Average Speed Operated	Interoperable with COASTER equipment (Y/N)
New Rail Line							

County of San Diego

DAHVIA LYNCH
DIRECTOR

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VINCE NICOLETTI
ASSISTANT DIRECTOR

August 8, 2023

Kirsten Uchitel
Associate Planner
SANDAG
401 B Street, Suite 800
San Diego, CA 92101

Sent via email to: RegionalPlanAmendment@sandag.org

REQUEST FOR COMMENTS ON THE AMENDMENT TO THE 2021 REGIONAL PLAN FOR THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)

Dear Kirsten Uchitel,

County of San Diego (County) staff has reviewed the San Diego Association of Governments (SANDAG) Amendment to the 2021 Regional Plan (Project), dated June 13, 2023. The amendment proposes to remove the regional Road User Charge (RUC) from the 2021 Regional Plan. Included as part of this amendment are updates to the financial strategies intended to demonstrate that there will be sufficient revenues to pay for the planned transportation improvements without the RUC. The Amendment is also intended to demonstrate that the federal Air Quality Planning and Transportation Conformity will also still be met and analyzes consistency with state targets to reduce greenhouse gas (GHG) emissions consistent with Senate Bill 375 (SB 375).

County staff is committed to continuing to partner with SANDAG staff on our shared goals of implementing programs and services to improve the quality of life of our residents and offers the following comments for consideration. The comments provided below are not an indication of County support or opposition for this Project. However, the County remains concerned that the original 2021 Regional Plan does not sufficiently take into consideration the existing population of the unincorporated area, particularly underserved and disadvantaged communities. Currently, the Regional Plan planning framework precludes the County from competing for millions of dollars in much-needed infrastructure and planning funding available to the region. The County is concerned that the reduced revenue projected under the updated Regional Plan will exacerbate these inequities and possible future funding to the unincorporated area. This comment letter includes a summary of these, and other key issue areas identified by staff in previous comment letters to SANDAG on both the 2021 Regional Plan (August 6th, 2021) and the 2021 Regional

Plan Draft Programmatic Environmental Impact Report (October 11, 2021), provided as attachments to this comment letter (Attachment A and Attachment B, respectively). The County requests that SANDAG consider and provide responses to the County's comments.

Removal of the Regional Road User Charge and Revenue Assumptions

The Regional Road User Charge (RUC) was previously deemed a necessary component in the 2021 Regional Plan. As was shared in our comments on the 2021 Regional Plan (attachment A), it is important for the County to better understand how investment would be applied to ensure that both the benefits and costs of the Regional Plan are equitably distributed across the region and the methodology for how the amended plan and future projects will function without the RUC. The proposed project provides updated revenue assumptions that show a net decrease in revenues from $173 billion to $163 billion over the plan's 30-year life. The updated revenue assumptions include future local sales tax revenue, updated TransNet revenue, and updated State and Federal funding. The Amendment states that this revenue will be sufficient to fund the anticipated transportation improvements as well as the ability to document the federal Air Quality Planning and Transportation Conformity; however, these funding sources are not guaranteed and therefore, may not be realized.

For example, a TransNet amendment may not qualify for the 2024 ballot and/or may not be passed by the voters and Bipartisan Infrastructure Law funding (BIL) is a competitive grant process that may not provide the level of funding that is anticipated. Considering this, the County is requesting further clarification on:

1. **Revenue Assumptions**: How the 2021 Regional Plan will meet its revenue assumptions, including the risks and impacts to projects if these anticipated revenue sources are not realized over the life of the Plan. It is unclear whether projects that have previously been planned, programmed, or awarded as part of TransNet would retain funding that was previously allocated, or if there would be any changes to the current allocation or use of funds that local agencies receive directly for local road system improvements if the revenue assumptions are not realized; and

2. **Project Prioritization:** It is unclear what methodology SANDAG will utilize for prioritizing projects if funding assumptions are not realized, including what, if any, criteria would be utilized to include or not include projects on the list for funding and how will local jurisdictions be involved in the process of project prioritization. The County reemphasizes that revenues generated should be allocated to support additional transportation and mobility options in unincorporated communities, which often have longer commutes and less access to alternative transportation options due to absence of regional planning for transit services to these communities.

Expansion of Mobility Hubs

In previous comment letters to SANDAG, the County provided comments regarding the need for more consideration and planning for the unincorporated areas. Less than 1% of the unincorporated area was included within mobility hubs, which is where transit and on-demand travel infrastructure investment is focused. To promote greater equity, mobility hubs should be inclusive of adjacent unincorporated communities, many which have greater populations than the incorporated cities and often, less access to alternative transportation options.

The removal of the RUC should be examined in terms of its impact on the planned transportation system, particularly in providing travelers with alternatives to driving. Previously, the County provided comment regarding the 2021 Regional Plan which delineated the boundaries of mobility hubs along jurisdictional boundaries, excluding more than 99% of the unincorporated area. The County maintains that there are opportunities to expand the proposed mobility hubs to include unincorporated communities, which would benefit from additional access to investment associated with inclusion in the adjacent mobility hubs, as these communities have few existing alternative options to driving. Below are some areas the County requests clarification on regarding mobility hubs:

1. **Implications:** Providing an assessment on the implications of the change in proposed funding sources, including the removal of the RUC, on the unincorporated county and its potential impact on growth in these areas is important.

2. **Development:** Understanding how this change might affect growth dynamics is key for evaluating regional development.

3. **Boundaries:** Reconsidering the boundaries of mobility hubs to include unincorporated areas is an important aspect to address within the regional plan. The County requests further details on SANDAG's approach to reevaluating the boundaries of the mobility hubs.

Regional Housing Needs Assessment and Sustainable Communities Strategy

County staff relies on SANDAG population, housing, and job growth forecasts for planning efforts. For the 6th Cycle Regional Housing Needs Allocation (RHNA), the unincorporated portion of the County was allocated 6,700 units for the planning period of 2021 – 2029. The 2021 Regional Plan forecasts that the County will build 7,419 units through 2050. Historic data shows that from 2010 to 2020, 7,330 new homes were built in the unincorporated area. If that trend continued, an additional 22,000 new homes would be built in the unincorporated area by 2050. In contrast to these historical trends, the Regional Plan forecast projects that the unincorporated county will only grow by 719 units between 2029 and 2035 and projects no future growth in the unincorporated area through 2050. The Sustainable Community Strategy for the unincorporated area should not be a no-growth strategy. The County is interested in understanding how SANDAG will account for future growth within the unincorporated areas, including natural growth beyond 2035 in the Regional Plan. Growth within the unincorporated areas should be included in the regional planning process. Below are some areas the County requests clarification regarding RHNA and the Sustainable Communities Strategies (SCS):

1. **Goals and Growth:** The County is requesting further transparency as to how SANDAG plans to reconcile this discrepancy and ensure alignment between RHNA goals, growth forecasts, funding availability, and the need to incorporate future growth in the unincorporated areas into the regional planning process.

2. **Alignment:** There should be alignment between RHNA goals, growth forecasts, and funding availability.

Greenhouse Gas Reduction Strategies

The County has and continues to request that SANDAG align GHG reduction and housing goals both in the 2021 Regional Plan and in the forthcoming 2025 Regional Plan. Ensuring alignment between GHG reduction strategies and RHNA goals is also essential for an integrated and sustainable planning approach. SANDAG's alignment with California Air and Resource Board (CARB) targets for transportation emissions must consider similar GHG reduction targets which are also set by CARB for local jurisdictions. The Amendment to the 2021 Regional Plan also identifies the need for funding beyond a fuel tax due to the shift in electric vehicles (EV) and more fuel-efficient vehicles. Below are some areas the County requests clarification on regarding GHG Reduction Strategies:

1. **Feasibility:** The County requests further transparency about the strategy and feasibility of implementing programs and plans to achieve GHG reductions in compliance with State targets that may be impacted from the removal of the RUC. Elaborating on how SANDAG intends to align these components would enhance transparency and clarity and will help ensure that coordination of regional GHG reduction goals.

2. **Local Alignment:** Please clarify how RUC removal and funding sources impact SANDAG partnerships which rely on grant funding to initiate programs, improvements, and initiatives which support smart growth in Mobility Hubs, connection, and reduction of Vehicle Miles Traveled (VMT) initiatives for GHG emissions within the unincorporated areas including environmental considerations and RHNA growth projection alignments.

3. **Cost:** It would be valuable to know if SANDAG made network performance assumptions to account for the contemporary increased costs of vehicles, rate of electric vehicle adoption, maintenance, fuel, insurance, inflation, and the overall cost of living for drivers, commuters, and other social and demographic trends and shifts to quantify the economic and greenhouse gas emissions impact.

4. **Funding Allocations:** Clarifying the approach taken to funding allocation would provide a better understanding of the analysis for the GHG emission reduction alignments with the state, CARB, grant funding, and expanding Mobility Hub connections within the unincorporated region. Regarding the implementation of projects and achievement of compliant emission levels, it would be beneficial to clarify which funds have been reallocated or will be added for this purpose.

Conclusion

Loss or reallocation of funding due to the removal of funding sources such as the RUC and pending funding sources could affect anticipated projects and limit the County's ability to provide housing and affordable, reliable, and safe mobility options, particularly to underserved communities. It is important to understand how SANDAG will address potential scenarios where revenue sources, such as TransNet funding or competitive BIL funding, are not realized at the anticipated levels. In such cases, it would be valuable to know how SANDAG will prioritize projects and adjust its strategies to ensure effective and equitable resource allocation and what role local jurisdictions will have in the project prioritization process. The County would like to understand if there are plans to revise an updated RUC or consideration of a similar revenue stream to replace the RUC and how SANDAG plans to address the County's previously provided feedback (Attachment A and Attachment B). The County is committed to working with SANDAG to ensure

that potential funding and project opportunities within the unincorporated areas are not precluded in the future. The County would like to understand how County comments provided to date will be addressed in this amended plan and on a go-forward basis.

The County appreciates the opportunity to comment on this Project. We look forward to receiving future documents related to this Project and providing additional assistance, at your request. If you have any questions regarding these comments, please contact Ashley Rivero, Land Use / Environmental Planner / Long Range Planning Division, at (619) 629-4438, or via e-mail at Ashley.Rivero@sdcounty.ca.gov.

Sincerely,

Lynnette Santos

Lynnette Santos
Chief, Long Range Planning Division
Planning & Development Services

Enclosures: Attachment A – COSD Comment Letter 2021-08-06
Attachment B – COSD Comment Letter 2021-10-11

cc: Stephanie Hernandez, CAO Staff Officer, LUEG (Stephanie.Hernandez@sdcounty.ca.gov)
Donald Chase, Planning and Development Services (Donald.Chase@sdcounty.ca.gov)
Nick Ortiz, Department of Public Works (Nick.Ortiz@sdcounty.ca.gov)
William Morgan, Department of Public Works (William.Morgan@sdcounty.ca.gov)
Jacob Armstrong, Planning and Development Services (Jacob.Armstrong@sdcounty.ca.gov)
Kevin Johnston, Planning and Development Services (Kevin.Johnston@sdcounty.ca.gov)
Tyler Farmer, Planning and Development Services (Tyler.Farmer@sdcounty.ca.gov)

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August 6, 2021

Hasan Ikhrata
Executive Director
SANDAG
401 B Street, Suite 800
San Diego, CA 92101

Sent via email to: SDForward@sandag.org

REQUEST FOR COMMENTS ON THE DRAFT 2021 REGIONAL PLAN FOR THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)

Dear Mr. Ikhrata,

Thank you to the San Diego Association of Governments (SANDAG) for your efforts to create a Regional Comprehensive Plan and Sustainable Communities Strategy (Regional Plan) to help design a regional transportation system that is fast, fair, clean and reduces greenhouse gas emissions. As County staff, we are committed to working with SANDAG staff on our shared goals of implementing programs and services to improve the quality of life of our residents as we determine where and how we grow, connect people and places, protect the environment, and provide opportunity for all of our region's residents.

This comment letter outlines areas within the Regional Plan for which County staff would like to request further clarification, exploration, and consideration. Attachment A provides additional comments from County staff for your consideration and incorporates additional information related to County-specific plans or policies that may further inform the Regional Plan.

LAND USE, TRANSPORTATION PLANNING, AND SMART GROWTH

Land use and transportation planning in the San Diego region is evolving to better address the most pressing issues of today, including climate change, quality of life, attainable housing, and social and economic inequities. The County has several planning efforts underway which prioritize addressing these issues, including the Regional Decarbonization Framework, the Climate Action Plan Update, the Electric Vehicle Roadmap, Office of Environmental and Climate Justice, and establishment of VMT thresholds. While independent of the Regional Plan, these efforts are aligned with the goals of the Regional Plan. County staff is interested in further understanding the regional growth modeling assumptions used within the Regional Plan and alignment with these County efforts.

PLANNING FOR THE UNINCORPORATED AREAS

The County represents more than 500,000 residents who live within 34 unincorporated communities throughout the region. County staff would like to better understand how the Regional Plan will address transportation options outside of proposed mobility hubs for those communities. The unincorporated community of Ramona, for example, has a population of 36,000 residents, which is a larger population than the incorporated communities of Imperial Beach, Lemon Grove, Coronado, Solana Beach, and Del Mar.

Less than 1% of the unincorporated area is within the proposed mobility hubs, which is where transit and on-demand travel infrastructure investment will be focused. The unincorporated north and east county communities represent a significant population with higher-than-average VMT in the region. Investment in public transit and other transportation options will make it easier for people to drive less, which results in decreased GHG emissions. However, investment outside of mobility hubs appears to be limited, which would make it difficult for unincorporated residents to use new transit service.

To promote greater equity, County staff see opportunities to expand the proposed mobility hubs to include adjacent unincorporated communities. When we overlay the proposed mobility hubs with the County's VMT efficient areas (using both the unincorporated and regional averages), North County Metro, Lakeside, and Spring Valley (Attachment B) are adjacent to what appear to be proposed mobility hubs. These unincorporated communities would benefit from additional access and investment associated with inclusion in adjacent mobility hubs, as these communities have few existing alternative options to driving.

County staff is also interested in understanding how Regional Housing Needs Assessment (RHNA) allocations would be assigned. For the current 6th RHNA cycle, which covers 2021 – 2029, SANDAG allocated 6,700 units for the unincorporated area, with a total housing forecast in the Regional Plan of 7,419 units through 2050 for the unincorporated area. This forecast projects the County's RHNA allocation of 6,700 units being met by 2029, with an additional growth of 719 units by 2035, and projects no further growth in the unincorporated area through 2050. Based on this forecast, it appears that beyond 2035, all future housing needs in the region from RHNA cycles would be allocated to and met by growth in incorporated cities.

In order to fulfill the goals of the Regional Plan in providing access to affordable, reliable, and safe mobility options for everyone in the region, County staff would like to work with SANDAG to ensure consideration is given to future investments and incentives within the unincorporated area that would result in expanded options for transit and active transportation, and to encourage shorter and fewer automobile trips, including locations of mobility hubs, transit leap, flexible fleets, and complete corridors.

COMMUTER PATTERNS AND MOBILITY IN THE UNINCORPORATED AREA

The Regional Plan focuses on five key investment opportunities: Next Operating System (OS), Complete Corridors, Transit Leap, Mobility Hubs, and Flexible Fleets. Many of the Regional Plan investments would be contained within proposed mobility hubs and along identified complete corridors. The majority of infrastructure improvements appear to support a shift to new rail and trolley line infrastructure, largely along the coastal areas. However, Ramona, Lakeside, Spring Valley, and other unincorporated east and north county communities represent a significant population that would benefit from similar consideration for infrastructure improvements as that proposed for the coastal communities with less population. According to SANDAG's "Commuting Patterns in the San Diego Region" study, a majority of the unincorporated east and north county residents who are employed commute outside the boundaries of their County Supervisorial

district, with 84% of District 2 residents working outside the district and 82% of District 5 residents working outside the district. Vehicle miles traveled could be reduced through greater mobility options for the unincorporated area (i.e., expansion of mobility hubs, increased transit options such as bus rapid transit, and improvements to transit frequency and service areas).

The County worked closely with SANDAG as part of the 2015 Regional Plan to identify roads in the unincorporated areas to include in the Regional Arterial System (RAS). Many of these roads serve as evacuation routes during emergencies, provide access to unincorporated communities from Caltrans roads, and create a link to the larger San Diego region.

County staff would like to continue coordinating with SANDAG to further identify Regional Plan investments in infrastructure, technology, and communication improvements for roads identified in both the County's Mobility Element and unincorporated roads included in the RAS and how these investments will further connect the unincorporated area to proposed mobility hubs, flexible fleets, or transit leaps. In addition to providing efficient movement of people and goods, these investments would increase the efficiency of evacuation routes, relay important information on evacuation conditions to first responders, and assist in getting residents safely away from hazardous conditions, all important components of resiliency planning.

FUNDING AND FINANCING

County staff appreciates the difficulty in forecasting funding and revenue sources for a regional transportation network. The Regional Plan identifies use of TransNet funds as part of the implementation, but it is not clear whether projects that have previously been planned, programmed, or awarded as part of the previous plan using TransNet would retain that funding allocation, or if there would be a reallocation of these funds as part of the Regional Plan. It is also unclear if there would be any changes to the current allocation or use of funds that local agencies receive directly for local road system improvements. The unincorporated area relies on TransNet funding to build, improve, and maintain transportation facilities that enhance roadway safety and support smart growth development, including road infrastructure to support increased transit options. Loss or reallocation of this funding could affect these projects and limit the County's ability to provide transportation services in support of our goal of reducing greenhouse gas emissions.

The Regional Plan indicates that user fees would help build a transportation system that provides travelers with alternatives to driving. County staff would like to further discuss how the proposed road user charges would be developed, implemented, and applied to ensure that this funding strategy will not disproportionately burden unincorporated communities, which often have longer commutes and less access to alternative transportation options due to lack of regional planning for transit services to these communities. Revenues generated should also be allocated to support additional transportation and mobility options in unincorporated communities, while vehicle use by those with access to alternate modes of transportation should be disincentivized since their communities are receiving significant investments in public transit.

County staff looks forward to learning more about how future funding and investment would be applied to ensure that both the benefits and the costs of the Regional Plan are equitably distributed across the region.

RESOURCE DISTRIBUTION

The Regional Plan provides SANDAG with an opportunity to guide future investments in a way that meets smart growth objectives and reduces GHG emissions, but also guides future allocation of resources to achieve equitable outcomes. Several of the unincorporated communities, such as Lakeside, Spring Valley, and Ramona, have larger populations than some of the incorporated

cities that are prioritized in the Regional Plan. In review of the proposed plan expenditures, a majority of the capital investments (55% of RTP funding) appear to go toward mobility hubs, complete corridors, and Next OS investments that are primarily outside of unincorporated communities. It is unclear what proportion of investment would go toward addressing mobility challenges within unincorporated communities and infrastructure investment that would provide linkages between the unincorporated areas and the proposed mobility hubs, transit leap, flexible fleets, and complete corridors. County staff is committed to working with SANDAG to further identify opportunities to equitably distribute the mobility benefits of the 5 Big Moves and further reduce GHG emissions regionwide.

The County appreciates the opportunity to comment on the Draft Regional Plan, and staff looks forward to future discussions regarding these comments. If you have questions regarding this letter, please contact Rami Talleh, Deputy Director with the Department of Planning and Development Services at 858-495-5475 or Rami.Talleh@sdcounty.ca.gov.

Sincerely,

SARAH E. AGHASSI
Deputy Chief Administrative Officer

cc: Chair Nathan Fletcher: Board of Supervisors, District 4
Vice Chair Nora Vargas: Board of Supervisors, District 1
Supervisor Joel Anderson: Board of Supervisors, District 2
Supervisor Terra Lawson-Remer: Board of Supervisors, District 3
Supervisor Jim Desmond: Board of Supervisors, District 5
Kathleen Flannery, Acting Director, Planning and Development Services
Jeff C. Moneda, Director, Department of Public Works
Brian Albright, Director, Department of Parks and Recreation

Attachments:
Attachment A: Comments from County Departments and Divisions
Attachment B: Expansion Potential of Mobility Hubs (North County Metro, Lakeside, and Spring Valley)

County of San Diego

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

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ATTACHMENT A
2021 REGIONAL PLAN COMMENTS FROM COUNTY OF SAN DIEGO DEPARTMENTS AND DIVISIONS

County of San Diego (County) staff in Planning & Development Services, the Department of Public Works, and the Department of Parks and Recreation reviewed the San Diego Association of Governments' (SANDAG) Draft 2021 Regional Plan (Regional Plan), for applicability to their respective work programs and County initiatives that are planned or currently underway. The County offers the following comments for your consideration.

TRANSPORTATION

1. County staff would be interested to better understand and discuss further with SANDAG the potential for Regional Plan strategies to be used as part of a potential regional mitigation strategy related to Vehicle Miles Traveled (VMT).

2. When would funding be expected to be implemented related to Transit Leap/Flexible Fleet Connections to Mobility Hub areas, as this is a potential opportunity to reduce VMT for residents living in the unincorporated area?

3. The County has developed an Electric Vehicle (EV) Roadmap and is committed to assisting with the deployment of regionwide EV infrastructure to reduce GHG emissions in the transportation sector. Could SANDAG provide additional details on the future development, application, and implementation of the proposed Road User Fees and other proposed road usage revenues? Will consideration be given to exemptions for use of clean mobility strategies?

4. County staff would like to discuss with SANDAG staff the Regional Plan strategies, including funding for Major Transit (for purposes of CEQA, defined as a rail transit station, ferry terminal *served by bus or rail, and a bus stop with two or more lines that provide transit service at 15 minute intervals or better during peak commute periods)* in areas of the unincorporated area that are identified as "VMT efficient" in the SANDAG VMT Map.

5. There is significant investment in development and infrastructure in the Otay Mesa area, and Otay Mesa is identified as a "Mobility Hub" area in the RTP. County staff would like to better understand what funding has been identified for this "Mobility Hub" area.

6. County staff would like to discuss with SANDAG the potential for "Major Transit" services along the I-15 corridor, such as the potential for buses on shoulders.

ROADS/TRAFFIC/FIELD ENGINEERING

7. Complete Corridors, such as the SR-67 and I-15 Corridors, are envisioned to act as the backbone of the regional transportation system. In addition to providing for safe and comfortable spaces to get around for all modes of transportation, road improvements such as intersection widening are important for the safe and reliable movement of all road users. County staff would like to discuss further identification and investment within complete corridors that provide linkages to the unincorporated area. These improvements could assist in providing routes for the County's eastern and northern rural regions that could be essential in the event of accidents or fire evacuation. For example, County staff would like to discuss with SANDAG the option of including safety improvements along the SR-67 Corridor on Wildcat Canyon Road, as this road is a relief route to SR-67. Additionally, road improvements on Old Hwy 395 and Pala Temecula Road in the north county may merit further conversation, as both of these roads serve as alternate routes to I-15 during peak traffic hours.

8. County staff would like to further discuss improvements of low flow crossings that are necessary to limit area flooding as well as the safe passage of motorists.

9. County staff would like to work with SANDAG to identify evacuation routes at a regional level, and the possibility of creating a separate section within the Regional Plan that would identify improvements of these routes and potential funding that could be part of the 2021 Regional Plan.

10. County staff would like to discuss with SANDAG how Smart Infrastructure and Connected Vehicles will address the legal and financial challenges with sharing traffic signal data with private entities and the liability of the potential misuse of signal timing data.

11. County staff would like to better understand the impact of Electric Vehicle Infrastructure on County of San Diego public right of way.

WATERSHED

12. Stormwater Management & Regional Needs Assessment; suggested edits in Appendix R, page R-2:
    a. "The County of San Diego has initiated an update of the 2010 Needs Assessment's 40-year water quality cost estimate using more recent water quality planning documents and strategies for achieving regulatory compliance and water quality objectives throughout the region. Since 2010, the Copermittees have worked to formulate Water Quality Improvement Plans (WQIPs) for the region's watersheds, including strategies, planned projects, and schedules to address their respective water quality objectives and compliance needs. The update to the Needs Assessment is intended to assist the County in planning and decision making and will draw upon the most recent WQIPs, with a focus on unincorporated areas to develop updated cost information."

BIOLOGY

13. Figure AA.1 shows the conserved habitat lands in the San Diego region (light green) and displays the areas included in the four subregional habitat conservation plans (subfigure).
    a. The Pre-Approved Mitigation Area (PAMA) of the South County Multiple Species Conservation Program (MSCP) and draft PAMA of the draft North County MSCP are labeled as "Proposed Conserved Habitat Lands" (dark green). This label may be misinterpreted by readers. While the MSCP Preserves will be assembled within the PAMA, not all PAMA designated lands will be conserved or are being actively pursued for conservation at this time.
    b. The draft Focused Conservation Area (FCA) of the draft East County MSCP was not included in the "Proposed Conserved Habitat Lands" (dark green). This area is equivalent to the draft North County MSCP's draft PAMA and should be included in this figure.
    c. The Rancho Guejito property located north of San Pasqual Valley Road will not be included in future iterations of the draft North County MSCP Permit Area. The portions of this property identified within the draft North County MSCP should be changed from dark green to white to reflect this change.
    d. In the subfigure, both the draft North County MSCP and Multiple Habitat Conservation Plan (MHCP) are identified by the number "4." The MHCP area should be identified by the number "1" to correspond with the provided key.

14. Although the draft 2021 Regional Plan mentions the importance of protecting habitat corridors and wildlife linkages through land acquisition, it does not appear to include the construction of safe passageways to connect wildlife to preserved lands bisected by existing and future regional transit corridors. It is recommended that SANDAG work with the San Diego Monitoring and Management Program (SDMMP) and community partners to identify the areas along regional transit corridors that would benefit from wildlife crossings and that these improvements be included in future regional projects.

PARKS AND RECREATION

15. For proposed projects that occur adjacent to Department of Parks and Recreation (DPR) County-managed lands, DPR staff would like to coordinate with SANDAG staff to ensure wildlife connectivity is maintained from adjacent lands to preserved County lands, including wildlife-only crossings.

16. For proposed projects that occur adjacent to or near existing or potential future trail connections, DPR staff would like to coordinate with SANDAG staff on trail connectivity throughout the County and incorporate safe multi-use crossings such as bridges or overpasses for recreational use.

17. DPR staff request SANDAG staff coordinate in developing SANDAG's 5 Comprehensive Multimodal Corridor Plans as mentioned in Appendix B: Implementation near DPR facilities:
    a. Central Mobility Hub and Connections, Coast, Canyons, and Trails – State Route 52, North County – SPRINTER/Palomar Airport Road/State Route 78/State Route 76, San Vicente – State Route 67, South Bay to Sorrento – Purple Line/Interstate 805/Blue Line/Interstate 5 South.

b. Study additional seven corridors to inform the next Regional Continuing Actions.
c. Pursue funding opportunities for projects, programs, and services identified in completed CMCPs.

18. County Staff would like to discuss with SANDAG the possibility of including trails and trail systems within the unincorporated area as part of the 2021 Regional Plan and to consider California Coastal Trail connections to DPR facilities.

AIRPORTS

19. As the owner and operator for eight airports in the region, County Airports continues efforts to safely operate its facilities, ensure future land uses are compatible with aircraft operations, and protect the health and safety of people and property within the vicinity of an airport. The County's airports serve as transportation hubs, emergency service facilities and economic engines in their communities. McClellan-Palomar Airport is the only commercial airport in North County and has over 145,000 annual aircraft operations. It is also a Customs and Border Protection Port of Entry. In East County, Gillespie Field is the 44th busiest airport in the nation with 240,000 annual operations. Both of these airports support thousands of jobs and generate hundreds of millions of dollars in economic activity. The County looks forward to the integration of these airports into the regional transportation system.

20. The San Diego County Regional Airport Authority adopted Airport Land Use Compatibility Plans for the eight airports, which included land use compatibility policies related to airspace, noise, safety and overflight. Those policies have been adopted by the County of San Diego through its General Plan and Zoning Code. After evaluating the forecasted increases in housing and jobs around the Mobility Hubs, there are several land use assumptions related to safety and noise around Fallbrook Airpark, Jacumba Airport, Gillespie Field and McClellan-Palomar Airport that County staff would like to better understand. For example, there are forecasted incompatible housing increases within the Runway Protection Zones at Gillespie Field. These inconsistencies could result in the assumed intensities and densities increases being unachievable.

County of San Diego

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ATTACHMENT B
2021 REGIONAL PLAN PROPOSED MOBILITY HUB EXPANSION AREAS

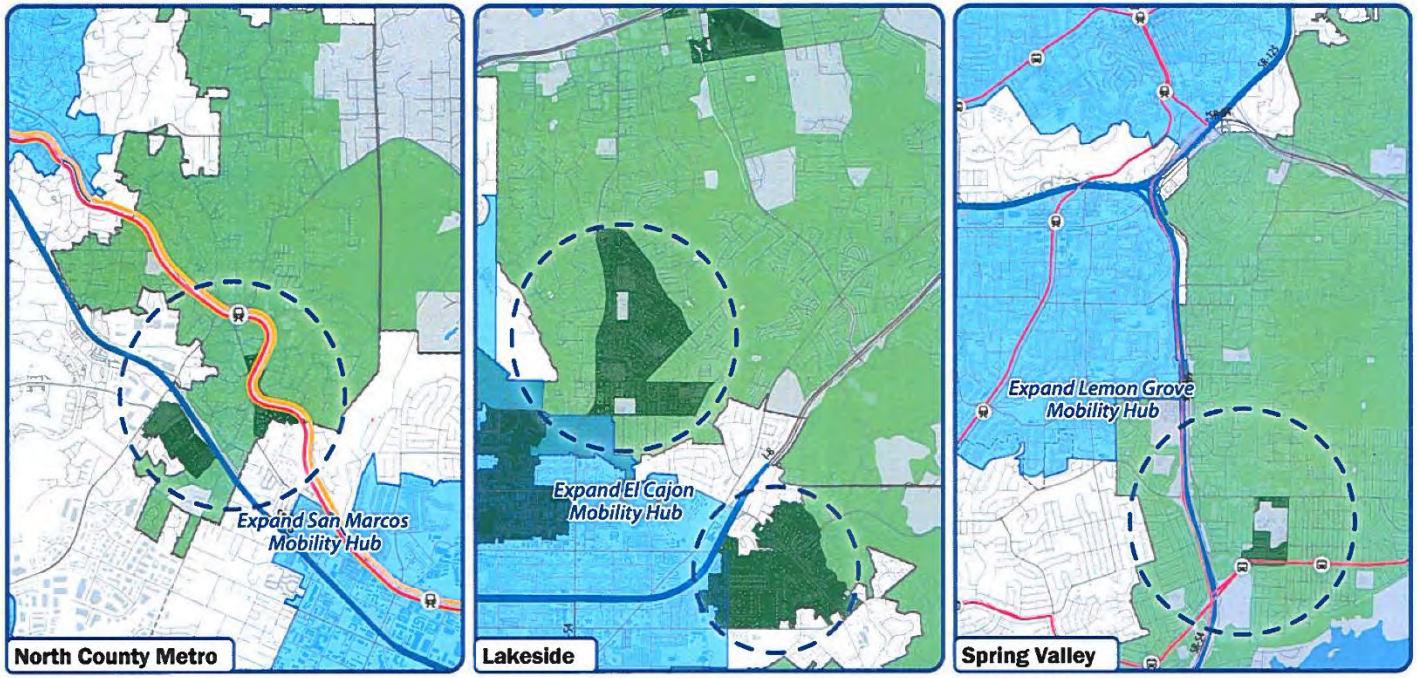
The Regional Plan will focus future investment, development, and growth in centralized areas referred to as "mobility hubs." There are locations in the unincorporated area that the County has forecasted for future growth, which included already designated Regional Housing Needs Assessment (RHNA) sites, and are located within close proximity to a proposed mobility hub. The County would like to work with SANDAG to consider the expansion of proposed mobility hubs to include additional unincorporated north and east county communities. As indicated in Figure 1, these proposed expansions include areas in North County Metro, Lakeside, and Spring Valley. Additional details for these three mobility hub expansions are provided below.

The North County Metro community is located between the proposed Vista and San Marcos mobility hubs. Expansion of the San Marcos mobility hub could include the Buena Creek Sprinter Station and additional housing units, including multiple RHNA sites.

Lakeside has multiple areas that are identified as efficient areas compared to the regional vehicle miles traveled (VMT) average. These areas are located immediately adjacent to the proposed El Cajon mobility hub. Expansion of the El Cajon mobility hub could include these VMT efficient areas as well as potentially including additional growth areas in Lakeside along the I-8 corridor.

Spring Valley is located east of the proposed Lemon Grove mobility hub and south of the proposed La Mesa mobility hub. This community has existing transit access along Jamacha Boulevard and is in close proximity to the MTS Trolley stations in Lemon Grove. Expansion of this mobility hub could include the Spring Valley areas near SR-125 and along Jamacha Boulevard.

Figure 1 Proposed Mobility Hub Expansions in North and East County



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ACTING ASSISTANT DIRECTOR

October 11, 2021

Kirsten Uchitel
Associate Planner
SANDAG
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Sent via email to: RegionalPlanEIR@sandag.org

RE: REQUEST FOR COMMENTS ON THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT FOR SAN DIEGO FORWARD: THE 2021 REGIONAL PLAN FOR SANDAG

Dear Ms. Uchitel,

The County of San Diego (County) staff reviewed SANDAG's Draft Programmatic Environmental Impact Report (Draft PEIR) for "San Diego Forward: The 2021 Regional Plan," dated August 2021. County staff provided detailed comments regarding the 2021 Regional Plan (Proposed Plan) in a letter previously submitted to SANDAG. The letter, dated August 6, 2021 (Attachment A), outlined opportunities within the Proposed Plan for which County staff requested further clarification, exploration, and consideration. County staff would like to continue discussions with SANDAG on how these opportunities align with the objectives of the proposed plan and the Draft PEIR.

To ensure that potential opportunities within the unincorporated area are not precluded in the future, County staff requests that SANDAG consider the comments below on the Draft PEIR and that any necessary refinements be reflected in Chapter 2, Project Description, and analyzed in the appropriate sections of the Final PEIR. County staff appreciates the opportunity to review the Draft PEIR for the Proposed Plan and offers the following comments for your consideration:

GENERAL

1. The Draft PEIR (Table 2-5) notes that 56% (1,855,597 out of 3,309,510 total people) of San Diego County residents are currently located outside of a Mobility Hub Network, including 512,597 people in the unincorporated area. With the significant investment described in the Proposed Plan, County staff would like to ensure that it is fairly and equitably distributed for the benefit of all County residents, including rural residents living in unincorporated communities.

2. Staff recommends the inclusion of potential investments in roads identified in the County's Mobility Element and in the Regional Arterial System that would further connect the unincorporated area to proposed mobility hubs, with consideration of those roads that also serve as evacuation routes.

3. Staff would also request consideration of how transit can be aligned with recreation access points to increase access to these important regional amenities.

4. The Proposed Plan focuses on mobility and land use changes that would serve three primary user groups: pedestrians, bicyclists, and vehicles. Please consider updating the analysis to consider mobility needs for wildlife (wildlife corridors) and for equestrians where appropriate.

5. From a social equity standpoint, please consider if allowing single occupancy vehicles should be permitted in managed lanes. Allowing single occupants that can afford to travel in managed lanes will create some inequities in the community.

AIRPORTS

1. The San Diego County Regional Airport Authority adopted Airport Land Use Compatibility Plans for the eight airports, which included land use compatibility policies related to airspace, noise, safety, and overflight. Those policies have been adopted by the County of San Diego through its General Plan and Zoning Code. After evaluating the forecasted increases in housing and jobs around the Mobility Hubs, there are several land use assumptions made in the Proposed Plan related to safety and noise around Fallbrook Airpark, Jacumba Airport, Gillespie Field, and McClellan--Palomar Airport that County staff would like to better understand. For example, there are forecasted incompatible housing increases within the Runway Protection Zones at Gillespie Field. These inconsistencies could result in making the assumed intensities and density increases included in the Proposed Plan unachievable.

AESTHETICS AND VISUAL RESOURCES

1. Page 4.1-10 of the Draft PEIR mentions the County of San Diego Dark Sky Ordinance and associated regulation of outdoor light fixtures within 15 miles of local observatories. This ordinance also includes the minimization of light pollution to reduce impacts to wildlife. Please consider expanding the analysis to address direct and indirect impacts due to light and glare on open space lands and wildlife corridors/linkages.

2. It is not clear what type of trees and vegetation will be used to replace impacted vegetation in cases where vegetation disruption causes potential aesthetic impacts (Mitigation Measures AES-2a, 2b, AES-3a). Mitigation Measure BIO-1e specifies that certain invasive species shall not be used to replace impacted vegetation. Please consider adding that same requirement to the Aesthetic/Visual Resources mitigation measures in the Draft PEIR.

BIOLOGICAL RESOURCES

1. Please clarify the significant reduction in acreages impacted between the 2015 EIR and the 2021 Draft EIR, especially as they relate to Wetlands and Riparian Habitat, Upland Habitat, Agricultural Land, and Transportation. The differences do not appear to correlate with the changes or updates made between the 2015 and 2021 Regional Plan.

2. On January 13, 2017, County staff submitted comments to SANDAG on the Notice of Preparation (NOP) of the Regional Plan Draft PEIR (Attachment B). In that letter, the County requested that SANDAG coordinate with County staff and evaluate in the Draft PEIR potential direct and indirect impacts on the Multiple Species Conservation Plan (MSCP). The comments related to the MSCP still stand (Attachment B). As such, it is not clear how the Proposed Plan would impact the MSCP, or if there is specific mitigation proposed to reduce these impacts. Please consider updating the analysis to clarify these potential impacts and associated mitigation.

3. Please ensure that maps are using the latest GIS data available from SanGIS, which is regularly updated. For example, the maps showing Open Space Parks and Recreation land (Figures 4.15-1 and 4.15-2) seem to be missing some of the County's Department of Parks and Recreation properties. Please ensure all references to County Department of Parks and Recreation properties are updated throughout the 2021 Draft PEIR.

4. Please consider including County parks and preserves and associated proposed project impacts to each specific park and preserve within the Draft PEIR; data on County parks and preserves can be found on SanGIS. For example, on Page 4.4-107, it states that the largest area of encroachment and associated impacts would occur on the Otay Ranch Preserve. However, the level and extent of that potential impact is not clear. Please coordinate in advance with the County Department of Parks and Recreation prior to implementation of projects that may have impacts to County parks and preserves.

5. The figures within the Draft PEIR do not show property ownership overlayed with the proposed project. To better understand and analyze potential impacts of the project, please consider the inclusion of a figure that shows County parks and preserves.

6. Please consider revising "Hardline Preserve" to "MSCP Preserve" throughout the Draft PEIR, as MSCP Preserve is the term most commonly used.

7. In Table 4.2-2 and Table 4.4-6, Otay Ranch and the associated General Development Plan/Subregional Plan are categorized as falling under the jurisdiction of the City of Chula Vista. While the text clarifies that Otay Ranch is jointly owned and managed by the City of Chula Vista and the County, the categorization in the tables is unclear. Please consider revising the tables to show the joint ownership and management of this area.

8. Figure 4.4-16, San Diego Conservation Planning Areas and Conserved Lands, does not appear to be consistent with the Subarea Plans under Adopted MSCP/MHCP Subregional Plans listed in Table 4.4-5. Please consider revising these to show all Subarea Plan Areas.

9. On page 4.4-107, Section BIO-4 Analysis Methodology, please consider updating the methodology to take into consideration requirements of the Public Park Preservation Act of

1971 (Public Resources Code Sections 5400-5409). In the event the Proposed Plan results in "take" of any County MSCP Preserve Lands, this would be considered "take" of designated park land and may require land or other compensation for loss of park land.

10. In Figures 4.4-3 through 4.4-8, one of the data sources for these figures is stated as the County of San Diego's SanBios data from 2017. Please consider using the County of San Diego's SanBios data through 2020, as this contains updated data.

11. Table 4.4-5 states that the County is pursuing an amendment to the South County Subarea Plan to include the Quino checkerspot butterfly (QCB). Please remove reference to QCB as the County has expanded the project to the Regional Butterflies Habitat Conservation Plan (RBHCP) to include a comprehensive approach that would cover QCB, Harbison's dun skipper, Hermes copper, and the Laguna Mountains skipper.

    a. Additionally, the RBHCP in currently being developed and has not yet been adopted. Therefore, reference to the RBHCP may not need to be included in Table 4.4-5 related to adopted regional conservation plans. Please consider removing the reference.

12. Given the significance and regional importance of wildlife corridors and wildlife linkages, please consider updating the analysis to consider areas where linkages and corridors could be impacted by the Proposed Plan and any mitigation measures that could be implemented to improve wildlife linkages.

13. Spread of invasive plants is a significant regional issue that many land managers face throughout the San Diego region. County staff supports Mitigation Measure BIO-1e, which would require a prohibition on planting or seeding of invasive species that appear on the most recent version of the California Invasive Plant Council California Invasive Plant Inventory. Please consider inclusion of an integrated invasive plant control plan with enforceable protocols for maintenance, construction, and emergency activities to follow when working within and moving between important habitat areas.

14. Section 4.4 has a description of the TransNet Environmental Mitigation Program (EMP) and states that the EMP provides funding for the acquisition, restoration, and management costs for the implementation of local Natural Community Conservation Plans (NCCPs). The EMP or other funding from TransNet may not provide a long-term regional funding source for conservation, including funding for the acquisition or ongoing management and monitoring. Please consider updating the PEIR to clarify that an adequate regional funding source has not yet been identified or put in place, which leaves local jurisdictions responsible for securing ongoing funding to implement local NCCPs.

CULTURAL RESOURCES

1. Please consider associated potential impacts on County parks and preserves related to cultural and historical resources. Staff understand that this is a PEIR, so please include the maximum possible area of impacts. Please coordinate in advance with the County Department of Parks and Recreation prior to implementation of projects that may have impacts to County parks and preserves and associated cultural and historical resources.

GEOLOGY, SOILS AND PALEONTOLOGY

1. The Grading and Erosion Regulations section does not identify and summarize applicable grading and erosion control ordinances. Applicable regulations are generally referenced to support a less-than-significant determination for thresholds (e.g GEO-3, Result in Substantial Soil Erosion or the Loss of Topsoil). The County's Grading Ordinance appears to only be referenced within the context of paleontological resources. Please consider also referencing the County's Grading Ordinance in the Grading and Erosion Regulations section.

2. Please consider revising Table 4.7-3 to reference the County of San Diego General Plan Goals S-8 and S-9. Local Policies Concerning Geologic and Seismic Hazards references Goal S-7, but it should read "The San Diego County General Plan Goal S-8 and S-9 in the Safety Element requires minimized personal injury and property damage resulting from seismic hazards, and damage caused by mudslides, landslides, or rock falls."

3. Within Table 4.7-4, Local Policies Concerning Unique Geological and Paleontological Features, for the County of San Diego, please consider including the following: "COS-9.1 Preservation. Require the salvage and preservation of unique paleontological resources when exposed to the elements during excavation or grading activities or other development processes."

4. The Draft PEIR states "there would be development on soils incapable of supporting septic tanks or Onsite Wastewater Treatment Systems (OWTS)." However, the analysis also states that through future corrective measures/regulatory requirements, impacts to groundwater would be less than significant. Please consider adding a discussion of which regulations would be applicable and how those regulatory requirements would ensure that there would be no adverse groundwater impacts.

GREENHOUSE GAS EMISSIONS

1. On January 13, 2017, the County submitted comments to SANDAG on the Notice of Preparation (NOP) of the Regional Plan Draft PEIR (Attachment B). At the time of these comments, the County was in the process of preparing the 2018 Climate Action Plan (CAP). Since the release of the NOP and submittal of these comments, County staff is now preparing a CAP Update that will set new greenhouse gas (GHG) emissions targets and identify measures to reduce GHG emissions in the unincorporated area. County staff would like to work collaboratively with SANDAG on the Proposed Plan to identify an efficient and cleaner multi-modal transportation system that reduces vehicle miles traveled for unincorporated area residents by providing mobility options, which would reduce greenhouse gas emissions, and improve air quality for all residents in the region (Attachment A). County staff requests that SANDAG consider the comments provided previously and listed below in the Draft PEIR.

    a. *Analyze alternatives that address multi-modal transportation options for the unincorporated county, particularly as it relates to transit service and alternative fuel infrastructure.* County staff would encourage SANDAG to consider extending the benefits of mobility hubs and transit leap opportunities to unincorporated communities in which these services do not currently exist.

b. *Analyze whether the developed/urban communities within the unincorporated county meet the Urban Area Transit Strategy.* The Urban Area Transit Strategy, considered in the previous 2050 Regional Transportation Plan, is not considered in this Proposed Plan and is replaced with broad concepts of Mobility Hubs. County staff is supportive of these efforts to centralize mobility investments for all users in urbanized areas. However, staff would encourage SANDAG to consider in the project description and analysis the potential for mobility hubs concepts that can be applied to unincorporated area communities that are not currently identified as being within and benefiting from mobility hubs and associated investments (Attachment A).

c. *Analyze an environmentally sustainable transportation system that can reduce vehicle miles traveled, gasoline consumption, and GHG emissions, while providing alternative modes of transportation for all economic sectors of our population.* County staff continues to encourage SANDAG to consider and identify sustainable transportation systems and strategies that can reduce vehicle miles traveled and GHG emissions from residents in unincorporated communities. For example, extending existing transit routes and reducing headways to increase transit service to unincorporated communities will encourage increased ridership, reduce vehicle trips, and will assist in decreasing GHG emissions.

d. *The County requests that SANDAG staff coordinate with County staff to ensure that the most recent planning assumptions are incorporated in the transportation models and growth forecasts.* It is not clear what projects or plans were considered and incorporated into the Proposed Plan modeling. However, there are some areas in which inconsistencies appear between approved development projects in the unincorporated area and projected growth identified in the Proposed Plan modeling. County staff relies on SANDAG population, housing, and job growth forecasts for planning efforts. As recently as July 2021, long-range planning efforts, such as the County's Housing Element Update, have relied on forecasts that project future housing growth in the unincorporated area of 50,184 new units between 2018 and 2050. These prior projections are significantly greater than the forecasted growth of 7,419 units during a similar time period in the Proposed Plan. Further, historic data shows that from 2010 to 2020, 7,330 new homes were built in the unincorporated area. If that trend continued, an additional 22,000 new homes would be built in the unincorporated area by 2050. County staff would appreciate continued coordination with SANDAG staff to ensure the most recent planning assumptions and projects are considered.

2. Based upon a review of the Draft PEIR, County staff encourages continued collaboration with SANDAG to ensure the most recent planning and land use assumptions (including approved development projects or those that are under construction) are reflected in regional modeling and growth forecasting. Through continued collaboration, the County can support the vision of the Proposed Plan by developing the CAP Update and related efforts based on similar assumptions and goals.

HAZARDS AND HAZARDOUS MATERIALS

1. Within Table 4.9-1 Major EnviroStor Hazardous Waste and Substances Sites in the San Diego Region, the list of sites does not appear to match the current Cortese list on the Department of Toxic Substances Control's (DTSC) website. Please consider adding a figure

to show where these sites are in relation to proposed land use changes and transportation improvements.

2. Threshold HAZ-1 seems to apply specifically for potential release of hazardous materials during pre-construction, demolition, or construction activities. However, the analysis in this section also discusses the potential for releases during operational activities. Please consider updating the mitigation measure to reduce the risk of hazardous materials releases during project operation.

HYDROLOGY AND WATER QUALITY

1. Please consider augmenting the analysis to consider potential water quality impacts that could affect sensitive wildlife species and their associated habitats.

LAND USE

1. The County's *Community Trails Master Plan* identifies multiple regional trails that are regional resources, as they would benefit residents and visitors throughout the region. Please consider how the potential transportation and land use changes could impact the connectivity of these regional trails. The County also requests that SANDAG consider further coordination with the County Department of Parks and Recreation during implementation of the Proposed Plan when potential regional and community trail impacts are anticipated. Additionally, please consider working with County staff to look for further opportunities to provide trail connections during implementation of transportation infrastructure projects where feasible.

PUBLIC SERVICES AND UTILITIES (RECREATIONAL FACILITIES)

1. Within the Section "County and City General Plans," please consider adding the County's Parkland Dedication Ordinance, Community Trails Master Plan, and County of San Diego Parks Master Plan to the Draft PEIR, as these are all resource documents that discuss regional trail and recreation facilities.

2. Page 4.15-42 and Page 4.15-45, Section REC-1:

    a. 2025
        i. The Regional Growth and Land Use Change section states that "*As noted under Threshold PS-1, approximately 78.8 percent of the 2025 population growth would occur within the City of San Diego, City of Chula Vista, and City of Escondido.*" Of the remaining 21.2 percent, it is unclear what portion is anticipated within the unincorporated County area. Please consider revising the PEIR to further clarify this.
        ii. Transportation Network Improvements and Programs section: Please consider adding a table showing areas of impacts to recreational facilities belonging to or within the County's jurisdiction. The PEIR does not appear to specify which County of San Diego Recreational Facilities are impacted by the proposed project.

b. 2035

i. As with the comment above under "2025," please consider revising the Regional Growth and Land Use Change section to show the percentage breakdown within the unincorporated area of the county.

ii. This section also states, *"Between 2026 and 2035, the majority of the open space conversions would occur as a result of growth and land use change in the Warner Springs area shown in Figure 4.15-2, which would convert 275 acres of open space parks to spaced rural residential* use." However, the analysis does not appear to explain the potential impact associated with this proposed loss of open space/park land. It should also be noted that this project is not yet approved and therefore may not result in open space conversion for additional growth and land use change(s). Please consider updating the analysis to take this into consideration and to further clarify and explain potential impacts.

3. Page 4.15-47, under REC-1 Implement Mitigation Measures Parks and other Recreational Facilities, please specify and/or provide information on the impacted facilities within the unincorporated areas of the county. Are there impacts to existing parks, campgrounds, trails, etc.? Please also consider including details of impacted County of San Diego facilities within the environmental document.

4. In the Pedestrian Facilities section of the Draft PEIR it states, "It should be noted that trail facilities are also considered part of the pedestrian network. The trail facilities within the San Diego region are further described and analyzed in Section 4.15, Public Services and Utilities, of this PEIR, along with other recreational facilities." Section 4.15 Public Services and Utilities further explains the trail facilities. However, the information is limited in that it only references the California Coastal Trail. Trails are an important aspect of the regional transportation network. Please consider updating the analysis to include existing trails and pathways and include this information as part of the pedestrian facilities assessment. The County's existing *Community Trails Master Plan* may be used as a reference document regarding regional trails.

TRANSPORTATION

1. If the boundaries of the proposed mobility hubs are not intended to be static, please include narratives and/or graphics to further clarify that the boundaries are not absolute.

2. County staff recommends that any 5 Big Moves pilot program or case study include and/or consider the unincorporated area (i.e. Flexible Fleet Strategic Plan).

3. Please coordinate with County staff in advance of transportation plans that go through or near County properties and facilities.

4. Regarding page 4.16-34, 4.16.3 SIGNIFICANCE CRITERIA, TRA-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including -transit, roadway, bicycle, and pedestrian facilities:

a. 2025: Transportation Network Improvements and Programs, under Pedestrian (page 4.16-34). Table 4.16-8 shows a Pedestrian Analysis table showing average daily walking trips, walking mode share, and average length of walking trip. It is unclear as to whether these include an assessment of trail system(s) and trail facilities. Please consider including trails as a part of this analysis.

b. 2035: Transportation Network Improvements and Programs, Same comment as 2025 above.

c. 2050: Transportation Network Improvements and Programs, Same comment as 2025 above.

Thank you again for the opportunity to comment on the Draft PEIR. County staff looks forward to continued discussions with SANDAG on how we can work together to better ensure that consideration is given to future investments and incentives that would result in expanded options for transit, active transportation, and shorter and fewer automobile trips. If you have any questions regarding these comments, please contact Luis Duran, Land Use/Environmental Planner, at (619) 214-4698, or via e-mail at luis.duran@sdcounty.ca.gov.

Sincerely,

Lynnette Tessitore

Lynnette Tessitore
Chief, Long Range Planning Division
Planning & Development Services

cc: Rosa Olascoaga, Policy Advisor, Board of Supervisors, District 1
Gregory Kazmer, Land Use Director, Board of Supervisors, District 2
Cody Petterson, Policy Advisor, Board of Supervisors, District 3
Emily Wier, Policy Advisor, Board of Supervisors, District 4
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Luis Pallera, CAO Staff Officer, LUEG
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January 13, 2017

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COMMENTS ON THE NOTICE OF PREPARATION OF A PROGRAM ENVIRONMENTAL IMPACT REPORT FOR SAN DIEGO FORWARD: THE REGIONAL PLAN

Dear Mr. Martin,

The County of San Diego (County) has reviewed the Notice of Preparation for the San Diego Forward Regional Plan Program Environmental Impact Report (PEIR). We appreciate the opportunity to provide input for SANDAG's consideration. The County offers the following comments.

TRAFFIC/TRANSPORTATION

The County is currently developing an Active Transportation Plan (ATP) for the unincorporated communities of the county. The ATP will integrate and update several existing plans and documents into a single plan. The ATP will serve as a master plan and policy document to guide the development and maintenance of active transportation infrastructure including sidewalks, pathways, multi-use trails, and bikeways; the ATP will include the Safe Routes to School programs for the unincorporated county. Additionally, the ATP is expected to be one of the implementation measures for the County's Climate Action Plan. Please consider identifying transit improvements and ATP and Transportation Demand Measures (TDM) in the SANDAG Regional Plan and PEIR which will assist the rural unincorporated areas in meeting the region's greenhouse gas (GHG) emission goals.

AIRPORTS

Incorporating the Regional Aviation Strategic Plan (RASP) and Airport Multimodal Accessibility Plan (AMAP) assumptions into the development of the Regional Plan is an important part of planning for the region's future transportation needs. Aviation travel is expected to grow substantially according to projections from the San Diego Regional Airport Authority and SANDAG. Please consider prioritizing the ground transportation network surrounding McClellan-Palomar and Gillespie Field airports to accommodate increased demand as San Diego International Airport nears operational capacity.

CLIMATE CHANGE AND GREENHOUSE GAS

The County is currently developing a Climate Action Plan for the unincorporated county. The largest GHG emission source in the region is the Transportation Sector. The County looks towards the Regional Plan to lead the efforts in reducing GHG emissions in the Transportation Sector. The recommendations noted are important for the local jurisdictions in meeting their share of the region's GHG emission reductions. The County and SANDAG, working collaboratively on the Regional Plan, can move towards an efficient and cleaner multi-modal transportation system. As it relates to SANDAG's Regional Plan, the County requests the following be considered:

a. Analyze alternatives that address multi-modal transportation options for the unincorporated county, particularly as it relates to transit service and alternative fuel infrastructure;

b. Analyze whether the developed/urban communities within the unincorporated county meet the Urban Area Transit Strategy;

c. Analyze an environmentally sustainable transportation system that can reduce vehicle miles traveled, gasoline consumption, and GHG emissions, while providing alternatives modes of transportation for all economic sectors of our population;

d. Clarify whether the Regional Plan GHG emission reductions will be consistent with the Air Resources Board (ARB) 2030 Target Scoping Plan; and

e. SANDAG's 2015 Regional Transportation Plan incorporated the County's 2011 General Plan Update Land Use and Mobility Elements. Since 2011, the County has adopted several general plan amendments (GPA) to the 2011 General Plan. The County requests that SANDAG staff coordinate with County staff to ensure that the adopted GPAs are incorporated in the transportation models and growth forecasts for the Regional Plan and PEIR Analysis.

MULTIPLE SPECIES CONSERVATION PLAN (MSCP)

The proposed Regional Plan covers areas that are critical to the County's Multiple Species Conservation Program (MSCP), both North and South County plans—including the assembly of a Preserve in each. The South County Subarea Plan was adopted in 1997; and the North County Plan is currently in development. As the Regional Plan encourages projects that are consistent with an SCS that achieves GHG reductions, we would anticipate that the PEIR would analyze the effects of the proposed Regional Plan on the MSCP South and North County plans, the assembly of the Preserve and full implementation of the plans. Any effect (direct or indirect) of the Regional Plan on the MSCP should be evaluated (and mitigated, if necessary). SANDAG staff should coordinate with County staff to best determine how to evaluate the MSCP South and NC Plan in the upcoming Regional Plan and PEIR.

PARKS AND RECREATION

The County's trails and pathway network provides safe, secure, healthy, affordable, and convenient travel choices between the places where people live, work, and play while reducing use of personal vehicles, thereby reducing GHG emissions. Please consider incorporating a discussion of the County's Community Trails Master Plan and encourage investment in trails and pathways that connect people with places where they live, work, and play.

VECTOR CONTROL PROGRAM

The County's Vector Control Program (VCP) is responsible for the protection of public health through the surveillance and control of mosquitoes that are vectors for human disease including West Nile virus (WNV). The VCP has completed their review and has the following comments regarding the Regional Plan.

1. The VCP requests that when implementing transportation projects or components of the environmental mitigation program, impacts from possible mosquito breeding sources are considered. Any area that is capable of accumulating and holding at least ½ inch of water for more than 96 hours can support mosquito breeding and development.

2. For your information, the County's Guidelines for Determining Significance for Vectors can be accessed at http://www.sandiegocounty.gov/content/dam/sdc/pds/docs/vector_guidelines.pdf.

3. The California Department of Public Health Best Management Practices for Mosquito Control in California is available at http://www.cdph.ca.gov/HealthInfo/discond/Documents/BMPforMosquitoControl07-12.pdf.

The County looks forward to receiving future documents and/or notices related to this project and providing additional assistance at your request. If you have any questions regarding these comments, please contact Danny Serrano, Land Use / Environmental Planner at (858) 694-3680, or via email at daniel.serrano@sdcounty.ca.gov.

Sincerely,

MARY KOPASKIE, Chief
Advance Planning Division
Planning & Development Services

Email cc: Michael De La Rosa, Policy Advisor, Board of Supervisors, District 1
Adam Wilson, Policy Advisor, Board of Supervisors, District 2
Dustin Steiner, Chief of Staff, Board of Supervisors, District 3
Adrian Granda, Policy Advisor, Board of Supervisors, District 4
Melanie Wilson, Policy Advisor, Board of Supervisors, District 5
Vincent Kattoula, CAO Staff Officer, LUEG
Nick Ortiz, Project Manager, PDS
Everett Hauser, Transportation Specialist, PDS
Bulmaro Canseco, Planner, PDS
Jeff Kashak, Planner, DPW
Richard Chin, Associate Transportation Specialist, DPW
Eric Lardy, Chief, Community Health Division, DEH

Reference

Provided by Dwight Worden

OPINION

Guest commentary: The road user charge has a place in our future transportation planning — at least for now

(File photo)

BY DWIGHT WORDEN

DEC. 2, 2022 2:56 PM PT

This guest commentary presents my personal opinions and does not necessarily reflect the views of my city or city council colleagues. *(1, see bottom)*

We need to reduce greenhouse gas (GHG) emissions: San Diego needs to reduce GHG emissions for our future survival and quality of life, and to avoid severe state and federal penalties if we don't. Transportation is the largest source of GHG emissions in our region at about 40% so we need to work on that sector.

The solution is a revamped transportation system: SANDAG has a comprehensive plan *(2, see bottom)* to do just that. It includes road and freeway projects, new rail service, improved bus service, accommodation for autonomous vehicles, support for electric vehicles, transit to serve work and other commuters, first and last mile options, bicycle and walking projects, environmental enhancements, and more. It will reduce our GHG emissions and meet local, state, and federal requirements. It will improve transportation options for everybody, reduce commute times, improve air quality, reduce congestion, and improve all aspects of our quality of life.

The challenge is money: What does it cost and how will we pay for it? $160 billion over the next 30 years is the cost estimate. Before you choke on that number, recognize that it is estimated that climate change left unaddressed will cost the U.S. $2 trillion per year *(3, see bottom)*. So, think of the RTP in terms of its avoided costs. From a cost benefit point of view it's our least expensive option.

Payment strategies proposed in the RTP include a series of 1 or ½ cent sales tax ballot measures, use of TRANSNET funds, and federal and state funds. Nobody likes more taxes, but they will be subject to vote on the ballot. San Diego County voters already, twice, approved TRANSNET taxes to improve our transportation system. San Diegans know how to vote "yes" for a good plan and we know how to vote "no" on a bad one.

The Road User Charge or RUC. The RUC has garnered more attention than it deserves. Of the $160 billion RTP price tag the RUC would account for only about $14 billion or 9%. So, what is it and why is it so controversial?

A RUC is a charge by mile to use the road system.

—Current gas taxes are a RUC. While we may not call it a RUC, current gas taxes (5.6% or about 54 cents a gallon at current prices) are a form of RUC. You pay these taxes every time you fill up for the right to drive our road systems. The funds are used to improve and maintain our roads. The more you drive the more you pay. Toll roads are also a current form of RUC. RUCs are not new.

Problems with gas taxes.

—We are transitioning to electric vehicles. Transitioning away from gas to EV cars and trucks is a good thing. But, EVs don't buy gas so they don't pay gas taxes. Currently, they use the road system for free. Gas taxes to build and repair roads are declining and are not a sustainable source to take care of our roads.

—Gas taxes are inequitable. Even used EVs are expensive. It is the well healed who can afford Teslas and other EVs. It's the middle class and working poor who are stuck paying gas taxes with older, poor mileage, gas burners. Why would we burden this sector with the sole cost of road maintenance? That's wrong on many levels.

The solution: Replace gas taxes by transitioning to a system where everyone, including EVs, pays as they drive. That's called a Road User Charge.

—Such a system restores equity and sustainability. EV drivers and gas burners all pay to maintain our road system based on how much they use the road system. That's sustainable and it's fair.

—Gas taxes will continue to decline as more and more EVs take to the road. Those taxes need to be replaced if we value our road systems. Some type of RUC can be the answer. Done right, the overall cost to drive will go down as we replace gas taxes with lower user charges under a system where everyone pays a fair share including wealthy EV drivers.

—Nobody supports the current gas tax system plus a RUC on top, yet that is what some opponents would have you believe. These opponents create a straw man and then show it no mercy! A more productive discussion addresses what is actually proposed: developing a RUC that will work in San Diego to transition away from gas taxes to a system where everyone pays and the overall cost of driving for everyone can go down.

The RUC in the plan is a placeholder. The RUC in the RTP is a conceptual placeholder to pay for a small part (9%) of overall RTP costs.

—It's only a concept. We can't implement a RUC without state legislation that doesn't exist.

— If the state authorizes RUCs in the future, we will figure out the specifics of a RUC that will work for San Diego. That's what the RTP proposes. If we can't build consensus we can drop it or the voters can reject it.

— It's a mistake to take it off the table now before we even know what it will be.

I support the RUC concept set out in the RTP. I support studying it and developing specifics. Will I support its implementation? I can't say until we put flesh on the proposal. If it shows me that, overall, driver costs will come down, it is more equitable, and is sustainable, I will support it. If not, I won't.

Let's be realistic. If we want to meet climate goals and avoid state and federal penalties we need a plan like the RTP and a way to pay for it. Let's keep the RUC on the table for further study.

1. Dwight Worden is the current Mayor of the City of Del Mar and is a retired land use, environmental, and government attorney.

2. The 2050 Regional Transportation Plan or RTP adopted in December 2021.

3. https://www2.deloitte.com/global/en/pages/about-deloitte/press-releases/deloitte-research-reveals-inactionon-climate-change-could-cost-the-world-economy-us-dollar-178-trillion-by-2070.html

OPINION

MORE ON THE SUBJECT

OPINION

Opinion/Letters to the Editor December 2022

OPINION

Opinion/Guest commentary: Give attention to your local elections

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OPINION

Opinion/Letters to the Editor October 2022

OUR COLUMNS

Opinion: Education Matters: When a map resolution isn't about a map

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OPINION

Guest commentary: The Road to La Grecia

OPINION

Opinion/Letters to the Editor June, July, August, September 2022

Submit a letter to the editor

LATEST NEWS

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High Tide Cullivan undefeated at the Don Battles On Showcase Tournament

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Review: Updated ‘To Kill a Mockingbird’ play makes a fierce and powerful statement against racism

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ARTS & ENTERTAINMENT

The not-so-silent nights of a John Waters Christmas

EVENTS

Solana Beach Friends of the Library to present a musical evening

---

EVENTS

Dec. 1: Local and regional events

Appendix F.3

Attached References to Comments on the Draft SEIR

References provided by Mike Bullock

Resolution 22-01

Resolution of the Oceanside Bicycle and Pedestrian Committee in Support of Replacing the State Gas Tax with a Means-Based Road Use Charge (RUC) that Protects Privacy

WHEREAS, (1) Greenhouse gas (GHG) emissions must be significantly reduced by 2030 to mitigate a climate catastrophe; (2) about 40% of California's GHG is emitted by on-road vehicles; and (3) even given the most ambitious estimates for fleet efficiency and fleet electrification, to support climate-stabilization requirements, it will be necessary to reduce per-capita driving; and furthermore,

WHEREAS, (1) California's current road-use fees (our gas tax, our toll roads and our bridge-use tolls) do not currently cover the full cost of operating and maintaining roads, and gas tax revenues are projected to further decrease as vehicles become more efficient and/or electric powered; (2) having the full cost of motor vehicle road use hidden from users decreases incentives to bicycling and walking, thereby increasing driving and, thus adding significantly to air pollution, congestion, sprawl, and GHG emissions; (3) an assessment conducted by the California Transportation Commission (CTC) found that 58 percent of our state's roads are in need of maintenance, 20 percent of our bridges need major or preventive maintenance, and 6 percent of our bridges require replacement; (4) roads and bridges are our most important cycling infrastructure; and (5) a RUC has been shown to be feasible by the CTC; and finally,

WHEREAS, (1) our gas tax is our most significant road-use fee; (2) state-mandated increases in battery-electric vehicles will reduce gas-tax revenue; (3) a gas tax is inherently regressive because low-income drivers tend to drive older, less fuel-efficient cars; and (4) a gas tax does not account for time, place, driver income, vehicle weight, vehicle pollution level, or instantaneous roadway congestion;

THEREFORE, BE IT RESOLVED, that the Oceanside Bicycle and Pedestrian Committee supports replacing the state gas tax with a road-use charge (RUC) pricing and payout system that (1) would cover all road-use costs; (2) would protect the economic interests of low- and middle-income drivers by use of a progressive price structure that also recognizes the needs of rural drivers; (3) would protect privacy by requiring a search warrant to obtain location or travel information and has built in safeguards against unauthorized data use; (4) would include an instantaneous congestion-pricing algorithm; (5) would ensure that the per-mile price incentive to drive energy-efficient cars would still be sufficient to support necessary fleet electrification; (6) would ensure that cyclists and pedestrians are not charged under the system, given that they contribute no emissions or wear-and-tear on the road system, and they help alleviate congestion.

BE IT FURTHER RESOLVED, that this support be communicated to the City of Oceanside.

Approved by a majority vote of those present at the March 14, 2022 Committee Meeting:

Tom Lichterman — Tom Lichterman, Chairman

March 14, 2022 — Date

November 17, 2021

SANDAG Board of Directors
401 B Street
San Diego, CA 92101

RE: Road Use Charges

Dear Chair Blakespear and SANDAG Board Members:

Recently there has been some public discussion of a proposed Road Use Charge (RUC), also known as a Vehicle Miles Traveled Fee (VMTF) included in the funding discussion in the current draft of the Regional Plan. The undersigned members of the Quality of Life Coalition support the concept of a Road Use Charge as part of a funding solution for transportation projects. We believe that a revised RUC would be more effective and equitable than current approaches to transportation funding, as explained below.

First, it is important to acknowledge that we already have a road use charge, known as the gas tax. There are both state and federal excise taxes included in the price we pay for gasoline and diesel fuel. These taxes have been in place for many years. Originally, they covered much of the cost of building and maintaining roads. However, because they were defined as cents per gallon, they failed to keep pace with inflation, and their real value has been steadily declining. They now cover only about one third of the costs of building and maintaining our road network. The rest of the cost must be taken from other tax revenue such as income, property, and sales taxes.

When the gas tax was first imposed, it was a reasonable approximation of road use. People who drove more, or who drove heavier vehicles, paid more. As fuel economy started to improve after the oil price shocks of the 1970's, the gas tax became less equitable as drivers of newer, more efficient cars paid less, and drivers of less efficient cars paid more.

That gradual decline in both equity and effectiveness was accelerated by the introduction of hybrid cars, which saw huge gains in fuel efficiency, and finally completely upended by the introduction of all-electric cars. Drivers of plug-in battery electric cars pay no gas tax at all, although they continue to contribute to wear and tear of the road network.

The current system is patently unfair and unsustainable. Roads are expensive and must be maintained. Gas tax revenue will continue to decline toward insignificance, even as the cost of maintaining our

highway network continues to rise. Drivers of older internal combustion engine (ICE) cars will be paying a larger and larger share of the costs.

Transportation planners at the Federal Government and many states, including California, are looking at potential ways to implement an equitable revenue stream to replace the current falling gas taxes. It is clear that some other form of Road Use Charge will need to be implemented to replace the current Gas Tax RUC.

Various approaches are under consideration, but there is not currently a detailed proposal to replace the existing system. Opponents are citing various "issues" based on speculation about what a system might look like. We believe that it is more important to identify the characteristics that would be desirable in a replacement for the current RUC.

Here are some suggestions about what a replacement RUC should do:

Equity

Low-income drivers tend to drive older, less fuel-efficient cars, and therefore pay for a disproportionate amount of road maintenance and repair. On the other hand, EVs are expensive and inaccessible for many, and will be accessed first by higher-income drivers, who will avoid paying for road maintenance and repair under the current gas tax system.

The RUC should cover a substantial fraction, but not all, of the costs. Everyone benefits from having a network of roads, including people who never drive on them, so some of the cost should be covered by general revenue.

The RUC implementation should allow for adjustments for a variety of factors to ensure fairness.

All road users should pay their fair share of the costs. The RUC should be based on the number of miles driven, and not how the vehicle is powered. Heavier vehicles cause more road wear and damage, so they should pay more.

Local Control

A portion of the RUC should be collected and disbursed locally, not at the whim of politicians in Sacramento or DC. SANDAG is best positioned to collect and distribute local RUC proceeds because they are governed by the Board members, who are accountable to the voters.

For More Information

As you may know, California has conducted a pilot project to learn more about Road Use Charges. Participants:

- Drove more than 37 million miles,
- 73 percent felt that road charging was more equitable than a gas tax,
- 87 percent of participants found the pilot to be easy,
- 85 percent were overall satisfied with the pilot, and,
- 91 percent expressed willingness to participate in another road charge pilot.

Much more information about the pilot program is contained in the final report at:
https://dot.ca.gov/-/media/dot-media/programs/road-charge/documents/rcpp-final-report-a11y.pdf

Caltrans has a web site with information on road use charges at https://caroadcharge.com/about

The Pew Trust reported in September on a new expansion of the pilot program at: https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/09/28/california-expands-road-mileage-tax-pilot-program

For more detailed analysis on Road Use Charges, please see the Information and Technology Innovation Foundation's policy makers guide on Road Use Charges. (https://itif.org/publications/2019/04/22/policymakers-guide-road-user-charges) It concludes with:

"Road user charges are the most viable and sustainable long-term 'user pay' option for the federal government to both raise adequate and appropriate revenues and provide the federal share of funding for the nation's surface transportation system.

David Grubb, Transportation Chair, Sierra Club San Diego

Pam Heatherington, Board Member, The Environmental Center of San Diego

Bee Mittermiller, Transportation Co-Chair, San Diego 350

Steven Gelb, Transportation Co-Chair, San Diego 350

William Rhatigan, Advocacy Manager, San Diego County Bicycle Coalition

Noah Harris, Transportation Policy Advocate, Climate Action Campaign

Deriving a Climate-Stabilizing Solution Set of *Fleet-Efficiency* and *Driving-Level* Requirements, for Light-Duty Vehicles in California

Paper #796315

Mike R. Bullock
Retired Satellite Systems Engineer, 1800 Bayberry Drive, Oceanside, CA 92054

ABSTRACT

An Introduction is provided, including the importance of light-duty vehicles (LDVs: cars and light duty trucks) and the top-level LDV requirements to limit their carbon dioxide ("CO2") emissions.

Climate crisis fundamentals are presented, including its cause, its potential for harm, California mandates, and a greenhouse gas (GHG) reduction road map to avoid disaster.

A 2030 climate-stabilizing GHG reduction target value is calculated, using statements by climate experts. The formula for GHG emissions, as a function of per-capita driving, population, fleet CO2 emissions per mile, and the applicable low-carbon fuel standard is given. The ratio of the 2015 value of car-emission-per-mile to the 2005 value of car-emission-per-mile is obtained.

Internal Combustion Engine (ICE) mileage values from 2000 to 2030 are identified, as either mandates or new requirements. A table is presented that estimates 2015 LDV fleet mileage.

Zero Emission Vehicle (ZEV) parameters are given. Methods are derived to compute equivalent 2030 mileage. Four cases are defined and overall equivalent mileage is computed for each. Those equivalent fleet mileage values are used to compute their corresponding required per-capita driving reductions, with respect to 2005. Measures to achieve the most reasonable per-capita driving reduction are described, with reductions allocated to each measure.

A conclusion is presented.

INTRODUCTION

Humanity's top-level requirement is to stabilize our climate at a livable level. This top-level requirement must flow down to cars and light-duty trucks, also known as Light-Duty Vehicles (LDVs), due to the significant size of their emissions. As an example, LDVs emit 41% of the GHG in San Diego County[1].

From a systems engineering perspective, the needed top-level LDV requirements are an upper bound on greenhouse gas (GHG) emissions per mile driven, applicable to all of the vehicles on the road, in the year of interest, and an upper bound on per-capita driving, given population growth. These two upper bounds must achieve the climate-stabilizing GHG emission target level. This paper will do a calculation of required driving levels, based on calculations of how clean our cars and fuels could be, predicted population growth, and the latest, science-based, climate-

stabilizing target, or requirement. All three categories of LDV emission-reduction strategies will be used: cleaner cars, cleaner fuels, and less driving. Four cases will be considered.

BACKGROUND: OUR CLIMATE PREDICAMENT

Basic Cause

Our climate crisis exists primarily because of these two facts[2]: First, our combustion of fossil fuels puts "great quantities" of CO_2 into our atmosphere; second, atmospheric CO_2 traps heat.

California's Primary CO2_e Emission-Reduction Mandates

California's Governor's Executive Order S-3-05[3] is based on the greenhouse gas (GHG) reduction limits that were recommended by climate scientists, for industrialized nations, in 2005. In 2005, climate scientists believed that if the industrialized nations of the world achieved the reduction-targets of S-3-05 (and other nations did something less), the Earth's climate could be stabilized at a livable level, with a reasonably high level of certainty. More specifically, this executive order aims for an average, over-the-year, atmospheric, temperature rise of "only" 2 degree Celsius, above the preindustrial temperature. It attempts to do this by limiting atmospheric CO_2_e to 450 PPM by 2050 and then reducing emissions further, so that atmospheric levels would come down to more tolerable levels in subsequent years. The S-3-05 emission targets are the 2000 emission level by 2010, the 1990 level by 2020, and 80% below the 1990 level by 2050.

It was thought that if the industrialized world achieved S-3-05 (and the non-industrialized world achieved an easier task), there would be a 50% chance that the maximum temperature rise will be less than 2 degrees Celsius, thus leaving a 50% chance that it would be larger than 2 degrees Celsius. A 2 degree increase would put over a billion people on the planet into a position described as "water stress" and it would mean a loss of 97% of our coral reefs.

There would also be a 30% chance that the temperature increase would be greater than 3 degrees Celsius. A temperature change of 3 degree Celsius is described in Reference 3 as being "exponentially worse" than a 2 degree Celsius increase.

The second California climate mandate is AB 32, the *Global Warming Solutions Act of 2006*. It includes provisions for a cap and trade program, to ensure meeting S-3-05's 2020 target, which is to be emitting at no more than the 1990 level of emissions. AB 32 was to continue after 2020. AB 32 required CARB to always implement measures that achieved the maximum *technologically feasible and cost-effective* (words taken from AB 32) greenhouse-gas-emission reductions.

In 2015 Governor Brown signed B-30-15. This Executive Order established a mandate for 40% below 2020 emissions by 2030, as can be seen by a Google search. If S-3-05 is interpreted as a straight line between its 2020 and its 2050 targets, then the B-30-15 target of 2030 is the same as the S-3-05 implied target of 2035, because 2035 is halfway between 2020 and 2050 and 40% is halfway to 80%. More recently, California adopted SB 32, which made achieving B-30-15 legally binding. Finally, in 2018, the Governors Executive Order B-55-18 established a mandate of zero net emissions by the year 2045.

California achieved the second GHG emission target of S-3-05 (to emit at the 1990 level by 2020) in 2018, which is two years early. However, the world emission levels have, for most years, been increasing, contrary to the S-3-05 trajectory. Because the world has been consistently failing to follow S-3-05's 2010-to-2020 trajectory, if California, still wants to lead the way to human survival, it must do far better than S-3-05, going forward, as will be shown.

Failing to Achieve these Climate Mandates

What could happen if we fail to achieve S-3-05, AB 32, and B-30-15 or if we achieve them but they turn out to be too little too late and other states and countries follow our example or do less?

It has been written[4] that, "A recent string of reports from impeccable mainstream institutions - the International Energy Agency, the World Bank, the accounting firm of PricewaterhouseCoopers - have warned that the Earth is on a trajectory to warm by at least 4 Degrees Celsius and this would be incompatible with continued human survival."

It has also been written[5] that, "Lags in the replacement of fossil-fuel use by clean energy use have put the world on a pace for 6 degree Celsius by the end of this century. Such a large temperature rise occurred 250 million years ago and extinguished 90 percent of the life on Earth. The current rise is of the same magnitude but is occurring faster."

Pictures That Are Worth a Thousand Words

Figure 1 shows (1) atmospheric CO_2 (in blue) and (2) averaged-over-a-year-then-averaged-over-the surface-of-the-earth, atmospheric temperature (in red). This temperature is with respect to a recent preindustrial revolution value. The data starts 800,000 years ago. It shows that the current value of atmospheric CO_2, which is over 410 PPM, far exceeds the values of the last 800,000 years. It also shows that we might expect the corresponding temperature to eventually be over 12 degrees above preindustrial temperatures. This would bring about a human disaster[3, 4, 5].

Figure 2 shows the average yearly temperature (in blue) with respect to the 1960-to-1990 baseline temperature. It also shows atmospheric levels of CO_2 (in red). The CO2 spike of Figure 1 is seen on Figure 2 to be an accelerating ramp up, starting at the time of our industrial revolution. The S-3-05 goal of 450 PPM is literally "off the chart", in Figure 2. Figure 2 shows that, as expected, temperatures are starting to rise along with the rising levels of CO_2. The large variations in temperature that are observed are primarily due to the random nature of the amount of solar energy being received by the earth.

FURTHER BACKGROUND: CALIFORNIA'S SB 375 AND AN IMPORTANT DATA SET

As shown in the Introduction, LDVs emit significant amounts of CO_2. The question arises: will driving need to be reduced or can cleaner cars and cleaner fuels arrive in time to avoid such behavioral change? Steve Winkelman, of the Center for Clean Air Policy (CCAP), worked on this problem and his results probably inspired California's SB 375.

SB 375, the *Sustainable Communities and Climate Protection Act of 2008*

Under SB 375, the California Air Resources Board (CARB) has given each Metropolitan Planning Organization (MPO) in California driving-reduction targets, for the years 2020 and 2035. "Driving" means yearly, per capita, vehicle miles travelled (VMT), by LDVs, with respect to 2005. The CARB-provided values are shown at this Wikipedia link, http://en.wikipedia.org/wiki/SB_375. It is important to note that although this link and many other sources show the targets to be "GHG" and not "VMT", SB 375 clearly states that the reductions are to be the result of the MPO's Regional Transportation Plan (RTP), or, more specifically, the Sustainable Communities Strategy (SCS) portion of the RTP. Nothing in the SCS will improve average mileage. That will be done by the state and federal governments by their Corporate Average Fleet Efficiency (CAFÉ) standards and any other laws or regulations that they might adopt. The SCS can only reduce GHG by reducing VMT.

Figure 1 Atmospheric CO_2 and Mean Temperature from 800,000 Years Ago

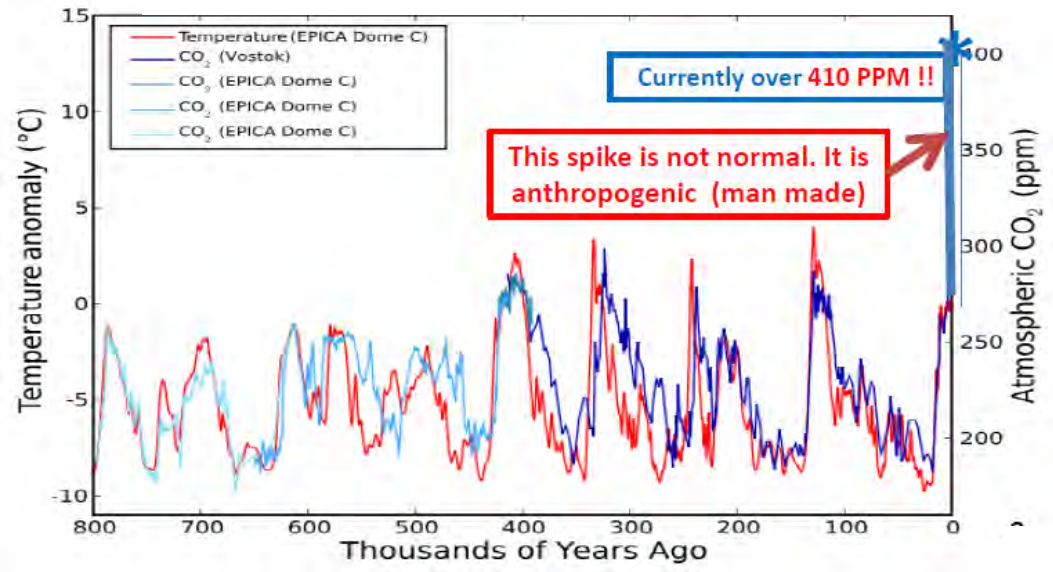
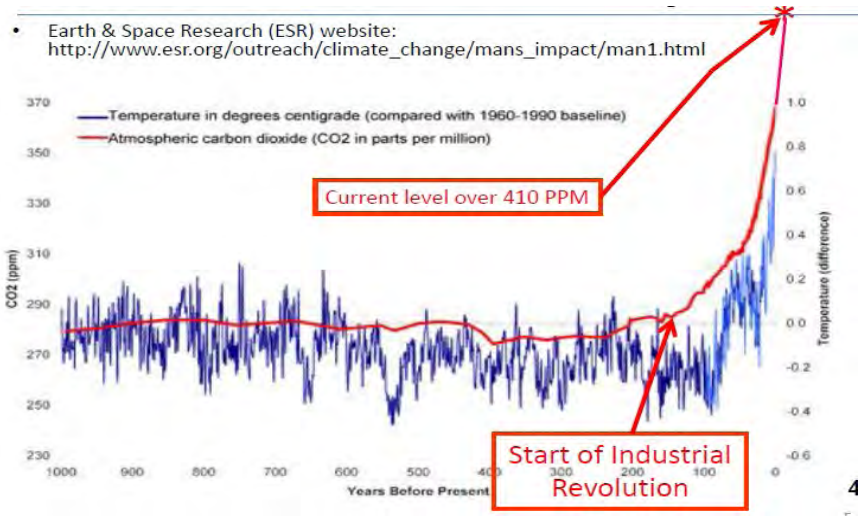


Figure 2 Atmospheric CO_2 and Mean Temperature, Over the Last 1,000 Years



Under SB 375, every Regional Transportation Plan (RTP) must include a section called a Sustainable Communities Strategy (SCS). The SCS must include driving reduction predictions corresponding to the CARB targets. Each SCS must include only *feasible* transportation, land use, and transportation-related policy data. If the SCS driving-reduction predictions fail to meet the CARB-provided targets, the MPO must prepare an Alternative Planning Strategy (APS). An APS uses *infeasible* transportation, land use, and transportation-related policy assumptions. The total reductions, resulting from both the SCS and the APS, must at least meet the CARB-provided targets.

Useful Factors from Steve Winkelman's Data

Figure 3[6].shows 5 variables as a percent of their 2005 value and also the 1990 emission value (turquoise) related to the 2005 CO2 emission value (the blue line). All of the variables are for LDVs. The year 2005 is the baseline year of SB 375. The red line is the Caltrans prediction of VMT. The purple line is California's current mandate for a Low Carbon Fuel Standard (LCFS). The LCFS also can be used to get the equivalent mileage from the actual mileage by dividing the actual mileage by the LCFS. The LCFS can be used to get the equivalent CO2 per mile driven by multiplying the actual CO2 per mile driven by the LCFS. As shown, by 2020, fuel in California must emit 10% less per gallon than in 2005. As written above, the turquoise line is the 1990 GHG emission in California. As shown, it is 12% below the 2005 level. This is important because S-3-05 specifies that in 2020, state GHG emission levels must be at the 1990 level. The green line is the C02 emitted per mile, as specified by AB 1493, also known as "Pavley 1 and 2" named after Senator Fran Pavley. The values shown do not account for the LCFS. The yellow (or gold) line is the S-3-05 mandate, referenced to 2005 emission levels. The blue line is the product of the red (miles), the green (CO2 per mile), and the purple line (LCFS, which reduces emission per mile) and is the percentage of GHG emissions compared to 2005. Since VMT is not being adequately controlled, the blue line is not achieving the S-3-05 line. Figure 3 shows that driving must be reduced. For this reason, Steve Winkelman can be thought of as the true father of SB 375.

Figure 3 **The S-3-05 Trajectory (the Gold Line) AND the CO_2 Emitted from Personal Driving (the Blue Line), where that CO_2 is a Function (the Product) of the California-Fleet-Average CO_2 per Mile (the Green Line), The Predicted Driving (VMT, the Red Line), and the Low-Carbon Fuel Standard (the Purple Line)**

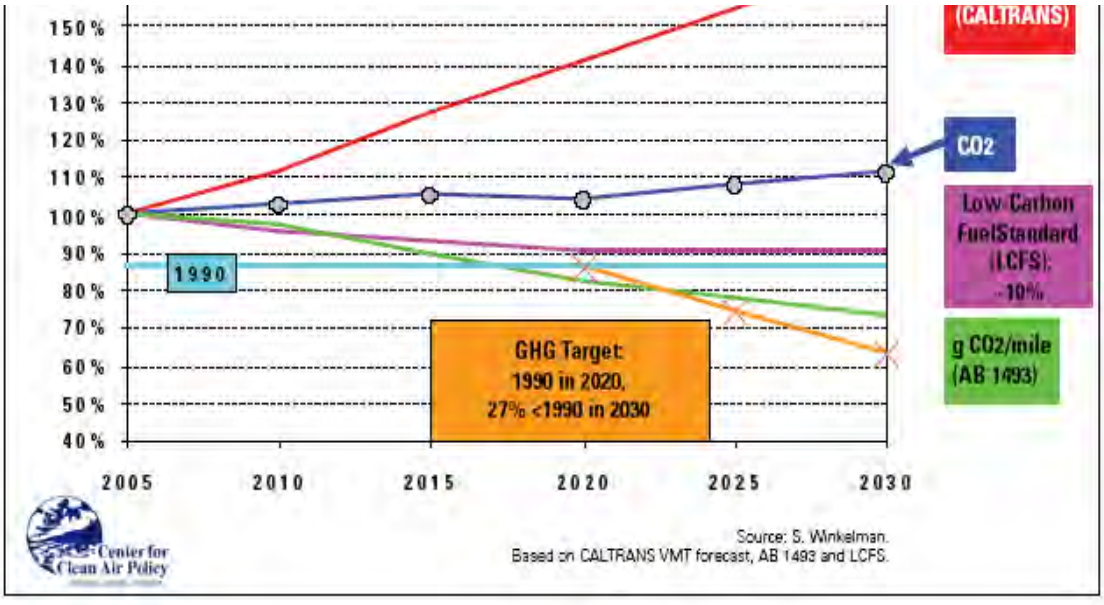


Figure 3 provides inspiration for a road map to climate success for LDVs. Climate-stabilization targets must be identified (from the climate scientists) and achieved by a set of requirements that will increase fleet efficiency and another set that will reduce per-capita driving.

THE DERIVATION OF CALIFORNIA'S TOP-LEVEL LDV REQUIREMENTS TO SUPPORT CLIMATE STABILIZATION

It is clear that more efficient (less CO2 emitted per mile) LDVs will be needed and this can be achieved with appropriate requirements. Significant improvements in efficiency will be needed if driving reductions are going to remain within what many people would consider politically achievable. Mileage and equivalent mileage will need to be specified. A significant fleet-fraction of Zero-Emission Vehicles (ZEVs, either Battery-Electric LDVs or Hydrogen Fuel Cell LDVs) will be needed. Since mileage and equivalent mileage are more heuristic than CO2 emissions per mile, they will be used in the derivations. CO2 per mile driven will not appear in the final equations.

Since the SB-375 work used 2005 as the reference year, that convention will be used. It will be assumed that cars last 15 years.

GHG Emission Target to Support Climate Stabilization

The primary problem with S-3-05 is that California's resolve and actions have been largely ignored by other states, our federal government, and many countries. Therefore, rather than achieving 2000 levels by 2010 (the first target of S-3-05) and 1990 levels by 2020 (the 2nd target of S-3-05), world emission has been increasing for nearly all of the years since 2010. (California, on the other hand achieved its 1990 emission level in 2018. This is two years sooner than the 2nd target of the S-3-05 requirement.) Reference 7 states on Page 14 that the required rate of reduction, if commenced in 2020, would be 15%. That rate means that the factor of 0.85 must be achieved, year after year. If this were done for 10 years, the factor would be $(0.85)^{10} = 0.2$, by 2030. This reduction of 80% down from the 2020 value matches the 2050 target requirement of S-3-5, which is 80% below the 1990 value. According to S-3-05, the 2020 emission value should be the same as the 1990 emission value. As noted above, the S-3-05 emission of 2050 was designed to support capping atmospheric CO2 at 450 PPM[3]. "Capping" means that the sum of all emissions (anthropogenic and natural) equals the sum of all sequestration (mostly photosynthesis.) Therefore, the author of the Reference 7 statement wanted the world to achieve the third target of S-3-05 to get the atmospheric CO2 to stop going up 20 years sooner than what S-3-05 was written to achieve. This shows the urgent nature of our climate crisis. Therefore, if California wants to do its part by setting an example for the world, the correct requirement for California is to achieve emissions that are reduced to 80% below California's 1990 value by 2030. The world's reduction rate is not anywhere near the needed 15% as we move towards the end of 2020. Therefore, the target, of 80% below 1990 levels by 2030 is considered to be correct for California. Reference 7 also calls into question the advisability of aiming for a 2 degree Celsius increase, given the possibilities of positive feedbacks that would increase warming. This concern for positive feedbacks is another reason that this paper will work towards identifying LDV requirement sets that will support LDVs achieving 80% below the 1990 value by 2030.

Thinking that LDVs can, for some reason, fail to achieve this target is dangerous thinking. As stated above, LDVs emit, by far, the most CO2 of all categories.

Notes on Methods

The base year is 2005. An intermediate year of 2015 is used. The car efficiency factor of 2015 with respect to 2005 is taken directly from Figure 3. The car efficiency factor of 2030 with respect to 2015 is derived herein, resulting in a set of car-efficiency requirements.

It is assumed that cars last 15 years. This is equivalent to assuming that the effect of the cars that last more than 15 years, thus increasing emissions, will be offset by the effect of the older cars that don't last as long as 15 years, thus reducing old-car emissions. As will be seen, there will also have to be some sort of an additional action to remove many of the older Internal Combustion Engine cars that are 15, through just 8 years old. Natural attrition will take care of some of this since as cars get older the probability that they will be taken out of service increases. However, some sort of "cash for gas guzzlers" program will be needed. How this is done is not covered in this paper. This is not unique. As another example, the car manufacturers will have to figure out how to produce the needed cars and batteries.

Primary Variables Used

Table 1 defines the primary variables that are used.

Fundamental Equations

The emissions are equal to the CO2 per mile driven multiplied by the per-capita driving multiplied by the population, since per-capita driving multiplied by the population is total driving. This is true for any given year.

Future Year k: $$\boldsymbol{e_k = c_k * d_k * p_k}$$ **(Eq. 1)**

Base Year i: $$\boldsymbol{e_i = c_i * d_i * p_i}$$ **(Eq. 2)**

Dividing both sides of Equation 1 by equal values results in an equality. The terms on the right side of the equation can be associated as shown here:

$$\boldsymbol{\frac{e_k}{e_i} = \frac{c_k}{c_i} * \frac{d_k}{d_i} * \frac{p_k}{p_i}}$$ **(Eq. 3)**

Table 1 Variable Definitions

Variable Definitions	
$\boldsymbol{e_k}$	**LDV Emitted C02, in Year "*k*"**
$\boldsymbol{L_k}$	**Low Carbon Fuel Standard (LCFS) Factor that reduces the Per-Gallon CO2 emissions, in Year "*k*"**
$\boldsymbol{C_k}$	**LDV CO2 emitted per mile driven, average, in Year "*k*", not accounting for the Low Carbon Fuel Standard (LCFS) Factor**
$\boldsymbol{c_k}$	**LDV CO2 emitted per mile driven, average, in Year "*k*", accounting for the Low Carbon Fuel Standard (LCFS) Factor**

p_k	**Population, in Year "*k*"**
d_k	**Per-capita LDV driving, in Year "*k*"**
D_k	**LDV Driving, in Year "*k*"**
M_k	**LDV Mileage, miles per gallon, in Year "*k*"**
m_k	**LDV Equivalent Mileage, miles per gallon, in Year "*k*" accounting for Low Carbon Fuel Standard (LCFS) Factor, so this is M_k/L_k**
N	**Number of pounds of CO2 per gallon of fuel but not accounting for the Low Carbon Fuel Standard (LCFS) Factor**

Since CO2 per mile ("c") is a constant (use "A", noting that it is equal to about 20 pounds per gallon) multiplied by the number of Gallons ("G") and since number of gallons is distance (use "D") divided by mileage (use "m"), then c = A*D/m. this shows that the ratio of the "c" values in different years is going to be equal to the reciprocal of the "m" values in those different years because the other variables will cancel out. Therefore:

To work with mileage: $$\frac{m_i}{m_k} = \frac{c_k}{c_i}$$ **(Eq. 4)**

Putting Equation 4 into Equation 5 results in the following equation:

$$\frac{e_k}{e_i} = \frac{m_i}{m_k} * \frac{d_k}{d_i} * \frac{p_k}{p_i}$$ **(Eq. 5)**

Showing the base year of 2005, the future year of 2030, introducing the intermediate year of 2015 and the year of 1990 (since emissions in 2030 are with respect to the 1990 value) results in Equation 6.

$$\frac{e_{2030}}{e_{1990}} * \frac{e_{1990}}{e_{2005}} = \frac{c_{2030}}{c_{2015}} * \frac{c_{2015}}{c_{2005}} * \frac{d_{2030}}{d_{2005}} * \frac{p_{2030}}{p_{2005}}$$ **(Eq. 6)**

The ratio on the far left is the climate-stabilizing target, which is the factor of the 2030 emission to the 1990 emission. It has been shown that this is 0.20 or 80% less. The next ratio is the emission of 1990 compared to 2005. It is the turquoise line of Figure 3, which is 0.87. The first ratio on the right side of the equation is the fleet emission per mile in 2030 compared to the value in 2015. This ratio will be derived in this report and it will result in a set of car-efficiency requirements. Moving to the right, the next ratio is the car efficiency in 2015 compared to 2005. It can obtained by multiplying the purple line 2015 value times the green line 2015 value, which is 0.90 * 0.93. The next term, still going from right to left, is the independent variable. It is the per-capita driving reduction required, with respect to the 2005 level of driving. The final term on the far right is the ratio of the population in 2030 to the population in 2005. Reference 8 shows that California's population in 2005 was 35,985,582. Reference 9 shows that California's population in 2030 is predicted to be 42,263,654. Therefore,

$$p_{2030}/p_{2005} = 42263654 \div 35985582 = 1.17446076$$ **(Eq. 7)**

Putting in the known values results in Equation 8:

$$0.20 * 0.87 = \frac{c_{2030}}{c_{2015}} * 0.90 * 0.93 * \frac{d_{2030}}{d_{2005}} * 1.17446076 \quad \textbf{(Eq. 8)}$$

Combining the values, solving for the independent variable (the per-capita driving ratio), and changing from emission-per-mile to equivalent-miles-per-gallon results in the following:

$$\frac{d_{2030}}{d_{2005}} = 0.177004896 * \frac{m_{2030}}{m_{2015}} \quad \textbf{(Eq. 9)}$$

With the coefficient being so small, it is doubtful that we can get the equivalent mileage in 2030 to be high enough to keep the driving ratio from falling below one. The mileage of the 2015 fleet will be based on the best data we can get and by assuming cars last 15 years. The equivalent mileage in 2030 will need to be as high as possible to keep the driving-reduction factor from going too far below 1, because it is difficult to reduce driving too much. The equivalent mileage will be dependent on the fleet-efficiency requirements in the near future and going out to 2030. Those requirements are among the primary results of this report.

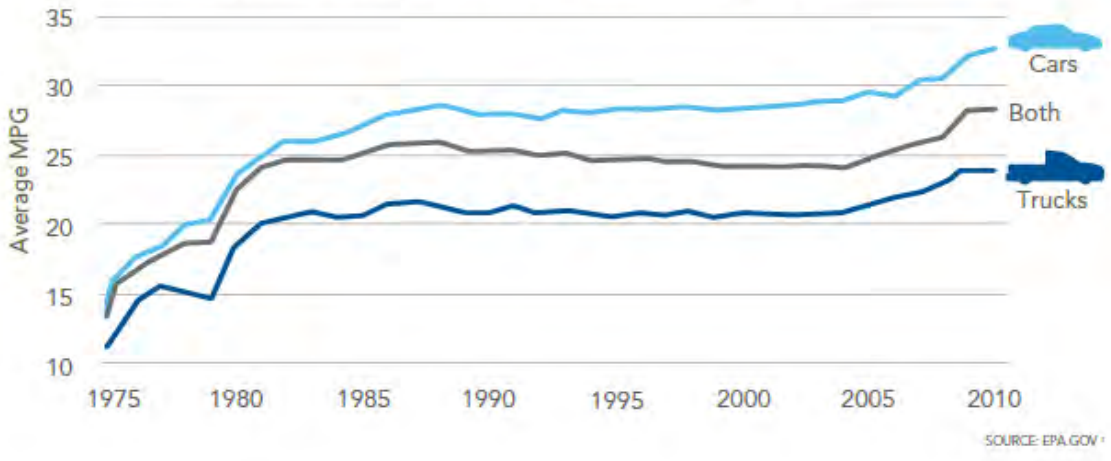
Internal Combustion Engine (ICE) Mileage, from Year 2000 to Year 2030

The years from 2000 to 2011 are taken from a plot produced by the PEW Environment Group,

http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Fact_Sheet/History%20of%20Fuel%20Economy%20Clean%20Energy%20Factsheet.pdf

The plot is shown here as Figure 6. The "Both" values are used.

Figure 4 **Mileage Values From the PEW Environment Group**



The values from 2012 to 2025 are taken from the US Energy Information Agency (EIA) as shown on their website, http://www.c2es.org/federal/executive/vehicle-standards#ldv_2012_to_2025. They are the LDV Corporate Average Fleet Efficiency (CAFÉ) values enacted into law in the first term of President Obama. From 2025 to 2030, it is assumed that the yearly ICE improvement in CAFÉ will be 2.5 MPG.

Overall Mileage of California's LDV Fleet in 2015

Table 2 uses these values of the Internal Combustion Engine (ICE) LDV mileage to compute the mileage of the LDV fleet in 2015. It assumes that the fraction of ZEVs being used over these years is small enough to be ignored. The 100 miles driven, nominally, by each set of cars, is an arbitrary value and inconsequential in the final calculation, because it will divide out. It is never-the-less used, so that it is possible to compare the gallons of fuel used for the different years. The "f" factor could be used to account for a set of cars being driven less. It was decided to not use this option by setting all of the values to 1. The Low Carbon Fuel Standard (LCFS) values are taken from Figure 3. The gallons of fuel are computed as shown in Equation 10, using the definition for L_k that is shown in Table 2.

$$\boldsymbol{Gallons\ Used\ per\ f * 100\ miles} = \frac{\boldsymbol{fx100}}{(\boldsymbol{CAFE\ MPG})/\boldsymbol{L_k}} \qquad \textbf{(Eq. 10)}$$

As shown in Table 2, using the definitions in Eq. 9:

$$\boldsymbol{m_{2015} = 27.63}$$

If it is deemed acceptable to have per-capita driving in 2030 be reduced 32% with respect to 2005 driving, then the left side of Eq. 9 becomes 0.68 and it is possible to use Eq. 9 to solve for the 2030 mileage as:

$$\boldsymbol{m_{2030} = (27.63) * 0.68 * \left(\frac{1}{0.177004896}\right) = 106.1462} \qquad \textbf{(Eq. 11)}$$

Likewise if it is decided that the per-capita driving in 2030 should equal the per-capita driving in 2005 then:

$$\boldsymbol{m_{2030} = (27.63) * 1.00 * \left(\frac{1}{0.177004896}\right) = 156.0974} \qquad \textbf{(Eq. 12)}$$

These values will provide the targets for the tables that compute the mileage values for 2030.

How ICE Mileage Values Will Be Used with ZEV Equivalent Mileage Values

To have LDVs achieve our climate-stabilizing target, after 2015, the net (computed using both ICE and ZEV vehicles) mileage values for each year will need to greatly improve by having a significant fraction of ZEVs. The ICE CAFÉ standards are used in this report as just the ICE contribution to fleet MPG. The ICE MPG values are inadequate by themselves and will therefore need to become less important; the ZEVs sales will need to overtake the ICE sales.

Federal requirements will need to change significantly. Currently, federally-mandated corporate average fuel efficiency (CAFÉ) standards have been implemented, from 2000 to 2025. These standards require that each corporation produce and sell their fleet of cars and light-duty trucks in the needed proportions, so that the combined mileage of all of the cars they sell (total miles driven in all cars sold in the year of interest divided by the total gallons used by all those cars, for any arbitrary distance) at least meets the specified mileage.

Table 2 Calculation of the Fleet MPG for 2015

LDV Set	Years Old	Model Year	CAFE MPG	LCFS Factor L_{Year}	Factor Driven f	Gallons Used Per f*100 Miles
1	14-15	2001	24.0	1.0	1.0	4.17
2	13-14	2002	24.0	1.0	1.0	4.17
3	12-13	2003	24.0	1.0	1.0	4.17
4	11-12	2004	24.0	1.0	1.0	4.17
5	10-11	2005	25.0	1.0	1.0	4.00
6	9-10	2006	25.7	.9933	1.0	3.87
7	8-9	2007	26.3	.9867	1.0	3.75
8	7-8	2008	27.0	.9800	1.0	3.63
9	6-7	2009	28.0	.9733	1.0	3.48
10	5-6	2010	28.0	.9667	1.0	3.45
11	4-5	2011	29.1	.9600	1.0	3.30
12	3-4	2012	29.8	.9533	1.0	3.20
13	2-3	2013	30.6	.9467	1.0	3.09
14	1-2	2014	31.4	.9400	1.0	2.99
15	0-1	2015	32.6	.9333	1.0	2.86
					Sum of Gallons:	54.29
					Miles = 100*Sum(f's):	1500
					MPG = Miles/(Sum of Gallons):	27.63

The car companies want to maximize their profits while achieving the required CAFÉ standard. In California, the car companies are already be required to sell a specified number of electric vehicles, which have a particularly-high, equivalent-value of miles-per-gallon. If the laws are not changed, this situation will allow companies to take advantage of their ZEV vehicles to sell more low-mileage, high-profit cars and light-duty trucks, and still achieve the federal CAFÉ standard.

It will be better to apply the CAFÉ standards to only the ICEs and then require, in addition to the CAFÉ standards, that the fleet of LDVs sold achieve some mandated fraction of ZEVs. The ZEVs will get ever-improving equivalent mileage, as our electrical grid is powered by a larger percent of renewable energy. In other words, their equivalent mileage is not fixed, but will improve over the years. Requirements developed here are for 2030. Therefore a high percentage of all the electricity generated in the state, including both the "in front of the meter" (known as the "Renewable Portfolio Standard" or "RPS") portion and the "behind the meter" portion is assumed to come from sources that do not emit CO2. The values of 85% and 90% are assumed. The values become one of the important fleet-efficiency requirements for cases that are considered. Hopefully these assumptions are reasonable. San Diego's Climate Action Plan (CAP) was the first to specify 100% renewable energy by 2035. Many other cities have followed San Diego's lead in this regard.

How to Compute the ZEV Equivalent Mileage Values

To calculate the equivalent mileage of the 2030 fleet of LDVs, it is necessary to derive a formula to compute the equivalent mileage of ZEVs, as a function of the percent of electricity that is generated without emitting CO2 (the mixed case), the equivalent ZEV mileage if the electricity is from 100% fossil fuel (the "West Virginia" case), and the equivalent ZEV mileage if the electricity is from 100% renewable sources (the ideal case), which is not infinity because it is assumed that the manufacturing of the car emits CO2. The variable definitions in Table 3 are used.

Table 3 Variables Used in the Calculation of ZEV Equivalent Mileage

Variable	Definition
m_z	ZEV Equivalent mileage
m_{zr}	ZEV Equivalent mileage if the electricity is from renewables
m_{zf}	ZEV Equivalent mileage if the electricity is from fossil fuels
r	fraction of electricity generated from renewable sources
G	Gallons of equivalent fuel used
D	Arbitrary distance travelled
Num	$m_{zr} * m_{zf}$
Den	$r * m_{zf} + (1 - r) * m_{zr}$

The derivation of the equation for equivalent ZEV mileage is based on the notion that the ZEV can be imagined to travel "r" fraction of the time on electricity generated from renewables and "(1-r)" fraction of the time on fossil fuel. If the vehicle travels "D" miles, then, using the definitions shown in Table 4, the following equation can be written.

$$G = \frac{r*D}{m_{zr}} + \frac{(1-r)*D}{m_{zf}} \quad \textbf{(Eq. 13)}$$

$$m_z = D/G = D/(\frac{r*D}{m_{zr}} + \frac{(1-r)*D}{m_{zf}}) \quad \textbf{(Eq. 14)}$$

Dividing the numerator and the denominator by D and multiplying the numerator and the denominator by the product of the two equivalent mileage values (m_{zr} and m_{zf}) results in Equations 31.

$$m_z = m_{zr} * m_{zf}/\left(r * m_{zf} + (1 - r) * m_{zr}\right) \quad \textbf{(Eq. 15)}$$

Using the definitions in Table 3:

$$m_z = Num/(Den) \quad \textbf{(Eq. 16)}$$

Table 4 shows 3 assignments of assumed values in which the fraction of electricity generated from renewables is varied and the results, using Equations 15 and 16, results in the three values of ZEV equivalent mileage. This shows the urgent need to move towards cleaner electricity.

Table 4 Variable Assignment and the Resulting ZEV Mileages

m_{zr}	m_{zf}	r	1-r	Num	Den	m_z
5000	70	0.80	0.20	350000.00	1056.00	331.44
5000	70	0.85	0.15	350000.00	809.50	432.37
5000	70	0.90	0.10	350000.00	563.00	621.67

Additional Variables Needed to Compute the Overall Equivalent Mileage in 2030, Taking Into Account Bothe ICEs and ZEVs

Table 5 shows the additional definitions that will be used in the calculation of 2030 overall mileage.

Table 5 Additional Variables Used in the Calculation of 2030 LDV Mileage

Variable	Definition
D_i	Distance travelled by ICE vehicles
D_z	Distance travelled by ZEV vehicles
G_i	Gallons of equivalent fuel used by ICE vehicles
G_z	Gallons of equivalent fuel used by ZEVs

Computing an LDV Overall Equivalent Fleet Mileage, for the *Balanced_1* Case

Table 6 shows the calculation for the overall equivalent mileage for all the cars on the road, in the year of 2030, for the *Balanced_1* case.

The name, *Balanced_1*, comes from the attempt to *balance* the difficulty of achieving the fleet efficiency-related requirements with the difficulty of achieving the driving-reduction related requirements. The *Balanced*_1 case assumes that electricity is 85% renewable, which is also difficult.

There will also be a *Balanced*_2 case that assumes that electricity is 90% renewable. Both the *Balanced_1* and the *Balanced_ 2* cases assume that it is reasonable to have per-capita driving in 2030 reduced 32%, with respect to 2005 per-capita driving. That assumption, along with the 85% renewable electricity assumption, was used to select the ***z*** values of Table 6 to result in the Equation 11 value of overall 2030 mileage, which is 106.1263 Miles Per Gallon (MPG). From Table 4, 85% renewable electricity results in a ZEV equivalent mileage of 432.37 MPG. That value of equivalent ZEV mileage in 2030, when electricity is 85% renewable, is used for all of the ZEV model years, for

this case. Note that this is overlooking the fact that not all BEVs are equally efficient. In order to simplify this analysis, the Table 4 values of m_{zr} and m_{zf} are considered to be applicable to all the ZEV models. Therefore, the 432.37 MPG value can be divided into each D_z value to compute the corresponding G_z value, in all of the model years being considered.

To reduce the miles driven in poor-mileage ICE's, the "f" factor is used. For example, if "f" is set to 0.30, as it is in 2016, then the miles driven is reduced by 70%. Achieving the required "f" values may require some type of "cash-for-gas-guzzlers" program. However, it could also be noted that when older cars are second or third cars in multi-car families in which family members have the luxury of choosing which car to drive, family members will usually choose the car that is cheaper to operate, thus making the "f" factors easier to achieve. Finally, the Low Carbon Fuel Standard (LCFS) is assumed to continue to improve from the currently mandated value of 0.9 by the end of 2019. This is another method of reducing the CO2 emissions of the ICE vehicles.

For the ICE vehicles, the G_i values are computed as the D_i value divided by the equivalent MPG value. The equivalent MPG is the CAFÉ MPG divided by the LCFS factor.

It is arbitrarily assumed that the cars, for each year being considered (the models for that year, both ZEVs and ICEs), go a total of 100 miles. Although this is an extremely small fraction of the actual miles that will be driven, it doesn't change the result because the number of gallons of equivalent gasoline is always proportional to miles. The fraction of cars that are ZEVs (***z***) is used to divide up this value of 100 Miles. However, the factor "f" reduces the miles driven by the ICE vehicles and this brings down the total miles driven for the years in which the "f" term is less than 1. For each year, the total miles per gallon (MPG) is computed as the total miles driven divided by the total gallons used. However, this value is not used in the calculation of the entire fleet equivalent mileage. The overall equivalent mileage is computed as the total miles driven divided by the total gallons used, where these quantities are summed over all of the 15 categories (years) of LDVs.

The following formulas are used to compute the overall equivalent mileage in 2030, of all of the LDVs on the road.

For the ICE calculations, for 2016, where

- "L_k" is defined in Table 1 (LCFS factor for year "k") and is the value in the "LCFS" column of Table 6 and
- "***z***" is from the "***z***" column and is the fraction of cars sold in the year that are ZEVs and
- "m_i" is the value from the CAFÉ MPG column:

$$\boldsymbol{D_i = 100 * f * (1 - z)} \qquad \textbf{(Eq. 17)}$$

$$\boldsymbol{G_i = D_i / (m_i \,/\, L_{2016})} \qquad \textbf{(Eq. 18)}$$

For the ZEV calculations:

$$\boldsymbol{D_z = 100 * z} \qquad \textbf{(Eq. 17)}$$

$$\boldsymbol{G_z = D_z / (432.37)} \qquad \textbf{(Eq. 18)}$$

In updating this report from its 2015 version, the fleet fraction of ZEVs ("***z***"), from 2015 to 2019, had to be reduced to approximate the low values that actually occurred from 2015 to 2019. However,

in 2020, it is assumed that the fraction will be at least as large as 8%, which is not such a trivial value. If it is actually larger than 8%, then there will be some margin built into the requirements derived in this report.

Table 6 Calculation of 2030 LDV Mileage Assuming the *Balanced_1* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	29.4	0.7943	.02	2	.005	31.40	0.7989	39.30
2017	35.1	.9200	38.15	.4	39.2	1.0275	.02	2	.005	41.20	1.0321	39.92
2018	36.1	.9133	39.53	.5	48.5	1.2271	.03	3	.007	51.50	1.2340	41.73
2019	37.1	.9067	40.92	.6	57.6	1.4077	.04	4	.009	61.60	1.4169	43.47
2020	38.3	.9000	42.56	.7	64.4	1.5133	.08	8	.019	72.40	1.5318	47.26
2021	40.3	.8500	47.41	.8	64.0	1.3499	.20	20	.046	84.00	1.3961	60.17
2022	42.3	.8000	52.88	.9	58.5	1.1064	.35	35	.081	93.50	1.1873	78.75
2023	44.3	.8000	55.38	1.0	45.0	0.8126	.55	55	.127	100.00	0.9398	106.40
2024	46.5	.8000	58.13	1.0	20.0	0.3441	.80	80	.185	100.00	0.5291	188.99
2025	48.7	.8000	60.88	1.0	6.0	0.0986	.94	94	.217	100.00	0.3160	316.48
2026	51.2	.8000	64.00	1.0	3.0	0.0469	.97	97	.224	100.00	0.2712	368.70
2027	53.7	.8000	67.13	1.0	2.0	0.0298	.98	98	.227	100.00	0.2565	389.93
2028	56.2	.8000	70.25	1.0	1.0	0.0142	.99	99	.229	100.00	0.2432	411.17
2029	58.7	.8000	73.38	1.0	1.0	0.0136	.99	99	.229	100.00	0.2426	412.20
2030	61.2	.8000	76.50	1.0	1.0	0.0131	.99	99	.229	100.00	0.2420	413.15
Sum of Miles and then Gallons of Equivalent Fuel:										**1235.60**	**11.64**	
Equivalent MPG of LDV Fleet in 2030:										***106.17***		
Sum of ZEV Miles = **795**. Fraction of Miles Driven by ZEVs = **64.3%**												

There is probably some margin from the 2016 to 2019 values as well. The difficult values are for 2022, 2023, and 2024, with 2024 requiring that ZEV sales are 80% of all the cars purchased in California. The purple color of the ***z*** values denotes difficulty. This shows that the government will need to require that the car companies achieve the **z** values or buy credits from a company such as Tesla, which sells 100% ZEVs.

The Table 6 ***z*** values were put into an EXCEL spread sheet that looks like Table 6. It produced the values shown in Table 6. The values were selected to try to get to the 106.1462 value that was computed in Eq. 11.

Using the result of 106.17 MPG into Equation 9, gives the following result:

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}} = 0.17700 * \frac{106.17}{27.63} = 0.68016 \qquad \textbf{(Eq. 19)}$$

This is the 32% reduction desired. It will be difficult to achieve. However, the required schedule of ZEV adoption is also difficult. The values of *z* from the years 2021 to 2025 will be at least as difficult as achieving the 32% reduction. This situation motivates the next case. If electricity could be made cleaner sooner, the years from 2021 to 2025 could be less difficult.

Computing an LDV Overall Equivalent Fleet Mileage, for the *Balanced_2* Case

The *Balanced_2* case is shown in Table 7.

The *Balanced_2* case is the same as the *Balanced_1* case except it includes an assumption that electricity is 90% renewable in 2030 instead of 85%. Table 7 shows the results using that assumption, which becomes a requirement for this case. For the *Balanced_2* case, the values of *z* are once again assigned to achieve the desired driving-reduction value of 32%.

From the second line of Table 4, this means that the equivalent mileage of the ZEV vehicles is 621.67 MPG.

Eq. 18 becomes:

$$G_z = D_z/(621.67) \qquad \textbf{(Eq. 20)}$$

This is used to compute the gallons of equivalent fuel from the distance, for the ZEV vehicles in Table 7.

The Table 7 ***z*** values were put into an EXCEL spread sheet that looks like Table 7. It produced the values shown in Table 7. The *z* values were selected to try to get to the 106.1462 value that was computed in Eq. 11.

Using the Table 7 result of 106.22 MPG into Equation 9, gives the following result:

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}} = 0.17700 * \frac{106.22}{27.63} = 0.68045 \qquad \text{(Eq. 21)}$$

Table 7 Calculation of 2030 LDV Mileage Assuming the *Balanced_2* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.927	37.01	.3	29.4	0.7943	.02	2	.003	31.40	.7975	39.37
2017	35.1	.920	38.15	.4	39.2	1.0275	.02	2	.003	41.20	1.0307	39.97
2018	36.1	.913	39.53	.5	48.5	1.2271	.03	3	.005	51.50	1.2319	41.81
2019	37.1	.907	40.92	.6	57.6	1.4077	.04	4	.006	61.60	1.4141	43.56
2020	38.3	.900	42.56	.7	64.4	1.5133	.08	8	.013	72.40	1.5262	47.44
2021	40.3	.850	47.41	.8	68.0	1.4342	.15	15	.024	83.00	1.4584	56.91
2022	42.3	.800	52.88	.9	67.5	1.2766	.25	25	.040	92.50	1.3168	70.25
2023	44.3	.800	55.38	1.0	55.0	0.9932	.45	45	.072	100.00	1.0656	93.84
2024	46.5	.800	58.13	1.0	30.0	0.5161	.70	70	.113	100.00	.6287	159.05
2025	48.7	.800	60.88	1.0	5.0	0.0821	.95	95	.153	100.00	.2349	425.62
2026	51.2	.800	64.00	1.0	3.0	0.0469	.97	97	.156	100.00	.2029	492.84
2027	53.7	.800	67.13	1.0	2.0	0.0298	.98	98	.158	100.00	.1874	533.52
2028	56.2	.800	70.25	1.0	1.0	0.0142	.99	99	.159	100.00	.1735	576.42
2029	58.7	.800	73.38	1.0	1.0	0.0136	.99	99	.159	100.00	.1729	578.45
2030	61.2	.800	76.50	1.0	1.0	0.0131	.99	99	.159	100.00	.1723	580.31
Sum of Miles and then Gallons of Equivalent Fuel:										**1233.60**	**11.61**	
Equivalent MPG of LDV Fleet in 2030:										***106.22***		
Sum of ZEV Miles = **761**. Fraction of Miles Driven by ZEVs = **61.7%**												

This is the 32% reduction desired. It will be difficult to achieve. However, the required schedule of ZEV adoption is also difficult. The values of $\boldsymbol{z}$ from the years 2021 to 2025 will be at least as difficult as achieving the 32% reduction. However, they are easier to achieve than the values needed in the *Balanced_1* Case. This quantifies the benefit of increasing the renewable fraction of electricity from 85% to 90%.

Computing an LDV Overall Equivalent Fleet Mileage, for the *2005_Driving* Case

When climate change and transportation policies are discussed, the opinion that we should simply electrify our fleet as soon as possible is often expressed. The idea is that the per-capita driving level does not have to be reduced, if we electrify our fleet fast enough. The relationships developed in this paper enable an analysis to see how this would work. This gives rise to the *2005_Driving* Case. For this case, it is assumed that electricity is 90% renewable.

From the third line of Table 4, this means that the equivalent mileage of the ZEV vehicles is 621.67 MPG. Therefore, the relationship shown in Eq. 20 is used.

The *2005_Driving* case is shown in Table 8.

For the *2005_Driving* case, the values of *z* are assigned to achieve the overall equivalent mileage (MPG) value computed in Eq. 12, which is 156.0974, because that value was computed for there being no change in the per-capita driving from the 2005 value.

Using the result of 155.99 MPG into Equation 9, gives the following result:

$$\frac{\boldsymbol{d_{2030}}}{\boldsymbol{d_{2005}}} = \mathbf{0.17700} * \frac{\boldsymbol{m_{2030}}}{\boldsymbol{m_{2015}}} = \mathbf{0.17700} * \frac{\mathbf{155.99}}{\mathbf{27.63}} = \mathbf{0.99930} \qquad \textbf{(Eq. 22)}$$

This is the 0% reduction desired. However, the required schedule of ZEV adoption is not possible. Jumping from 8% in 2020 to 82% in 2021 defies reason. It appears that our best bet, to do our part to avoid human extinction, is to proceed with the assumption (and thus requirement) that we are going to have to reduce per-capita driving, as shown in either the *Balanced_1* or the *Balance_2* case.

Computing an LDV Overall Equivalent Fleet Mileage, for the *Mary_Nichols* Case

Mary Nichols was first appointed to the California Air Resource Board (CARB) in 1975 and became Chair in 1979. After leaving CARB, she founded the Los Angeles Chapter of the Natural Resources Defense Council (NRDC) in 1989. She was reappointed to the position of Chair of

CARB in 2007 by Governor Arnold Schwarzenegger and she is still serving in that position today.

Table 8 Calculation of 2030 LDV Mileage Assuming the *2005_Driving* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	29.4	.7943	.02	2.0	.003	31.40	0.7975	39.37
2017	35.1	.9200	38.15	.4	39.2	1.0275	.02	2.0	.003	41.20	1.0307	39.97
2018	36.1	.9133	39.53	.5	48.5	1.2271	.03	3.0	.005	51.50	1.2319	41.81
2019	37.1	.9067	40.92	.6	57.6	1.4077	.04	4.0	.006	61.60	1.4141	43.56
2020	38.3	.9000	42.56	.7	64.4	1.5133	.08	8.0	.013	72.40	1.5262	47.44
2021	40.3	.8500	47.41	.8	14.4	.3037	.82	82.0	.132	96.40	0.4356	221.29
2022	42.3	.8000	52.88	.9	2.7	.0511	.97	97.0	.156	99.70	0.2071	481.42
2023	44.3	.8000	55.38	1.0	1.0	.0181	.99	99.0	.159	100.00	0.1773	563.99
2024	46.5	.8000	58.13	1.0	1.0	.0172	.99	99.0	.159	100.00	0.1765	566.72
2025	48.7	.8000	60.88	1.0	1.0	.0164	.99	99.0	.159	100.00	0.1757	569.23
2026	51.2	.8000	64.00	1.0	1.0	.0156	.99	99.0	.159	100.00	0.1749	571.84
2027	53.7	.8000	67.13	1.0	1.0	.0149	.99	99.0	.159	100.00	0.1741	574.23
2028	56.2	.8000	70.25	1.0	1.0	.0142	.99	99.0	.159	100.00	0.1735	576.42
2029	58.7	.8000	73.38	1.0	1.0	.0136	.99	99.0	.159	100.00	0.1729	578.45
2030	61.2	.8000	76.50	1.0	1.0	.0131	.99	99.0	.159	100.00	0.1723	580.31
Sum of Miles and then Gallons of Equivalent Fuel:										**1254.20**	**8.04**	
Equivalent MPG of LDV Fleet in 2030:										***155.99***		
Sum of ZEV Miles = **990.0** Fraction of Miles Driven by ZEVs = **78.9%**												

The following quote[13] inspires the *Mary_Nichols* Case:

Regulations on the books in California, set in 2012, require that 2.7 percent of new cars sold in the state this year be, in the regulatory jargon, ZEVs. These are defined as battery-only or fuel-cell cars, and plug-in hybrids. The quota rises every year starting in 2018 and reaches 22 percent in 2025. Nichols wants 100 percent of the new vehicles sold to be zero- or almost-zero-emissions by 2030

The mathematical relationships developed in this paper make it possible to determine the driving reduction that would be required if it is desired to stabilize the climate at a livable level, assuming the schedule of fleet electrification implied by the above quote. Electricity is required to be 90% renewable. The results of the *Mary_Nichols* Case are shown in Table 9.

The corresponding driving reduction is computed using Eq. 9.

$$\frac{d_{2030}}{d_{2005}} = 0.177005 * \frac{m_{2030}}{m_{2015}} = 0.177055 * \frac{77.24}{27.63} = 0.495 \quad \textbf{(Eq. 14)}$$

This means that the per-capita driving will need to be about 50% less in 2030 than in year 2005. It is not known if CARB understands this.

The official policy of the California Democratic Party (CDP) is expressed in its Platform. A statement that applies to this report and to CARB can be viewed by looking at the California Democratic Party (CDP) website, then select "About Us", "Standing Committees", "Platform Committee", "2020 Platform", and finally "Energy and Environment Plank". In that Plank, the following statement is found

- *Demand a state plan specifying how cars and light-duty trucks can meet climate-stabilizing targets by defining enforceable measures to achieve necessary fleet efficiency and per-capita driving limits;*

However, your author's efforts to get CARB to do such a "state plan", or to convince a state legislator to write legislation to direct CARB to do such a plan, have not been successful.

If CARB would do such a plan or would consider the results of this report, they would perhaps decide to push for a more ambitious fleet electrification schedule and would also push for state legislation and regulation to enact measures to reduce VMT.

Preliminary Conclusions Drawn from the Results of the Four Cases Run

Table 10 is a summary showing the most important results of the four cases considered. The purple-colored entries denote difficult requirements; red denotes nearly impossible.

Considering the *Balance_1* and the *Balanced_2* cases and the fleet electrification schedules for each, it is first concluded that California needs to work to get its electricity to be at least 85% renewable by 2030 and furthermore that getting it to be 90% from renewables by 2030 would make the electrification schedule much easier.

Table 9 Calculation of 2030 LDV Mileage Assuming the *Mary_Nichols* Case

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	29.2	.7886	.027	2.7	.004	31.89	0.7930	40.22
2017	35.1	.9200	38.15	.4	38.9	1.0201	.027	2.7	.004	41.62	1.0245	40.63
2018	36.1	.9133	39.53	.5	47.4	1.2003	.051	5.1	.008	52.56	1.2086	43.49
2019	37.1	.9067	40.92	.6	55.5	1.3560	.075	7.5	.012	63.01	1.3681	46.06
2020	38.3	.9000	42.56	.7	63.0	1.4814	.099	9.9	.016	72.98	1.4974	48.74
2021	40.3	.8500	47.41	.8	70.1	1.4790	.124	12.4	.020	82.47	1.4988	55.02
2022	42.3	.8000	52.88	.9	76.7	1.4509	.148	14.8	.024	91.48	1.4746	62.03
2023	44.3	.8000	55.38	1.0	82.8	1.4957	.172	17.2	.028	100.00	1.5233	65.65
2024	46.5	.8000	58.13	1.0	80.4	1.3834	.196	19.6	.032	100.00	1.4149	70.67
2025	48.7	.8000	60.88	1.0	78.0	1.2813	.220	22.0	.035	100.00	1.3167	75.95
2026	51.2	.8000	64.00	1.0	62.4	0.9750	.376	37.6	.060	100.00	1.0355	96.57
2027	53.7	.8000	67.13	1.0	46.8	0.6972	.532	53.2	.086	100.00	0.7828	127.75
2028	56.2	.8000	70.25	1.0	31.2	0.4441	.688	68.8	.111	100.00	0.5548	180.25
2029	58.7	.8000	73.38	1.0	15.6	0.2126	.844	84.4	.136	100.00	0.3484	287.05
2030	61.2	.8000	76.50	1.0	0.0	0.0000	1.000	100.0	.161	100.00	0.1609	621.67
Sum of Miles and then Gallons of Equivalent Fuel:										**1236.00**	**16.00**	
Equivalent MPG of LDV Fleet in 2030:										***77.24***		
Sum of ZEV Miles = **457.9**. Fraction of Miles Driven by ZEVs = **37.0%**												

Certainly, achieving a 32% reduction in driving in 2030 compared to the 2005 level will be difficult. However, increasing the rate of fleet electrification, from what is shown in the *Balanced_1* and *Balanced_2* cases (***z***, in Tables 6 and 7) would be even more difficult.

Table 10 **Four-Case Summary of Requirements**

	Case Designations			
	Balanced_1	**Balanced_2**	**2005 Driving**	**Mary Nichols**
% Renewable Electricity	**85.0%**	**90.0%**	**90.0%**	**90.00%**
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	**20.0%**	15.0%	**82.0%**	12.35%
% ZEVs, Year 2022	**35.0%**	25.0%	**97.0%**	14.76%
% ZEVs, Year 2023	**55.0%**	**45.0%**	99.0%	17.18%
% ZEVs, Year 2024	**80.0%**	**70.0%**	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	**32.0%**	**32.0%**	0%	**50.5%**

Besides that, it should be recognized that California alone cannot stabilize our earth's climate. California's best hope is to set an example for other states and other countries. Taking too many of the world's production of electric vehicles will not work. For a more specific example, lithium batteries may be in short supply and so it may be counterproductive for California to have more than its fair share, thus preventing other states and countries from electrifying their fleet at the required rate. The rates of electrification shown for the *Balanced_1* and the *Balanced_2* cases are aggressive enough, as shown by the purple-colored entries.

California needs to adopt a set of requirements to achieve the 32% reduction. If CARB wants to work to have California legislate requirements to achieve the *Mary Nichol*'s case of a 50% reduction in driving, that would also work and allow more electric cars to go to other states and countries. However the 50% reduction in per-capita driving might be politically impossible at this time.

Since the 32% reduction seems prudent, it begs the question as to what this means in terms of roadway congestion.

The net (as opposed to the per-capita) driving change, going from 2005 to 2030 can be computed by multiplying the per-capita driving factor corresponding to the 32% reduction, which is 0.68, by the population factor of 1.1744, computed in Equation 7. The product of these two values is 0.7986. This means that, even with the 17% increase in California's population, the net driving will have to drop by the factor of about 0.80, or by 20%. If this LDV-driving-reduction requirement (of 0.68) is selected, all of California's transportation money can be used to improve transit, improve active transportation (mainly walking and biking), and maintain, but not expand, roads. There can be little or no congestion because California highway capacity now is larger than it was in 2005 while the state's net driving must drop by 20%.

ACHIEVING THE REQUIRED DRIVING REDUCTION OF THE *BALANCED_1* AND THE *BALANCED_2* CASES

As shown in Equation 19, for the *Balanced_1* case, and in Equation 21 for the *Balanced_2* Case, in 2030, the per-capita driving will need to be 32% below the 2005 value. As shown in this link, https://en.wikipedia.org/wiki/Sustainable_Communities_and_Climate_Protection_Act_of_2008 , California's Metropolitan Planning Organizations (MPOs) are adopting Region Transportation Plans (RTPs) that will achieve reductions in year 2020 and 2035. The convention adopted in this report for these reductions, specifically the per-capita driving reduction with respect to the per-capita driving in 2005, matches the SB 375 convention. As shown in the link, the targets, for year 2035, range from 0% for the Shasta MPO to 16% for Sacramento Area Council of Governments. However, it may be true that some of the 2035 requirements have been revised upwards, to be as large as 19% for some MPOs. Since the climate stabilization target year here is 2030 instead of 2035, and to be reasonably conservative, it is assumed here that the state (this is for all MPOs) will achieve a 12% reduction in per-capita driving, in 2030, compared to 2005. This leaves approximately 20% to be achieved by new requirements.

The title of each of the following subsections contains the estimated per-capita driving reduction each strategy will achieve, by 2030.

Reallocate Funds Earmarked for Highway Expansion to Transit and Consider Transit-Design Upgrades (2%)

San Diego County has a sales tax measure called "TransNet", which allocates approximately one-third for highway expansion, one-third for transit, and one-third for road maintenance. It has a provision that allows for a reallocation of funds, if supported by at least two-thirds of SANDAG Board members, including a so-called weighted vote, where governments are given a portion of 100 votes, proportional to their population. This requirement would be to reallocate the TransNet amount, earmarked for highway expansion, to transit and to do similar reallocations throughout California.

This money could be used to fund additional transit systems; improve transit operations; and/or fund the redesign and implementation of the redesign of existing transit systems. The redesign could include electrification and automation (including automation of fare collection and such features as screening passengers to prevent them from boarding if they have a fever or are in a "test positive" database) or even upgrading to a different transit technology.

A Comprehensive Road-Use Charge (RUC) Pricing and Payout System to Unbundle the Cost of Operating Roads (10%)

Comprehensive means that pricing would be set to cover all costs (including road maintenance and externalities such as harm to the environment and health); that privacy and the interests of low-income drivers doing necessary driving would be protected; that the incentive to drive fuel-efficient cars would be at least as large as it is under the current fuels excise tax; and finally, as good technology becomes available, congestion pricing is used to protect critical driving from congestion.

The words *payout* and *unbundle* mean that some of the money collected would go to people that are losing money under the current system.

User fees (gas taxes and tolls) are not enough to cover road costs[10] and California is not properly maintaining its roads. Reference 10 shows that in California user fees amount to only 24.1% of what is spent on roads. Besides this, the improved mileage of the ICEs and the large number of ZEVs mean that gas tax revenues will drop precipitously.

This RUC system could be used to help reduce the ICE LDV miles driven in 2016 to 2022, as shown in the "f" column of Tables 6 through 9. This system could probably be implemented in less than 2 years if the urgency of our climate crisis is recognized..

Unbundling the Cost of Car Parking (8%)

Unbundling the cost of car parking[11] throughout California is conservatively estimated to decrease driving by 8%, based on Table 1 of Reference 11. That table shows driving reductions that occur in response to introducing a price, for 10 cases. Its average reduction in driving is 25% and its smallest reduction is 15%. However, these numbers are for individual cases whereas the 8% is the decrease in driving in California, due to introducing value pricing where there is a zero price today, or where the price is below its value price. These concepts are explained in Reference 11.

The first such systems should be installed by a (RFP is Request for Proposal) RFP-process-identified, third-party vendor, such as Google, Qualcomm, Uber, or Lime Bicycle, for municipal government employees, as part of the government's Climate Action Plan. The system would be operated for the financial gain of the employees, with a hard requirement in the RFP that even

employees that continue to drive every day would at least break even. The winning third-party vendor would be skilled at monetizing parking whenever it is not being used by the employees and skilled at monetizing data. The parking system would be fully automated, like Uber, except with a more useful phone app that would find the best parking at the user-specified price and walk-distance. The parking would be available to all drivers driving a car registered in the system. Briefly stated, the system is value priced, shared, automated, and provides earnings to all the people that are effectively losing wages or paying higher costs because the parking is being provided. The vendor would also be good at expanding the system both geographically and over all types of uses, in an economically disruptive way; as Uber and Lyft did to the taxi cab industry. The system would be as easy to use as "free" parking, once the car is registered. It would utilize congestion pricing to protect the desired maximum-occupancy rate.

Good Bicycle Projects

The best criterion for spending money for bicycle transportation is the estimated reduction in driving per the amount spent. The following strategies may come close to maximizing this parameter.

Projects to Improve Bicycle Access (1%)

All of the smart-growth neighborhoods, central business districts, and other high-trip destinations or origins, both existing and planned, should be checked to see if bicycle access could be substantially improved with either a traffic calming project, a "complete streets" project, more shoulder width, or a project to overcome some natural or made-made obstacle. For example, in some cases, long stretches of freeways cut off bicycle passage on surface streets that are perpendicular to the freeway. In some of these cases, a bicycle bridge over the freeway would be cost effective.

League-of-American-Bicyclist-Certified (LCI) Instruction of "Traffic Skills 101" (1%)

Most serious injuries to bike riders occur in accidents that do not involve a motor vehicle[12]. Most car-bike accidents are caused by wrong-way riding and errors in intersections; the clear-cut-hit-from-behind accident is rare[12].

After attending *Traffic Skills 101*, students that pass a rigorous written test and demonstrate proficiency in riding in traffic and other challenging conditions, in passing an on-road-riding test, would be paid for their time and effort.

As an example of what could be done in San Diego County, if the average class size was 3 riders per instructor and each rider passes both tests and earns $100 and if the instructor, with overhead, costs $500 dollars, for a total of $800 for each 3 students, that would mean that $160M could teach $160M/$800 = 200,000 classes of 3 students, for a total of 600,000 students. The population of San Diego County is around 3 million.

Eliminate or Greatly Increase the Maximum Height and Density Limits Close to Transit Stops that Meet Appropriate Service Standards (2%)

As sprawl is reduced, more compact, transit-oriented development (TOD) will need to be built. This strategy will incentivize a consideration of what level of transit service will be needed, how it can be achieved, and what levels of maximum height and density are appropriate. Having no limits at all is reasonable if models show that the development can function without harming the existing adjacent

neighborhoods, given the level of transit service and other supporting transportation policies (such as car parking that unbundles the cost and supports the full sharing of parking[12]) that can be assumed.

Complete Streets (Streets designed for all users), "Road Diets", and "Traffic Calming", Such as Replacing Signalized Intersections with Roundabouts (1%)

These projects will encourage active transportation, such as bicycling and walking. These projects also fit well with the addition of TOD and increasing density. They will reduce speeds and therefore reduce noise. The noise reduction and increased safety will encourage people to want to live on and around the redesigned arterials where they would not want to have lived before. People will also be more inclined to shop and to work in such surroundings.

Net Driving Reduction from All Identified Strategies

By 2030, the sum of these strategies should be realized as shown in Table 11.

CONCLUSION

The urgency of our climate crisis dictates that California should develop plans such as the cases considered in this paper for a climate-stabilizing target year of 2030. The state needs to select a case and move forward with legislation and implementation. The cases considered in this paper indicate that California should achieve electricity that is at least 85% from renewable sources and a per-capita driving reduction of at least 32% with respect to 2005 driving levels. The eight driving-reducing requirements described in this paper are an example of how this could be done.

Table 11 Requirements to Achieve a 32% Reduction in 2030 Per-Capita Driving, with Respect to 2005

Driving Reduction Requirements	Percent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Value-Priced Parking (Unbundling the Cost)	8%	0.92
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
*Pay-to-Graduat*e Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		0.68
% Reduction		**32%**

ABREVIATIONS AND ACRONYMS

AB 1493	California's Assembly Bill 1493
AB 32	California's Assembly Bill 32
APS	Alternative Planning Strategy
CAFE	Corporate Average Fleet Efficiency
CARB	California Air Resources Board
CBD	Center for Biological Diversity
CEQA	California Environmental Quality Act
CCAP	Center for Clean Air Policy
CNFF	Cleveland National Forest Foundation
SB 375	California's Senate Bill 375
CO_2	Carbon Dioxide
CO_2_e	Carbon Dioxide Equivalent GHG
EHM	"Extra Heroic Measures" LDV Case
GEO	Governor's Executive Order
ICE	Internal Combustion Engine LDV
kW-h	Kilo Watt-hour
LCFS	Low Carbon Fuel Standard
LDV	Light-Duty Vehicle
MPO	Metropolitan Planning Organization
Pavley	Senator Pavley's AB 1493
PPM	Parts per Million
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
S-3-05	Governor's Executive Order S-3-05
SANDAG	San Diego Association of Governments
SCS	Sustainable Community Strategy
TransNet	San Diego County sales tax

GHG	Greenhouse gas	**URL**	Universal Resource Locator
GW-h	Giga Watt-Hours	**VMT**	Vehicle Miles Travelled
HM	"Heroic Measures" LDV Case	**ZEV**	Zero Emission Vehicle LDV

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KEYWORDS

Driving, climate, mandates, S-3-05, SB 375, RTP, CEQA, Unbundled, GHG, CAFÉ, ZEVs

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September 16, 2011

Honorable Jerome Stocks
Chair, Board of Directors
San Diego Association of Governments
401 B Street, Suite 700
San Diego, CA 92101

RE: **Draft Environmental Impact Report for 2050 Regional Transportation Plan and Sustainable Communities Strategy**

Dear Chairman Stocks and Honorable Members of the Board:

Attorney General Kamala D. Harris submits the following comments on the Draft Environmental Impact Report (DEIR) prepared for the San Diego Association of Governments' (SANDAG) 2050 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS).[1] While we recognize the difficulty of SANDAG's task – to prepare the first SCS in the State as required by SB 375[2] – our review of the DEIR for the RTP/SCS has revealed some significant legal problems, as set forth below. We believe that SANDAG has the ability to correct these problems and improve the RTP/SCS, which will benefit not only the San Diego region, but will help to set the standard for other Metropolitan Planning Organizations across California.

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[1] The Attorney General submits these comments pursuant to her independent power and duty to protect the environment and natural resources of the State from pollution, impairment, or destruction, and in furtherance of the public interest. (See Cal. Const., art. V, § 13; Gov. Code, §§ 12511, 12600-12612; *D'Amico v. Bd. of Medical Examiners* (1974) 11 Cal.3d 1, 14-15.) This letter is not intended, and should not be construed, as an exhaustive discussion of the DEIR's compliance with the California Environmental Quality Act (CEQA).

[2] Senate Bill 375 (Chapter 728, Statutes of 2008).

Comments on the DEIR

Localized Air Pollution

The SANDAG region has some of the most serious local air quality problems in the State and the nation – in substantial part caused by vehicle emissions. The harm from these pollutants is not necessarily distributed equally throughout the region, but may be more concentrated in communities immediately adjacent to large-scale industrial and commercial development and major transportation corridors, and may more particularly affect certain segments of the population. As discussed below, our review of the DEIR indicates that SANDAG has set too low a bar for determining whether the air quality impacts of its RTP/SCS are significant, and, further, has failed to analyze the impacts of projected increases in pollution on communities that are sensitive or already overburdened with pollution, in violation of CEQA.

Background: Pollutants of Concern in the San Diego Air Basin

It is well established that "[t]he significance of an activity depends upon the setting." (*Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 718 [citing Cal. Code Regs., tit. 14, § 15064, subd. (b)]; see also *id.* at 721.) Accordingly, the significance of any added pollutant emissions must be judged in the context of an air basin that already exceeds health-based federal air quality standards. (See *ibid.*) The San Diego area was ranked by the American Lung Association this year as having the seventh worst ozone problem, and the fifteenth worst particulate pollution problem, in the nation.[3] Pollutants of concern in the San Diego air basin include ozone, the chemical commonly called "smog," which may permanently decrease lung function;[4] and particulate matter, which impairs lung function and can exacerbate asthma. Small particulate matter (2.5 microns in size or less), a component of diesel exhaust, is of particular concern, because it can penetrate deeply into the lungs, bypassing the body's defenses, and can carry carcinogens on the surface of the particles.

The seriousness of the localized air pollution problem as it exists today in the region can hardly be overstated. The area exceeded the health-based federal ozone standard on 24 days in 2009, and it exceeded the federal particulate standard on 4 days. The basin exceeded the more stringent California standard for ozone on 127 days in 2009, and the fine-particulate standard on 78 days. The area has a history of failing to meet applicable air quality objectives. The San Diego Air Pollution Control District (APCD) stated in its 2009 Regional Air Quality Strategy (RAQS) that it has not consistently met the Health and Safety Code's 5% per year ozone reduction target during any year during the 2003-2006 time period, and that the APCD expects reductions of only about 3% per year during the 2006-2009 time period. (San Diego APCD 2009-RAQS, p. 2.)

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[3] American Lung Association, *State of the Air 2011*, at pp. 11, 13.
[4] Gauderman, et al., *The Effects of Air Pollution on Lung Development from 10 to 18 Years of* Age (Sept. 9, 2004) 351 The New England Journal of Medicine 1057-1068.

SANDAG's Focus on "Conformity" with the State Air Pollution Plans Fails Adequately to Address the Region's Serious Air Quality Problems.

Where an area exceeds federal air quality standards for air pollutants, federal law allows funding of the individual transportation projects listed in an RTP only if the RTP "conforms" to a federally approved state plan to meet those federal standards. The DEIR's analysis of whether localized air pollution resulting from the RTP/SCS is significant under CEQA focuses almost exclusively on whether such conformity is achieved. There are significant problems with this limited approach, which substitutes a determination of whether certain federal laws are met for SANDAG's obligation under CEQA to conduct a thorough analysis of the actual effects on the air and on public health that will result from the addition of the many hundreds of miles of highway expansion and extensions that are in the RTP/SCS.

California's most recent federally approved plan was prepared in 2007, and therefore does not reflect current conditions. The DEIR acknowledges that the federal EPA is expected to soon reclassify the San Diego Air Basin as in "serious" nonattainment of the federal ozone standard, a designation that requires attainment of the federal standard by June of 2013. (DEIR, p. 4.3-6.) Demonstrating conformity with the 2007 plan emissions budgets does not, by itself, show that relevant health effects created by the new pollution generated by the RTP/SCS have been analyzed and disclosed, or even that the relevant federal standards will be met. Instead, EPA's reclassification of the air basin as having worse air quality, and the imposition of such a short deadline for meeting the federal ozone standard, indicates a more serious air pollution problem that may require more stringent control measures to protect the public health.[5]

In addition, the DEIR fails to analyze whether the California standard for ozone, more stringent than the federal standard, will be met during the life of the RTP/SCS, or what the RTP/SCS's contribution to current or future violations of that standard will be. The DEIR appears to rely solely on the RAQS to meet the state ozone standard. (See DEIR at p. 4.3-29-30.) Yet, as noted, the region has not consistently met the RAQS 5% per year ozone reduction target. The fact that U.S. EPA is expected to reclassify the Basin as in "serious" nonattainment of the less stringent federal ozone standard would indicate that the RAQS standards have not been enough to prevent deteriorating air quality. Thus, any assumption that the RAQS will consistently achieve the 5% reduction target in the future is unsupported, and any assertion that the RAQS will attain the state ozone standard at a time certain unfounded. A full analysis is

[5] Even if conformity with federal standards in state-approved plans were an appropriate benchmark for significance under CEQA, the DEIR does not contain a quantitative analysis, using the most recent available air quality measurements as the baseline, to determine whether the federal air quality standards will actually be met, and what the public health consequences would be of adding the expected pollutant load from the RTP/SCS to existing conditions. (DEIR, at p. 4.3-14.)

needed to show that the emissions caused by the RTP/SCS at different time points during its life will not contribute significantly to violations of the state ozone standard in the San Diego Air Basin.

SANDAG Has Failed Adequately to Address Impacts to Public Health and Communities Already Burdened with Pollution.

We commend SANDAG for including in its DEIR a chapter entitled "Environmental Justice." (DEIR, ch. 4.06.) That section appears to focus primarily on the RTP/SCS's effect on access to transit by traditionally underserved communities. SANDAG has, however, failed to analyze other equally, if not more, significant effects of the RTP/SCS on communities currently experiencing environmental injustice. The principal omission of the DEIR is the lack of any discussion of the impacts of the increased air pollution that will result from carrying out the RTP/SCS on communities already severely impacted by air pollution. As noted, CEQA requires that the significance of environmental impacts be considered in context. (*Kings County Farm Bureau, supra,* 221 Cal.App.3d at 718.) Such context may appropriately include (1) whether the region includes communities or subpopulations that may be particularly sensitive to increases in pollution; and (2) whether such communities or groups are already at or near their capacity to bear any additional pollution burden.

The DEIR does not identify whether the area affected by the RTP/SCS includes particularly sensitive communities that will be affected disproportionately by the acknowledged increase in pollution. "[A] number of studies have reported increased sensitivity to pollution, for communities with low income levels, low education levels, and other biological and social factors. This combination of multiple pollutants and increased sensitivity in these communities can result in a higher cumulative pollution impact." (Office of Environmental Health Hazard Assessment, *Cumulative Impacts: Building a Scientific Foundation* (Dec. 2010), Exec. Summary at p. ix.)[6] Research in other parts of California has shown that disadvantaged and minority communities are often exposed to unhealthful air more frequently and at higher levels than other groups.[7] Identifying these communities is an essential part of describing the relevant CEQA setting.

Once such communities are identified, SANDAG must analyze how the health of the residents in these communities would be expected to be particularly affected. As discussed, residents already are experiencing serious air pollution that is impacting health and welfare, and it is reasonable to assume that these effects currently are more concentrated in certain areas of the region, for example, in communities adjacent to large-scale industrial or commercial operations or transportation corridors used by heavy-duty trucks. In addition, viewed at the individual community scale, there may be synergistic adverse effects. For example, research

[6] Available at http://oehha.ca.gov/ej/cipa123110.html.
[7] Hall and Brajer, *The Benefits of Meeting Federal Clean Air Standards in the South Coast and San Joaquin Valley Air Basins* (2008) at 22-23.

has shown that increases in greenhouse gas emissions may result in localized ozone increases; such increases have been observed in California.[8]

We believe that particulate pollution may be of special concern to already burdened communities. As discussed, diesel particulate emissions have serious health effects, since they impact respiratory function and can exacerbate asthma. Further, diesel particulates are known to the State of California to cause cancer,[9] and have been listed by the Air Resources Board (ARB) as a toxic air contaminant.[10] The DEIR shows that particulate matter pollution will increase over the life of the RTP/SCS. (DEIR, Table 4.3-5, p. 4.3-25.) It also reports that the ARB estimated in 2000 – over a decade ago – that a subset of particulate pollution, fine particulates emitted by diesel vehicles, created an additional cancer risk of 720 cancer cases per one million persons exposed in the San Diego Air Basin. (DEIR, p. 4.3-8.) For comparison purposes, a private business must provide a warning if it exposes individuals to a chemical that poses an increased cancer risk of ten cases in one million people exposed. (Cal. Code Regs, tit. 27, § 25703(b).)

Despite this high cancer risk, and the DEIR's own recognition that particulate pollution will increase over the life of the RTP/SCS, the DEIR does not analyze what public health effects the increase in particulate matter will cause. Nor does it estimate what portion of the increase in particulate pollution will be carcinogenic diesel particulate matter, and disclose the public health effects that increase may cause. Such an analysis is required under CEQA, so that both the decision maker and the public can know the full consequences of the decision being made. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1219-1220.) We are especially concerned that no analysis is presented either of the current risk from particulate pollution, nor of the impact of the projected increase in particulate pollution, on already overburdened or sensitive communities. Given the increase in particulate emissions shown in the DEIR, given the emphasis in the RTP/SCS on the Goods Movement Strategy for the San Diego region (RTP/SCS, Chapter 6), and given the DEIR's recognition that much of this goods movement will be accomplished by diesel trucks (DEIR, p. 4-16-8; see, also, RTP/SCS, Tech. Appdx. 4, p. 4 [estimating that roads and truckways will carry 90% by volume of goods through the region]), it is incumbent on SANDAG to fully analyze the public health consequences of the RTP/SCS in general, and of the Goods Movement Strategy, in particular.[11]

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[8] Jacobson, *Enhancement of Local Air Pollution by Urban CO2 Domes* (2010) Environ. Sci. Technol. 2497-2502. This phenomenon is of concern because, as discussed, under the RTP/SCS, vehicle miles travelled (VMT) trends up as the total number of vehicles on the road increases. (DEIR, pp. 4.12-16, 4.12-21, 4.12-24; contrast with Table TA 3.1, showing an overall decrease of 1% in VMT by 2050.) Increases in VMT cause increased emissions of greenhouse gases, which may in turn exacerbate localized pollution.

[9] Cal. Code Regs., tit. 27, § 27001.

[10] Cal. Code Regs., tit. 17, § 93000.

[11] See *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1219-1220, cited above.

The goal of an RTP/SCS is a sustainable community, and no community can be sustainable unless its public health is protected. Thus, while the inclusion of a separate chapter of the DEIR on environmental justice is commendable, the current analysis is deficient, and should be redone and expanded to disclose the full scope of the air pollution and public health consequences of the RTP/SCS, and to propose mitigation measures for those consequences that are proportional to the seriousness of the impacts. (*City of Marina v. Board of Trustees of the California State University* (2006) 39 Cal.4th 341, 361-62.) We would be happy to work with SANDAG in making this part of the DEIR more meaningful.

SANDAG Has Failed Adequately to Consider Feasible Mitigation for Localized Air Quality Impacts.

Although it finds the RTP/SCS's impacts on localized air pollution to be significant, the DEIR proposes almost no mitigation measures to reduce or offset these impacts. Instead, the DEIR states that "mitigation measures at the program level is [sic] infeasible" for ozone precursors and carbon monoxide, and defers all mitigation for these pollutants to individual project-level CEQA processes. (DEIR, pp. 4.3-46, 4.3-47, 4.3-48.) CEQA requires that project changes or mitigation either be adopted or shown through substantial evidence to be infeasible; the DEIR, however, does not make such a showing.

The DEIR offers virtually no evidence that program-level mitigation is actually infeasible, and the mitigation measures it does propose lack certainty and are incomplete. For example, compliance with future local land use plans (the scope of which is not now known) is identified as the only feasible mitigation for ozone-related impacts. (DEIR, p. 4.3-48.) Mitigation for fine particulate matter is not discussed separately from mitigation for coarse particulates, despite their different sizes, health impacts, and sources. The dust control measures in the DEIR are not shown to be effective against fine particulates, which come more from industrial processes and fuel combustion than from ground disturbance. The DEIR's treatment of mitigation for conventional air pollution does not comply with CEQA's substantive mandate to mitigate all significant impacts. (Pub. Resources Code, §§ 21002, 21081(a).)

It is vital for the health of the San Diego region's public that all feasible mitigation be adopted and carried out to prevent further deterioration of the already unhealthy air, and it is also vital for the region's economy. Research shows consistently that the costs of reducing pollution are far outweighed by clean-air benefits such as increased worker productivity, increased agricultural outputs, and reductions in mortality and illness that result from cleaner air.[12] The research cited above -- finding minority communities more severely affected by air pollution -- also calculated the significant costs associated with polluted air in other air basins. Costs ranged

[12] On a nationwide basis, the Office of Management and Budget has estimated that the benefits of clean air regulations outweigh the costs by a ratio of about four to one. OMB, "Informing Regulatory Decisions: 2003 Report to Congress on the Coasts and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities."

from $1,250 per person per year in the South Coast Air Basin to $1,600 per person per year in the San Joaquin Valley Air Basin, due to increased health care costs and emergency room visits, missed work and school days, and even premature deaths.[13] CEQA mandates that SANDAG improve its analysis of the feasibility of localized air pollution mitigation, and the economic benefits of cleaner air and healthier communities must be considered in the feasibility calculus.

Climate Change Impacts: Greenhouse Gas Emissions

Before discussing the DEIR's treatment of GHG emissions, it is important first to establish the relevant context for evaluating significance. The climate is affected by the concentration of GHGs in the atmosphere. The concentration of carbon dioxide, the primary GHG, has increased from approximately 280 parts per million (ppm) in pre-industrial times to well over 380 ppm, according to the National Oceanic and Atmospheric Administration's (NOAA) Earth Systems Research Laboratory.[14] Almost all of the increase is due to human activities (such as fossil fuel use).[15] The current rate of increase in carbon dioxide concentrations is about 1.9 ppm/year; present carbon dioxide concentrations are higher than any time in at least the last 650,000 years.[16] GHGs persist in the atmosphere for decades and in some cases millennia.[17]

The atmosphere and the oceans are reaching their capacity to absorb GHGs without significantly (and perhaps abruptly) changing the Earth's climate. California is already seeing the effects of climate change. As the Resources Agency observed in its 2009 report, we already are experiencing sea level rise, coastal erosion, increased average temperatures, more extreme hot days and increased heat waves, fewer shifts in the water cycle, and increases in the frequency and intensity of wildfires. (Resources Agency, *2009 Climate Adaptation Strategy* at p. 3.)[18] These effects are expected to increase with rising GHG levels in the atmosphere.

The burdens of climate change will not be shared equally. Future climate scenarios are expected to disproportionately affect, for example, the urban poor, the elderly and children, traditional societies, agricultural workers and rural populations. (Office of Environmental Health Hazard Assessment, *Indicators of Climate Change in California: Environmental Justice Impacts* (Dec. 2010) at p. 2.)[19]

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[13] Hall and Brajer, at 5.
[14] See http://www.epa.gov/climatechange/science/recentac.html.
[15] *Id.*
[16] *Id.*
[17] Intergovernmental Panel on Climate Change, *Frequently Asked Questions*, FAQ 10.3 (2007), available at www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-faqs.pdf.
[18] Available at http://www.climatechange.ca.gov/adaptation/.
[19] Available at http://oehha.ca.gov/multimedia/epic/epic123110.html.

In order to stabilize the climate and avoid the most catastrophic outcomes of climate change, we must substantially reduce our annual GHG emissions over time, achieving a low-carbon future by midcentury. California has memorialized this overarching environmental objective in law. Under AB 32[20], by 2020, California must reduce its total statewide greenhouse gas emissions to the level they were in 1990. (Health & Saf. Code, § 38550). To achieve AB 32's 2020 target, total statewide greenhouse gas emissions must be reduced by approximately 15 percent from current (2008) levels. AB 32 implements Executive Order S-03-05 (2005),[21] which set the statewide 2020 target as an interim step to reducing statewide emission levels, by 2050, to 80 percent below 1990 levels. "The 2020 goal was established to be an aggressive, but achievable, mid-term target, and the 2050 greenhouse gas emissions reduction goal represents the level scientists believe is necessary to reach levels that will stabilize climate." (Air Resources Board (ARB), Scoping Plan at p. 4.)[22]

The emissions reductions required to reach our statewide climate objective are substantial. In the longer term, we must reduce our total GHG emissions by approximately four percent per year between 2020 and 2030, and our per capita emissions by slightly less than five percent per year during the 2020 to 2030 period, with continued reductions required through midcentury. (These reductions required are graphically illustrated by the chart from ARB's Scoping Plan, attached to this letter as Exhibit A.) One of the prime objectives of SB 375, a law supporting and complementary to AB 32, and of the requirement for Sustainable Communities Strategies, is to create a long-term downward trajectory for GHG emissions in California through transportation and land use strategies.

Given the seriousness of the climate change problem, and the enormity of our GHG reduction task, we are greatly concerned that, when viewed in context, the RTP/SCS seems to be setting the region on a course that is inconsistent with the State's climate objectives. Specifically, per capita GHG emissions from cars and light-duty trucks increase as compared to the previous year after 2020 (see RTP, Table 301 at p. 3-3), while AB 32 requires that we must aggressively and steadily reduce total per capita GHG emissions during this time period. (See Exhibit A.) Moreover, the total number of vehicle miles travelled (VMT) driven in the San Diego region will steadily increase over the life of the RTP/SCS over the 2010 baseline by 10%, 32% , and 51% in 2020, 2035, and 2050, respectively. (DEIR, pp. 4.12-16, 4.12-21, 4.12-24;

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[20] Cal. Health and Safety Code, § 38,500, *et seq.*

[21] The DEIR states that the Executive Order "does not constitute a 'plan' for GHG reduction, and no state plan has been adopted to achieve the 2050 goal." (DEIR, pp. 4.8-29 to 4.8-30.) The DEIR therefore does not find the RTP/SCS's failure to meet the Executive Order's goals to be a significant impact. This position fails to recognize that Executive Order S-3-05 is an official policy of the State of California, established by a gubernatorial order in 2005, and designed to meet the environmental objective that is relevant under CEQA (climate stabilization). SANDAG thus cannot simply ignore it.

[22] Available at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. The Scoping Plan was readopted by ARB on August 24, 2011.

contrast with Table TA 3.1.) Under the most optimistic figures presented in the DEIR, total VMT will drop only 1% over current levels by 2050. Moreover, the DEIR predicts that the 14.33 million metric tons of greenhouse gases (expressed as MMT of carbon dioxide equivalent) emitted by cars and light duty trucks in 2010 (DEIR, p. 4.8-5) will fall to 12.04 MMT in 2020 (DEIR, p. 4.8-20), based largely on statewide tailpipe and fuel standards, but will then begin rising again, to 12.94 MMT in 2035 and 14.74 MMT in 2050. (DEIR, pp. 4.8-23, 4.8-25, respectively.) Thus, although SANDAG will meet the SB 375 goals for per capita GHG targets for cars and trucks set for it by ARB in 2020 and 2035, the DEIR shows that total GHG emissions from cars and light-duty trucks in 2050 will increase over the 2010 emissions level.

The DEIR finds the impact of the RTP/SCS on GHG emissions to be not significant in 2020 (DEIR, p. 4.8-20), significant in 2035 (DEIR, p. 4.8-23), and significant in 2050 (DEIR, p. 4.8-25). SANDAG must, however, make a determination whether the project as a whole has significant climate change impacts. We believe strongly that it does. What the DEIR shows is that the suite of strategies relied on by SANDAG, which include a heavy reliance on roadway expansion projects, does not deliver GHG reductions that are sustainable in the long term. In fact, infrastructure and land use decisions made in the early years of the RTP/SCS may lock in transportation inefficiencies and preclude any realistic possibility of meeting the Executive Order's goal of an 80% reduction in GHG emissions. The DEIR states that "[t]otal land-use based GHG emissions in 2050 are projected to be 21.85 MMT CO2e, or 50 percent greater than GHG emissions in 2010 (Table 4.8-11)." (DEIR at p. 4.8-24.) The DEIR should address the impact of the draft RTP/SCS on this important long-term policy in greater detail.

The DEIR is legally deficient for the additional reason that it does not analyze potential changes to the project design or specific mitigation measures for the GHG emissions impacts from land use; it makes only a generalized promise to prepare future RTPs "to incorporate policies and measures that lead to reduced GHG emissions." (DEIR, p. 4.8-35.) Further, the DEIR proposes some mitigation measures for GHG emissions attributable to transportation, but does not include any transportation mitigation that relates to land use, nor does it show that any such measures would be infeasible. We believe that CEQA requires much more analysis of potential mitigation measures, and that postponing this discussion and analysis until future RTP/SCS's and individual projects is a violation of CEQA's substantive provisions. (Public Res. Code §§ 21002, 21081(a); see *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 89-96.) SANDAG has the authority to approve the RTP/SCS even if it will have substantial environmental impacts, and CEQA will not second-guess the wisdom of that choice, so long as substantial evidence supports SANDAG's findings. (Public Res. Code § 21081(b).) However, SANDAG may not approve an environmentally damaging project until and unless it has adopted all feasible mitigation measures or shown that further mitigation – including land use mitigation – is infeasible. The DEIR does not yet do so.

We recognize that this is the first SCS prepared in California, and that SANDAG is charting new territory. However, the legal requirements of CEQA, including the requirement to mitigate significant impacts to the extent feasible, are not satisfied simply because the RTP/SCS meets the targets contained in SB 375 for 2020 and 2035. CEQA demands a full analysis and all

feasible mitigation of every significant impact resulting from the implementation of the RTP/SCS, throughout the full life of the Plan. The DEIR does not now provide this for GHG emissions.

Comments on RTP/SCS

Although we are not commenting directly on the legal adequacy of the RTP/SCS under SB 375, we concur in the comments submitted to SANDAG by the California Office of Planning and Research (OPR). As discussed above, we are particularly concerned that per capita greenhouse gas (GHG) emissions associated with cars and light-duty trucks (and associated co-pollutants like particulate matter) begin to rise after 2020. (See OPR comment letter at pp. 3-4; Draft RTP at p. 3-3, Table 3.1; see also DEIR at Tables 4.3-5, p. 4.3-25.) As OPR notes, this "implies that future growth will be unavoidably less transportation efficient, which counters SB 375's underlying purpose." (OPR comment letter at p. 3.) If the RTP/SCS in fact runs counter to SB 375's purpose to reduce transportation-related GHG emissions over time, this would bear on whether the effects of the plan should be considered significant under CEQA.

In addition, OPR's comments discuss a failure of the DEIR and RTP/SCS to fully disclose the methodology by which VMT was projected, making it difficult or impossible for the lay public to determine for itself whether the information presented in the two documents is accurate and supported by substantial evidence. This lack of transparency is also a crucial flaw under CEQA, a statute whose purposes include accountability as to governmental decisions that affect the environment. (*Laurel Heights Improvement Ass'n v. Regents of the University of California* (1989) 47 Cal.3d 376, 392 [holding that "the EIR . . . is a document of accountability" for the public officials who certify it].)

Conclusion

We appreciate the difficulty of preparing the first SCS in California. We believe that SANDAG has not yet prepared a DEIR on the RTP/SCS that fully satisfies CEQA's requirements, and urge SANDAG to redo several parts of the DEIR, as described in our comments herein. This RTP/SCS presents SANDAG with an opportunity to integrate transportation and land-use planning in a way that reduces GHG emissions and harmful air pollution, and that produces other benefits such as increased mobility and better public health for all the region's residents, particularly its sensitive and already overburdened communities. We

would be happy to work with SANDAG to take the additional steps needed to take full advantage of this opportunity. We appreciate your consideration of our comments.

Sincerely,

Timothy R. Patterson by SLD

TIMOTHY R. PATTERSON
Supervising Deputy Attorney General

Susan L Durbin

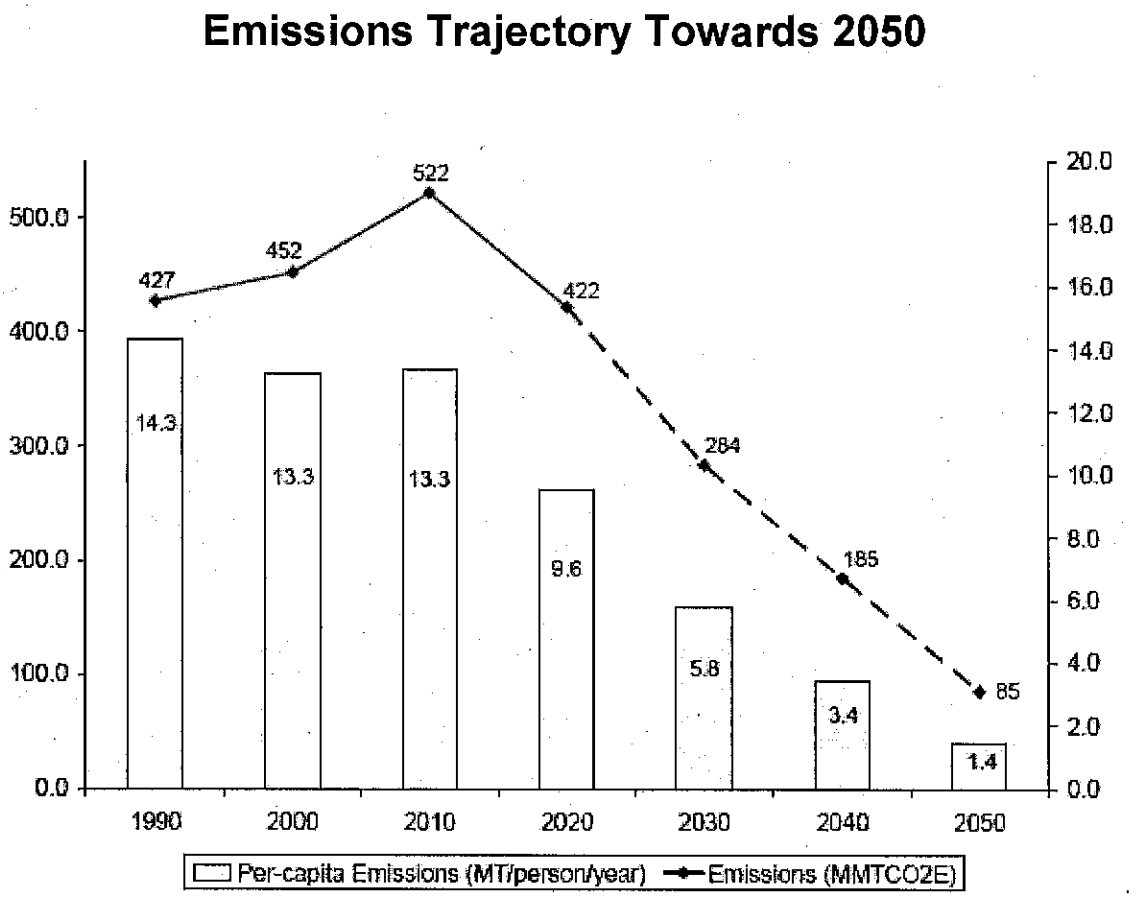
SUSAN DURBIN
Deputy Attorney General

For KAMALA D. HARRIS
Attorney General

cc: Gary Gallegos, Executive Director, San Diego Association of Governments
Julie D. Wiley, General Counsel, San Diego Association of Governments

Attachment

EXHIBIT A



(ARB, Scoping Plan, Figure 6, at p. 118.)

Deriving a Climate-Stabilizing Solution Set of Fleet-Efficiency and Driving-Level Requirements, for Light-Duty Vehicles in California

AWMA Paper 796315

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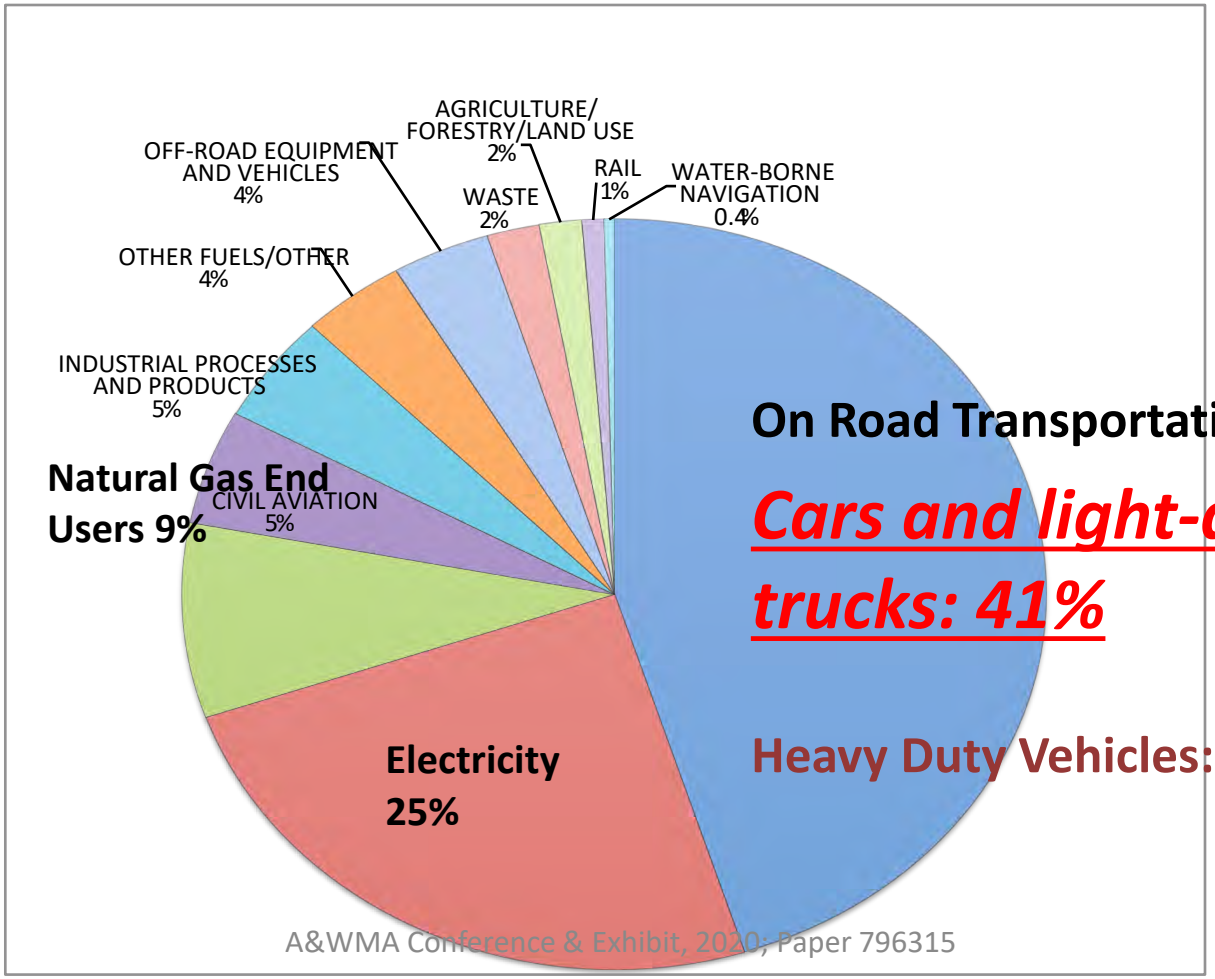
Why pick on cars?

Greenhouse Gas (GHG) Emissions, SD County

Source: Energy Policy Initiatives Center (EPIC, USD)

http://www.sandiego.edu/EPIC/ghginventory/GHG-On-Road1.pdf.pdf



Why is there a Climate Problem?

Any Earth Science text book* contains the following facts:

- **Atmospheric CO2 traps heat**
  - CO2 Molecules absorb and then emit, in a random direction, infrared radiation, heat given off by the Earth's surface
  - This effect is significant
- **Combustion of fossil fuels adds great quantities of CO2 to our Earth's atmosphere**
  - The amount of C02 in the atmosphere is well known
  - Our yearly emissions are well known

*** For example, Page 539 of *Earth Science*, Tarbuck and Lutgens, Tenth Edition, published by Prentice Hall, 2003.**

How Bad Could It Get?

- *Scientific American* June 2008 issue
  - 550 PPM CO2 possible in several decades
  - This could (5% probability) lead to 8 Deg. Celsius of warming
  - 8 Deg. Celsius could lead to "a devastating collapse of the human population, perhaps even to extinction"
- December 24/31 2012 Issue of Nation magazine:

A recent string of reports from impeccable mainstream institutions-the International Energy Agency, the World Bank, the accounting firm of PricewaterhouseCoopers-have warned that the Earth is on a trajectory to warm by at least 4 Degrees Celsius

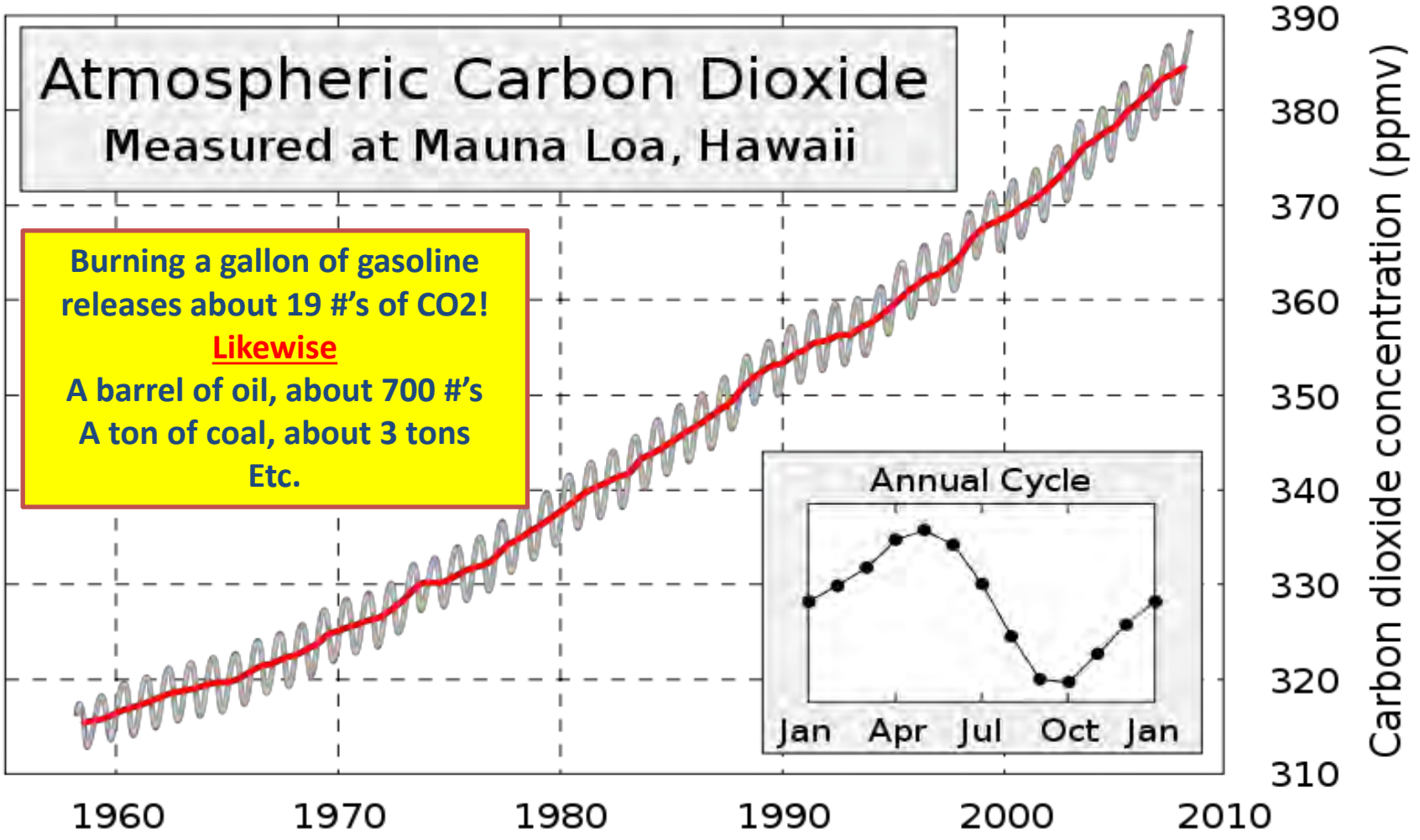
[4 Degrees Celsius] would be *incompatible with continued human survival*.

Winter, ***UU World*** magazine (p. 57) " Lags in the replacement of fossil-fuel use by clean energy use have put the world on a pace for 6 degree Celsius by the end of this century. Such a large temperature rise occurred 250 million years ago and extinguished 90 percent of the life on Earth. The current rise is of the same magnitude but is occurring faster. We must reduce or eliminate all uses of fossil fuels.

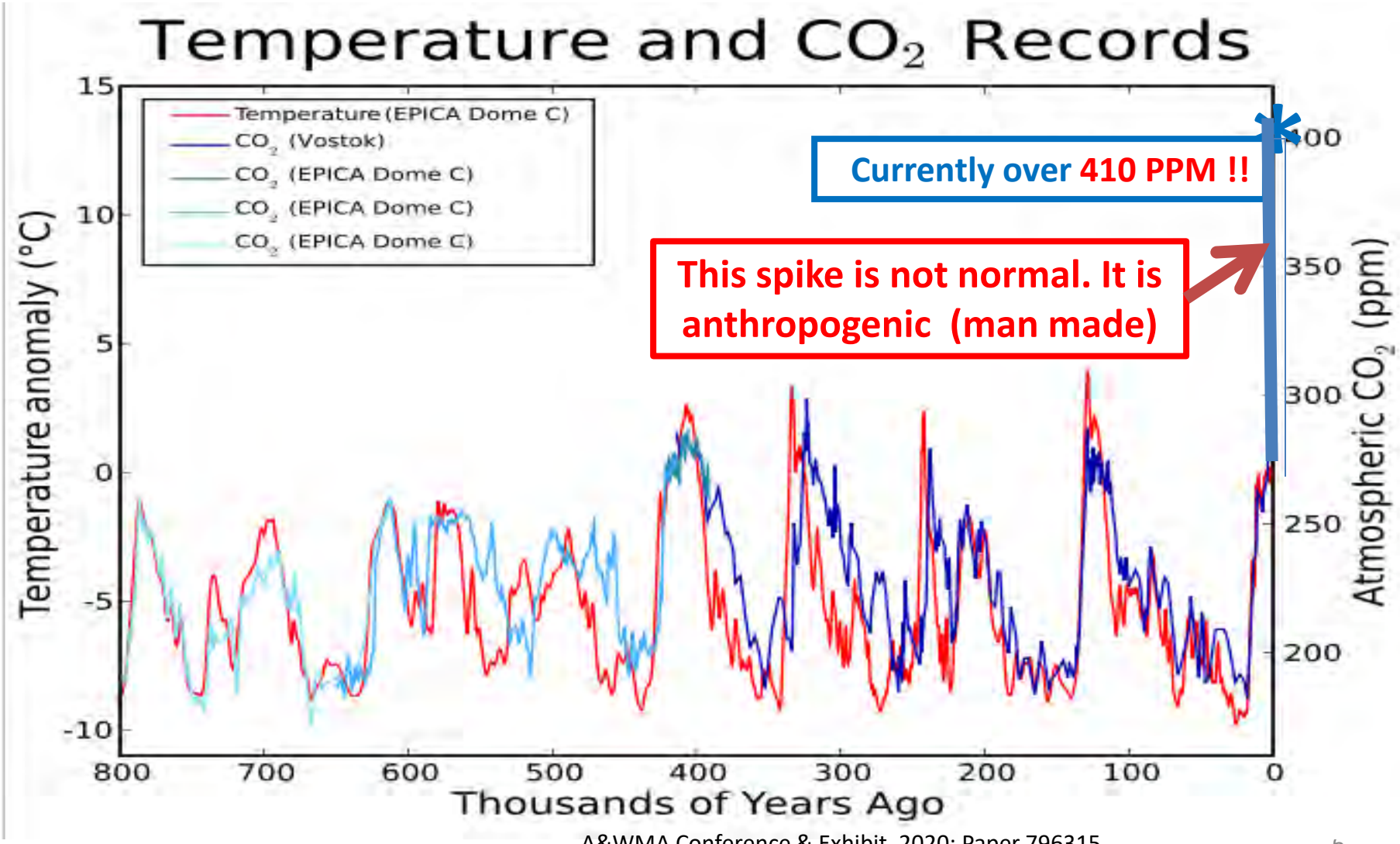
Climate Data

Currently around 415 PPM! *

- Keeling Curve:
  http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis

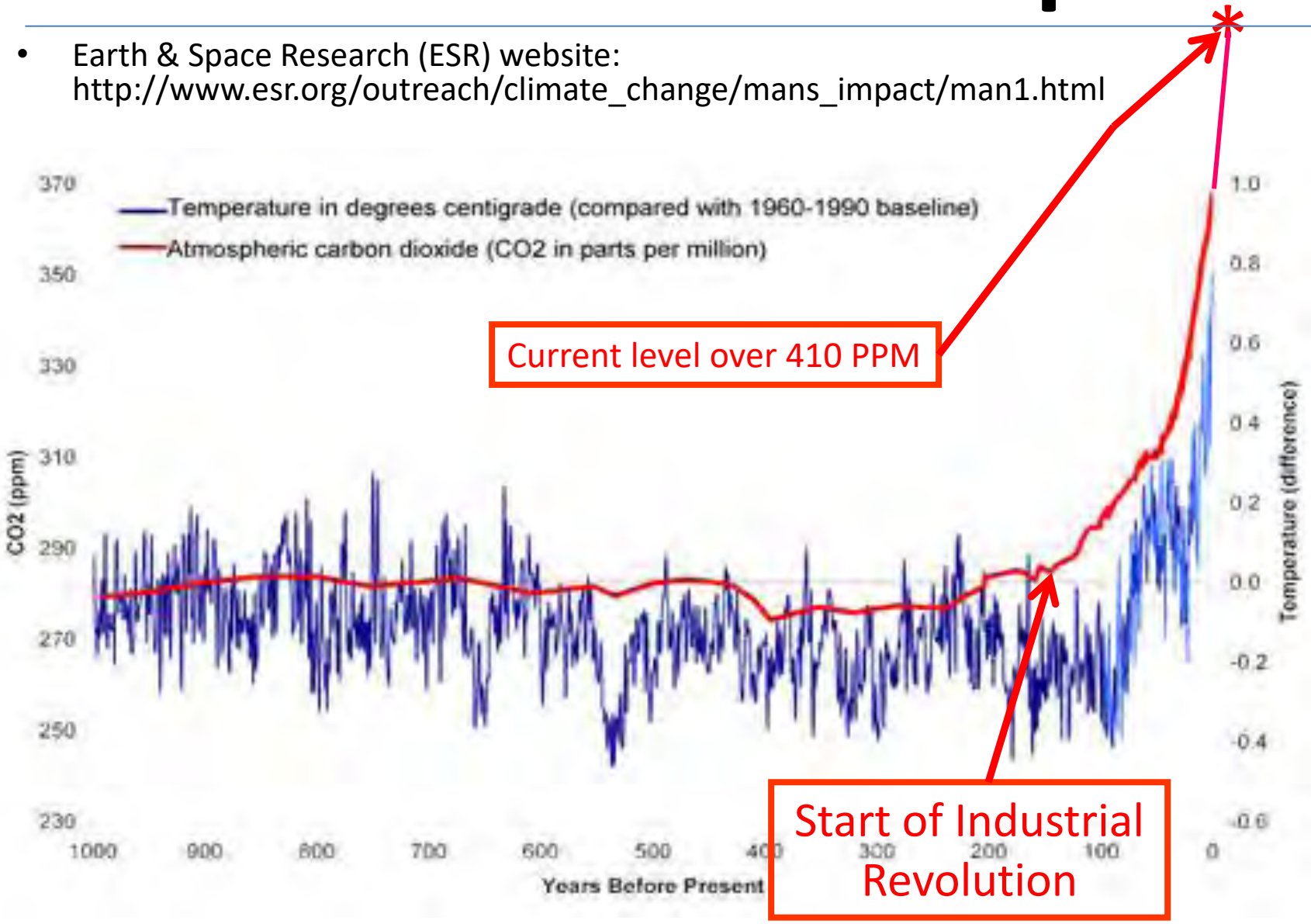


Climate Change, Mostly Normal



Let's Zero In on that Spike

- Earth & Space Research (ESR) website: http://www.esr.org/outreach/climate_change/mans_impact/man1.html



Fixing the Problem

We must stabilize the value of the earth's atmospheric CO2_e

CO2_e Emissions | **Sequestration (Photosynthesis)**

$E_N + E_A + E_{WFB}$ > → Positive Slope

$E_N + E_A + E_{WFB}$ = → Zero Slope

$E_N + E_A + E_{WFB}$ < → Negative Slope

S

Natural: rotting, fire, digestion. respiration

Anthropogenic: combustion of fossil fuel, methane, other

Warming **F**eed **B**ack: such as methane from melting permafrost

Growth of plants on Earth

The Warming Feed Back term, E_{WFB}, is the wild card. It must not become dominant.

Fixing the Problem page 2 of 2

We must stabilize the value of the earth's atmospheric CO2_e. Here is Step 1:

If Anthropogenic emissions were sufficiently low, the slope would be zero, thus capping the value of the Earth's atmospheric CO2_e. To achieve this, industrialized nations must limit their emissions to 80% below their 1990 levels.

Warning: The Warming Feed Back terms must not become dominant.

BRIEF OF SCIENTISTS AMICUS GROUP AS *AMICI CURIAE* IN SUPPORT OF PLAINTIFFS-APPELLANTS SEEKING REVERSAL

DANIEL M. GALPERN
Law Offices of Charles M. Tebbutt, P.C.
941 Lawrence St. Eugene, OR 97401-2815

USCA Case #13-5192 Document #1465822 Filed: 11/12/2013

A. Parties and *Amici*. Except for the following, all parties, intervenors, and *amici* appearing before the district court and in this Court are listed in the Brief for Plaintiffs-Appellants. **James Hansen**, David Beerling, Paul J. Hearty, Ove Hoegh-Guldberg, Pushker Kharecha, Valérie Masson-Delmotte, Camille Parmesan, Eelco Rohling, Makiko Sato, Pete Smith, and Lise Van Susteren are *amici curiae* in this appeal (referred to hereinafter as "Amici Scientists.").

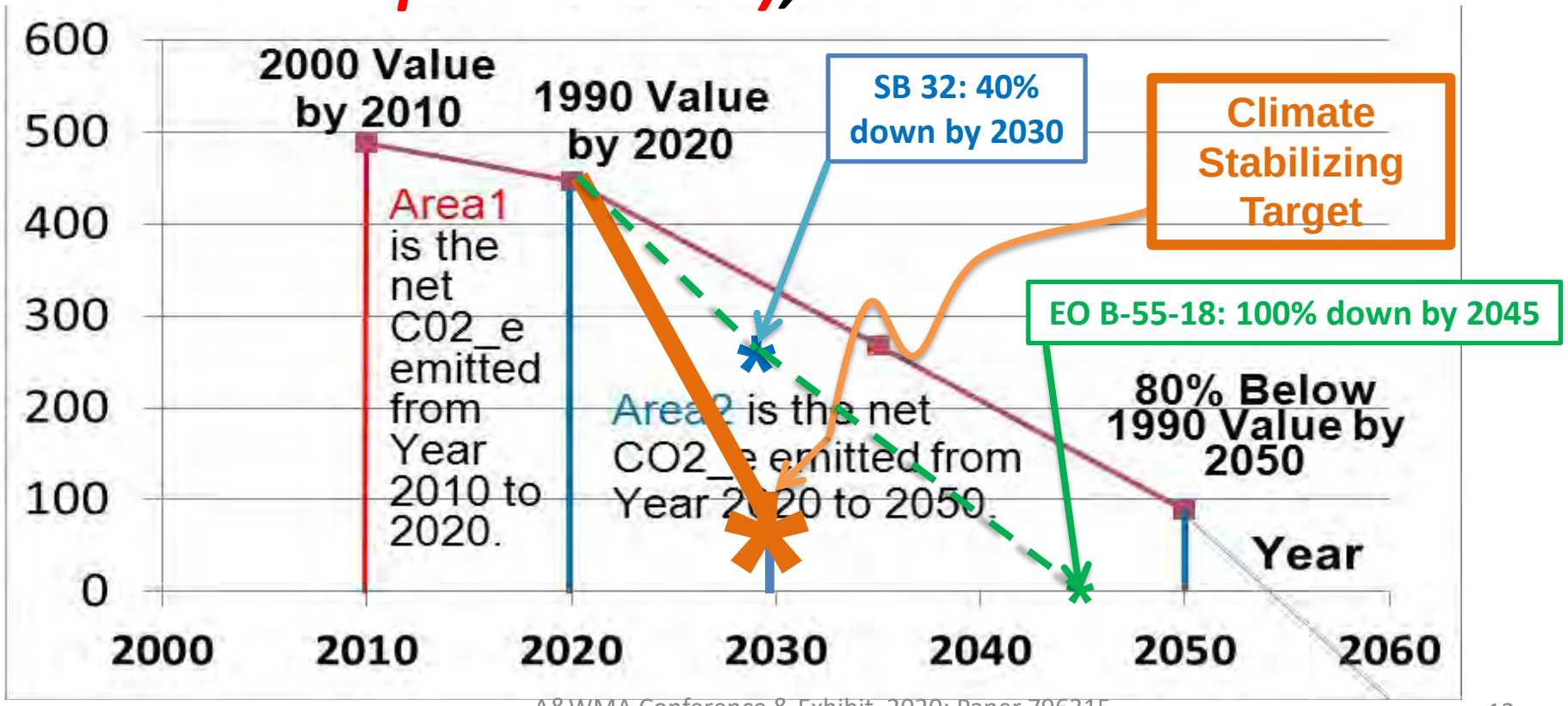
From the Climate Scientists

From Page 21: . . . the required rate of emissions reduction would have been about 3.5% per year if reductions had started in 2005, ***while the required rate of reduction, if commenced in 2020, will be approximately 15% per year.***

- My math:
  - 15% means a factor of 0.85, year after year
  - Consider the 10 years from 2020 to 2030
  - $(.85)^{\mathbf{10}} = .20$, which is 80% down
  - Other articles, describing Hansen's work: "**decarbonization by 2030**"

New Climate-Stabilization Prescription

Shown with 3 California Mandates: EO S-3-05 (Red Line & 4 Square Points), SB 32 and EO B-55-18



***How*, for LDVs:**

Deriving a Climate-Stabilizing Solution Set of Fleet-Efficiency and Driving-Level Requirements, for Light-Duty Vehicles in California

We have the climate scientist's target. We must now derive the LDV Requirements.

Notes on Methods

- Base year 2005
- Intermediate year 2015
- Car Efficiency Factor from 2005 to 2015
  - Steve Winkelman's data
  - http://www.nrdc.org/globalWarming/sb375/files/sb375.pdf
- Car Efficiency Factor, 2015 to 2030
  - Derived in paper (and here)
  - Results in car-efficiency requirements
- Cars last 15 years

From a California law (***SB 375***) giving per-capita driving reduction targets to be achieved in Regional Transportation Plans

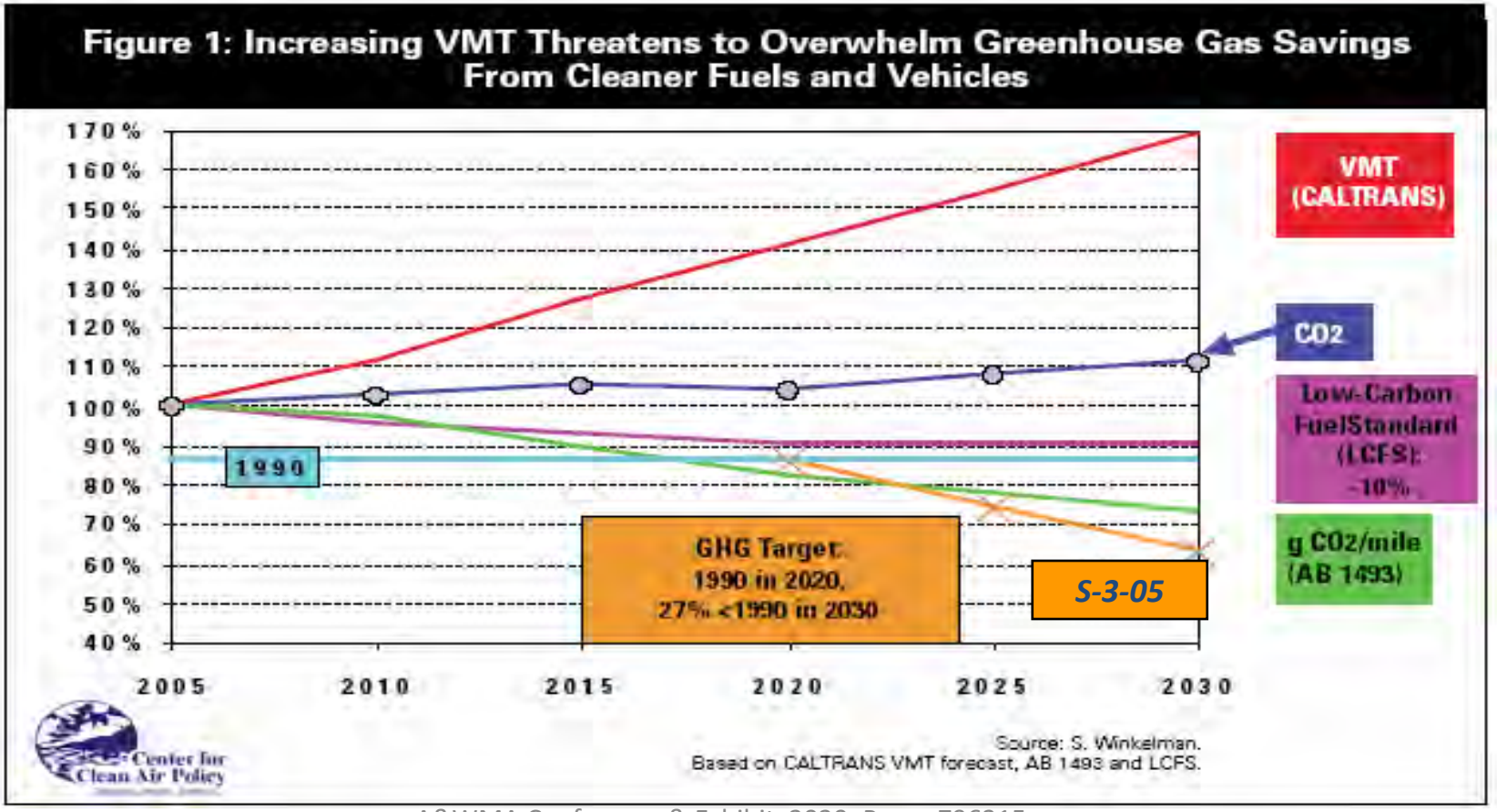
Report on ***SB 375*** See its Table 1.

Cars that survive beyond 2030 are balanced out by those that don't survive to 2030.

Data Relating 1990, 2005, & 2015 Data

Purple (Low carbon fuel), Green (C02/Mile), & Gold (S-3-05)

Figure 1, from: http://www.ecovote.org/sites/default/files/pdf/sb375.pdf



Variables

Definitions	
e_k	LDV Emitted C02, in Year "k"
L_k	Low Carbon Fuel Standard (LCFS) Factor that reduces the Per-Gallon CO2 emissions, in Year "k" (k is denotes Year 2030)
C_k	LDV CO2 emitted per mile driven, average, in Year "k", not accounting for the Low Carbon Fuel Standard (LCFS) Factor
c_k	LDV CO2 emitted per mile driven, average, in Year "k", accounting for the Low Carbon Fuel Standard (LCFS) Factor
p_k	Population, in Year "k"
d_k	Per-capita LDV driving, in Year "k"
D_k	LDV Driving, in Year "k"
M_k	LDV Mileage, miles per gallon, in Year "k"
m_k	LDV Equivalent Mileage, miles per gallon, in Year "k" accounting for the Low Carbon Fuel Standard (LCFS) Factor, so this is M_k/L_k
N	Number of pounds of CO2 per gallon of fuel but not accounting for the Low Carbon Fuel Standard (LCFS) Factor

Fundamental Equations

Future Year k: $\boldsymbol{e_k} = c_k * d_k * p_k$

Base Year i: $\boldsymbol{e_i} = c_i * d_i * p_i$

$$\frac{\boldsymbol{e_k}}{\boldsymbol{e_i}} = \frac{\boldsymbol{c_k}}{\boldsymbol{c_i}} * \frac{\boldsymbol{d_k}}{\boldsymbol{d_i}} * \frac{\boldsymbol{p_k}}{\boldsymbol{p_i}}$$

To work with mileage: $\dfrac{\boldsymbol{m_i}}{\boldsymbol{m_k}} = \dfrac{\boldsymbol{c_k}}{\boldsymbol{c_i}}$

Solution Overview

"k" denotes Year 2030
"i" denotes Year 2005

Car Efficiency Factor
From existing mileage requirements and the ***requirements defined herein***

From existing and predicted population

$$\frac{e_k}{e_i} = \frac{m_i}{m_k} * \frac{d_k}{d_i} * \frac{p_k}{p_i}$$

From the known 1990-to-2005 factor and the **Climate-Stabilizing-Target, which is the factor of 2030 emissions to 1990 emissions**

The Independent Variable
It becomes the ***required per-capita driving reduction with respect to 2005 driving***

A&WMA Conference & Exhibit, 2020; Paper 796315

Solution Using Intermediate Year of 2015

From the **Climate-Stabilizing-Target**, **which is the factor of 2030 emissions to 1990 emissions**

Car Efficiency Factor
From existing mileage requirements and the ***requirements defined herein***

From Winkelman. It is the product of the factor from the green line and the purple line.

From known and predicted populations

$$\frac{e_{2030}}{e_{1990}} * \frac{e_{1990}}{e_{2005}} = \frac{c_{2030}}{c_{2015}} * \frac{c_{2015}}{c_{2005}} * \frac{d_{2030}}{d_{2005}} * \frac{p_{2030}}{p_{2005}}$$

Taken from the Winkelman data: the known 1990-to-2005 factor of emissions (the light blue line)

The Independent Variable
It becomes the ***required 2030 per-capita driving reduction with respect to 2005 driving***

Putting In the Easy-to-Get Values

From the **Climate-Stabilizing-Target**, **which is the factor of 2030 emissions to 1990 emissions ("80% down")**

Car Efficiency Factor
From existing mileage requirements and the ***requirements defined herein***

From Winkelman. It is the product of the factor from the green line and the purple line. There is less CO2 per mile, thanks to the LCFS

From known and predicted populations

$$0.20 * 0.87 = \frac{c_{2030}}{c_{2015}} * 0.90 * 0.93 * \frac{d_{2030}}{d_{2005}} * 1.17446$$

Taken from the Winkelman data: the known 1990-to-2005 factor of emissions (the light blue line)

This ratio is the Independent Variable.
It is the *required per-capita 2030 driving reduction with respect to 2005 driving*

Combining the Easy-to-Get Values, Solving for the Independent Variable, and Changing the 2015-to-2030 Car Efficiency from CO2-Per-Mile to Equivalent-Miles-Per-Gallon

$$0.17700 = \frac{c_{2030}}{c_{2015}} * \frac{d_{2030}}{d_{2005}}$$

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{c_{2015}}{c_{2030}}$$

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}}$$

Equivalent Mileage in 2030 is what we make it. **It better be as high as possible, because a large driving reduction will be difficult.**
= "NUMERATOR MILEAGE"

The required per-capita 2030 driving with respect to 2005 driving

2015 Fleet Mileage is computed
= "DENOMINATOR MILEAGE"

Some Requirements Defined to Achieve 2030 Fleet Equivalent-Mileage

- Low-Carbon Fuel Standards (LCFS)
- Corporate Average Fuel Efficiency (CAFÉ) Standards from 2015 to 2030
- Driving Reduction Factors (f_n) for bad-mileage years (Year n)

Both California's existing and extended, "L_k"

Existing, to 2025
Specified to 2030

- For example, 0.75 means 25% less driving
- ***Cash for Gas-guzzlers?***

Three More Requirements

Defined to Achieve 2030 Fleet Equivalent-Mileage

- CAFÉ Standards only apply to Internal Combustion Engine (ICE) LDVs
- New Requirement: Fraction of fleet sold that must be ***Zero Emission Vehicles*** (ZEVs)
- In 2030, only 15%, or (the other case) 10% of electricity is from fossil fuels

Define "z" to be the fraction of fleet sold that must be ZEVs

Fleet Mileage for Intermediate Year 2015

LDV Set	Years Old	Model Year	CAFE MPG	LCFS Factor L_{Year}	Factor Driven f	Gallons Used Per f*100 Miles
1	14-15	2001	24.0	1.0	1.0	4.17
2	13-14	2002	24.0	1.0	1.0	4.17
3	12-13	2003	24.0	1.0	1.0	4.17
4	11-12	2004	24.0	1.0	1.0	4.17
5	10-11	2005	25.0	1.0	1.0	4.00
6	9-10	2006	25.7	.9933	1.0	3.87
7	8-9	2007	26.3	.9867	1.0	3.75
8	7-8	2008	27.0	.9800	1.0	3.63
9	6-7	2009	28.0	.9733	1.0	3.48
10	5-6	2010	28.0	.9667	1.0	3.45
11	4-5	2011	29.1	.9600	1.0	3.30
12	3-4	2012	29.8	.9533	1.0	3.20
13	2-3	2013	30.6	.9467	1.0	3.09
14	1-2	2014	31.4	.9400	1.0	2.99
15	0-1	2015	32.6	.9333	1.0	2.86
					Sum of Gallons:	54.29
					Miles = 100*Sum(f's):	1500
					MPG = Miles/(Sum of Gallons):	27.63

Computed DENOMINATOR MILEAGE

ZEV Derivation Variables

Variable	Definition
m_z	ZEV Equivalent mileage (miles per equivalent gallon)
m_{zr}	ZEV Equivalent mileage if the electricity is from 100% renewables
m_{zf}	ZEV Equivalent mileage if the electricity is from 100% fossil fuels
r	fraction of electricity generated from sources not emitting CO2
G	Gallons of equivalent fuel used
D	Arbitrary distance travelled
Num	$m_{zr} \times m_{zf}$
Den	$r \times m_{zf} + (1 - r) \times m_{zr}$

ZEV Derivation

$$G = \frac{r \times D}{m_{zr}} + \frac{(1-r) \times D}{m_{zf}}$$

$$m_z = D/G = D/\left(\frac{r \times D}{m_{zr}} + \frac{(1-r) \times D}{m_{zf}}\right)$$

$$m_z = m_{zr} \times m_{zf} / \left(r \times m_{zf} + (1-r) \times m_{zr}\right)$$

$$m_z = Num/(Den)$$

m_{zr}	m_{zf}	r	1-r	Num	Den	m_z
5000	70	0.80	0.20	350000.00	1056.00	331.44
5000	70	0.85	0.15	350000.00	809.50	432.37
5000	70	0.90	0.10	350000.00	563.00	621.67

Four Variable Definitions & Selecting a Target Numerator Mileage Value

Variable	Definition
D_i	Distance travelled by ICE vehicles
D_z	Distance travelled by ZEV vehicles
G_i	Gallons of equivalent fuel used by ICE vehicles
G_z	Gallons of equivalent fuel used by ZEVs

This previously-derived equation was used.

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}}$$

The driving reduction, $\frac{d_{2030}}{d_{2005}}$, was set to 0.68, corresponding to a 32% reduction in driving.

Then, using the previously-computed $\mathbf{m_{2015}}$ = 27.63 mile per gallon (MPG), the ***Numerator Mileage (m_{2030})*** was computed to be around **106 MPG**.

Finally, the ***z*** values were selected in the following table, by trial and error, to get the ***Numerator Mileage (m_{2030})*** to be close to that **106 MPG** value.

"Balanced_1", 85% Renewable Electricity

ZevMileage = 432.37 So $G_z = D_z / 432.37$

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.9267	37.01	0.3	29.4	0.7943	0.02	2	0.005	31.40	0.7989	39.30
2017	35.1	0.9200	38.15	0.4	39.2	1.0275	0.02	2	0.005	41.20	1.0321	39.92
2018	36.1	0.9133	39.53	0.5	48.5	1.2271	0.03	3	0.007	51.50	1.2340	41.73
2019	37.1	0.9067	40.92	0.6	57.6	1.4077	0.04	4	0.009	61.60	1.4169	43.47
2020	38.3	0.9000	42.56	0.7	64.4	1.5133	0.08	8	0.019	72.40	1.5318	47.26
2021	40.3	0.8500	47.41	0.8	64.0	1.3499	0.20	20	0.046	84.00	1.3961	60.17
2022	42.3	0.8000	52.88	0.9	58.5	1.1064	0.35	35	0.081	93.50	1.1873	78.75
2023	44.3	0.8000	55.38	1.0	45.0	0.8126	0.55	55	0.127	100.00	0.9398	106.40
2024	46.5	0.8000	58.13	1.0	20.0	0.3441	0.80	80	0.185	100.00	0.5291	188.99
2025	48.7	0.8000	60.88	1.0	6.0	0.0986	0.94	94	0.217	100.00	0.3160	316.48
2026	51.2	0.8000	64.00	1.0	3.0	0.0469	0.97	97	0.224	100.00	0.2712	368.70
2027	53.7	0.8000	67.13	1.0	2.0	0.0298	0.98	98	0.227	100.00	0.2565	389.93
2028	56.2	0.8000	70.25	1.0	1.0	0.0142	0.99	99	0.229	100.00	0.2432	411.17
2029	58.7	0.8000	73.38	1.0	1.0	0.0136	0.99	99	0.229	100.00	0.2426	412.20
2030	61.2	0.8000	76.50	1.0	1.0	0.0131	0.99	99	0.229	100.00	0.2420	413.15
Sum of Miles and then Gallons of equivalent fuel:										1235.60	11.64	

Equivalent MPG of LDV Fleet in 2030: 106.17

ZEV Miles Driven = 795.0 Fraction of Miles Driven by ZEVs = 64.3%

Computed NUMINATOR MILEAGE

Computing the Ratio of Per-Capita 2030 Driving to Per-Capita 2005 Driving

Equivalent Mileage in 2030 = "**NUMERATOR MILEAGE**"

$$\frac{d_{2030}}{d_{2005}} = .1770 * \frac{106.17}{27.63} = .68$$

2015 Fleet Mileage was computed before **=** "**DENOMINATOR MILEAGE**"

The factor of 0.68 means there is a 32% reduction in per-capita driving, from 2005 to 2030.

Again, for the next case, the ***z*** values were selected by trial and error, to get the 106 MPG value, corresponding to a 32% decrease in driving.

"Balanced_2", 90% Renewable Electricity

ZevMileage = 621.67 So $G_z = D_z / 621.67$

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.927	37.01	0.3	29.4	0.7943	0.02	2	0.003	31.40	0.7975	39.37
2017	35.1	0.920	38.15	0.4	39.2	1.0275	0.02	2	0.003	41.20	1.0307	39.97
2018	36.1	0.913	39.53	0.5	48.5	1.2271	0.03	3	0.005	51.50	1.2319	41.81
2019	37.1	0.907	40.92	0.6	57.6	1.4077	0.04	4	0.006	61.60	1.4141	43.56
2020	38.3	0.900	42.56	0.7	64.4	1.5133	0.08	8	0.013	72.40	1.5262	47.44
2021	40.3	0.850	47.41	0.8	68.0	1.4342	0.15	15	0.024	83.00	1.4584	56.91
2022	42.3	0.800	52.88	0.9	67.5	1.2766	0.25	25	0.040	92.50	1.3168	70.25
2023	44.3	0.800	55.38	1.0	55.0	0.9932	0.45	45	0.072	100.00	1.0656	93.84
2024	46.5	0.800	58.13	1.0	30.0	0.5161	0.70	70	0.113	100.00	0.6287	159.05
2025	48.7	0.800	60.88	1.0	5.0	0.0821	0.95	95	0.153	100.00	0.2349	425.62
2026	51.2	0.800	64.00	1.0	3.0	0.0469	0.97	97	0.156	100.00	0.2029	492.84
2027	53.7	0.800	67.13	1.0	2.0	0.0298	0.98	98	0.158	100.00	0.1874	533.52
2028	56.2	0.800	70.25	1.0	1.0	0.0142	0.99	99	0.159	100.00	0.1735	576.42
2029	58.7	0.800	73.38	1.0	1.0	0.0136	0.99	99	0.159	100.00	0.1729	578.45
2030	61.2	0.800	76.50	1.0	1.0	0.0131	0.99	99	0.159	100.00	0.1723	580.31
Sum of Miles and then Gallons of equivalent fuel:										1233.60	11.61	

Equivalent MPG of LDV Fleet in 2030: 106.22

ZEV Miles Driven = 761.0 Fraction of Miles Driven by ZEVs = 61.7%

Computed NUMINATOR MILEAGE

Selecting a Target Numerator Mileage Value to Get a 0% Reduction in Driving

This previously-derived equation was used.

$$\frac{d_{2030}}{d_{2005}} = 0.17700 * \frac{m_{2030}}{m_{2015}}$$

The driving reduction, $\frac{d_{2030}}{d_{2005}}$, was set to 1.00, corresponding to a 0% reduction in driving.

Then, using the previously-computed $\mathbf{m_{2015}}$ = 27.63 mile per gallon (MPG), the ***Numerator Mileage (m_{2030})*** was computed to be around **156 MPG**.

Finally, the ***z*** values were selected in the following table, by trial and error, to get the ***Numerator Mileage (m_{2030})*** to be close to that **156 MPG** value.

"2005 Driving Case", 90% Renewable Electricity

Zev mileage = 621.67 So $G_z = D_z / 621.67$

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.9267	37.01	0.3	29.4	0.7943	0.02	2.0	0.003	31.40	0.7975	39.37
2017	35.1	0.9200	38.15	0.4	39.2	1.0275	0.02	2.0	0.003	41.20	1.0307	39.97
2018	36.1	0.9133	39.53	0.5	48.5	1.2271	0.03	3.0	0.005	51.50	1.2319	41.81
2019	37.1	0.9067	40.92	0.6	57.6	1.4077	0.04	4.0	0.006	61.60	1.4141	43.56
2020	38.3	0.9000	42.56	0.7	64.4	1.5133	0.08	8.0	0.013	72.40	1.5262	47.44
2021	40.3	0.8500	47.41	0.8	14.4	0.3037	0.82	82.0	0.132	96.40	0.4356	221.29
2022	42.3	0.8000	52.88	0.9	2.7	0.0511	0.97	97.0	0.156	99.70	0.2071	481.42
2023	44.3	0.8000	55.38	1.0	1.0	0.0181	0.99	99.0	0.159	100.00	0.1773	563.99
2024	46.5	0.8000	58.13	1.0	1.0	0.0172	0.99	99.0	0.159	100.00	0.1765	566.72
2025	48.7	0.8000	60.88	1.0	1.0	0.0164	0.99	99.0	0.159	100.00	0.1757	569.23
2026	51.2	0.8000	64.00	1.0	1.0	0.0156	0.99	99.0	0.159	100.00	0.1749	571.84
2027	53.7	0.8000	67.13	1.0	1.0	0.0149	0.99	99.0	0.159	100.00	0.1741	574.23
2028	56.2	0.8000	70.25	1.0	1.0	0.0142	0.99	99.0	0.159	100.00	0.1735	576.42
2029	58.7	0.8000	73.38	1.0	1.0	0.0136	0.99	99.0	0.159	100.00	0.1729	578.45
2030	61.2	0.8000	76.50	1.0	1.0	0.0131	0.99	99.0	0.159	100.00	0.1723	580.31
Sum of Miles and then Gallons of equivalent fuel:										1254.20	8.04	

Equivalent MPG of LDV Fleet in 2030: 155.99

ZEV Miles Driven = 990.0 Fraction of Miles Driven by ZEVs = 78.9%

Computed NUMINATOR MILEAGE

Computing the Ratio of Per-Capita 2030 Driving to Per-Capita 2005 Driving

Equivalent Mileage in 2030 is what we made it by selecting the "z" values in the previous table. = "**NUMERATOR MILEAGE**"

$$\frac{d_{2030}}{d_{2005}} = .1770 * \frac{155.99}{27.63} = 1.00$$

2015 Fleet Mileage was computed **= "DENOMINATOR MILEAGE"**

For the next case, the ***z*** values were taken from a published article describing values selected by the Chair of the California Air Resources Board, Mary Nichols.

"Mary Nichols Case", 90% Renewable Electricity

Zev Mileage = 621.67 So $G_z = D_z / 621.67$

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	0.9267	37.01	0.3	29.2	0.7886	0.027	2.7	0.004	31.89	0.7930	40.22
2017	35.1	0.9200	38.15	0.4	38.9	1.0201	0.027	2.7	0.004	41.62	1.0245	40.63
2018	36.1	0.9133	39.53	0.5	47.4	1.2003	0.051	5.1	0.008	52.56	1.2086	43.49
2019	37.1	0.9067	40.92	0.6	55.5	1.3560	0.075	7.5	0.012	63.01	1.3681	46.06
2020	38.3	0.9000	42.56	0.7	63.0	1.4814	0.099	9.9	0.016	72.98	1.4974	48.74
2021	40.3	0.8500	47.41	0.8	70.1	1.4790	0.124	12.4	0.020	82.47	1.4988	55.02
2022	42.3	0.8000	52.88	0.9	76.7	1.4509	0.148	14.8	0.024	91.48	1.4746	62.03
2023	44.3	0.8000	55.38	1.0	82.8	1.4957	0.172	17.2	0.028	100.00	1.5233	65.65
2024	46.5	0.8000	58.13	1.0	80.4	1.3834	0.196	19.6	0.032	100.00	1.4149	70.67
2025	48.7	0.8000	60.88	1.0	78.0	1.2813	0.220	22.0	0.035	100.00	1.3167	75.95
2026	51.2	0.8000	64.00	1.0	62.4	0.9750	0.376	37.6	0.060	100.00	1.0355	96.57
2027	53.7	0.8000	67.13	1.0	46.8	0.6972	0.532	53.2	0.086	100.00	0.7828	127.75
2028	56.2	0.8000	70.25	1.0	31.2	0.4441	0.688	68.8	0.111	100.00	0.5548	180.25
2029	58.7	0.8000	73.38	1.0	15.6	0.2126	0.844	84.4	0.136	100.00	0.3484	287.05
2030	61.2	0.8000	76.50	1.0	0.0	0.0000	1.000	100.0	0.161	100.00	0.1609	621.67
Sum of Miles and then Gallons of equivalent fuel:										1236.00	16.00	

Equivalent MPG of LDV Fleet in 2030: 77.24

ZEV Miles Driven = 457.9 **Fraction of Miles Driven by ZEVs = 37.0%**

Computed NUMINATOR MILEAGE

Computing the Ratio of Per-Capita 2030 Driving to Per-Capita 2005 Driving

Equivalent Mileage in 2030 is what resulted from the Mary Nichols statement. It is the "**NUMERATOR MILEAGE**"

$$\frac{d_{2030}}{d_{2005}} = .1770 * \frac{77.24}{27.63} = .495$$

2015 Fleet Mileage was computed = "**DENOMINATOR MILEAGE**"

CARB may not understand that the fleet electrification schedule suggested by their Board Chair would require that per-capita driving be about half what it was in 2005, if LDVs are to achieve climate-stabilizing targets.

Net Driving Decrease with Respect to 2005 Driving for the "Balanced" Cases

(Per-Capita Driving Factor) x (Population Factor) = Net Driving Factor

This factor corresponds to the 32% reduction in per-capita driving

(.68) x (1.1744) = .80

Therefore, even though the population will grow 17%, net driving must decrease by 20%.

Therefore, why add highway lanes?

We need enforceable measures to reduce driving so much there will be no more congestion!

4 Cases that Support Climate Stabilization

Note: Purple denotes difficult; red, impossible.

	Case Designations			
	Balanced_1	Balanced_2	2005 Driving	Mary Nichols
% Renewable Electricity	85.0%	90.0%	90.0%	90.00%
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	20.0%	15.0%	82.0%	12.35%
% ZEVs, Year 2022	35.0%	25.0%	97.0%	14.76%
% ZEVs, Year 2023	55.0%	45.0%	99.0%	17.18%
% ZEVs, Year 2024	80.0%	70.0%	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	32.0%	32.0%	0%	50.5%

Enforceable Measures to Reduce 2030 Driving by 32% With Respect to 2005

California designs and implements this

Local governments do this with a 3rd party vendor

Driving-Reduction Requirments	Per-Cent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Value-Priced Parking (Unbundling the Cost)	8%	0.92
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
Pay-to-Graduat e Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		**0.68**
% Reduction		**32%**

These enforceable measures are described in the AWMA paper.

An Important Pricing Strategy

A Road-Usage-Charge (RUC) Pricing & Payout System

THEREFORE, BE IT RESOLVED, that the Democratic Club of Carlsbad and Oceanside (DEMCCO) supports a road-usage charge (RUC) pricing & payout system that would (1) cover all road-use costs, including the environmental & health costs caused by driving; (2) mitigate impacts on low-income users; (3) protect privacy; (4) include congestion pricing; (5) keep the per-mile price incentive to drive energy-efficient cars at least as large as it is with today's fuel excise tax; and (6) send its earnings to all citizens and institutions that are currently losing money by subsidizing road use.

Another Important **Pricing** Strategy

A good car-parking system: value-priced (with congestion pricing), shared, automated, and providing earnings to those losing money because the parking is being provided.

The first such systems should be installed by a third-party vendor (such as **Google, Qualcomm, Uber, or Lime Bicycle)**, selected by a RFP (Request for Proposal) process, for municipal government employees, as part of the government's **Climate Action Plan**. It would be operated for the financial gain of the employees. The RFP would specify that even employees that continue to drive every day would at least break even. The winning third-party vendor would be skilled at monetizing parking, whenever it is not being used by the employees; at monetizing data; and at expanding the system. The system would be automated with a useful phone app to find the best parking at the user-specified price and walk-distance.

From: https://www.cadem.org/body/Final-CDP-Platform-2020-11.16.2019.pdf

From the 2020 California Democratic Party (CDP) Platform

- Work to ensure that all graduating high school students are climate literate, including knowing
  - o reasons for anthropogenic climate change and its potential for harm;
  - o the difference between climate stabilization and destabilization;
  - o climate-stabilizing greenhouse gas (GHG) reduction targets;
    - the basis for those targets, and
    - the measures needed to achieve them; and
  - o the primary categories of emissions, including the most problematic category: cars and light-duty trucks;

- Demand a state plan specifying how cars and light-duty trucks can meet climate-stabilizing targets by defining enforceable measures to achieve necessary fleet efficiency and per-capita driving limits;

- Demand Regional Transportation Plan (RTP) driving-reduction targets, shown by science to support climate stabilization;
- Work for equitable and environmentally-sound road and parking operations; smart growth; “complete streets”; teaching bicycling traffic skills; and improving transit, from local systems to high-speed rail;
- Support the design and implementation of a single, environmentally-sound technology system that will collect and distribute fees for the use of roads, parking, and transit that is both economically fair and convenient and protects user privacy and the interests of low-income users;
- Work for the electrification of all trucking and transit systems;
- Work to ensure that freeway expansion projects are subordinate to more sustainable alternatives that will result in more jobs and growth.

From the 2016 & 2018 Platform (*Dividend Account Parking*)

- Work for shared, convenient, and value-priced parking, operated with a system that provides earnings to those paying higher costs or receiving a reduced wage, due to the cost of providing the parking.

Please email comments or questions to **mike_bullock@earthlink.net**

Dividend-Account Parking: Feasible & Enforceable Mitigation

Updated from Air and Waste Management Association Paper 2010-A-554-AWMA

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ABSTRACT

Bundled-cost and *bundled-benefit* car-parking systems (generally called "free parking") are defined, showing that they are not free and that they increase the drive-alone mode, since non-drivers lose just as much money as those that use the parking.

Dividend-Account Parking (DAP) is defined as a parking system in which all of the parking spaces are *shared* by all drivers that are driving a car that is registered in the system. "Registered" means that the car can be associated with a person having an *account* in the system. The parking is *value-priced*, with an option for a *congestion pricing overlay*. The critical final feature is that the earnings (*dividends*) are given to the people, for whom the parking is built, such as employees, shoppers, residents of apartments or condominiums, students, or train riders. It is stated that this system is defined in the California Democratic Party (CDP) Platform, making it the official policy of the largest political, environmental, and public-policy-advocacy organization in California. It is also at the center of the Sierra Club's lawsuit against the San Diego County's Climate Action Plan (CAP). The court has found in multiple rulings that DAP is feasible mitigation.

Motivations for change are provided, mostly based on an Air and Waste Management Association paper, *Climate-Stabilizing California Light-Duty-Vehicle (LDV) Requirements*. The following is shown:

1. Parking reform is needed, since fleet electrification, while critically needed (ASAP), cannot, under even the most wildly-optimistic assumptions, achieve the needed GHG emission reduction, for light-duty vehicles (LDVs), soon enough to achieve climate-stabilizing targets.
2. Per-capita driving must be reduced.

It is asserted that parking reform has a large role to play.

DAP is presented as a feasible, enforceable, mitigation measure for any Climate Action Plan or for any application where sustainability is a goal.

100 word summary:

Bundled-cost and *bundled-benefit* car-parking systems (erroneously called "free") are defined, showing that they are not free and that they increase the drive-alone mode, since non-drivers lose just as much money as drivers, due to the parking.

Dividend Account Parking (DAP) is presented as a mitigation measure for any Climate Action Plan (CAP) or for any application where sustainability is a goal. The parking is shared, convenient, fully automated, and value priced with a congestion-pricing algorithm. Earnings go to those losing money because the parking is provided.

Motivations are provided, based on an Air and Waste Management Association (AWMA) paper.

Dividend-Account Parking (DAP) is defined as a parking system in which all of the parking spaces are *shared* by all drivers that are driving a car that is registered in the system. "Registered" means that the car can be associated with a person having an *account* in the system. The parking is *value-priced*, with an option for a *congestion pricing overlay*. The critical final feature is that the earnings (*dividends*) are given to the people, for whom the parking is built, such as employees, shoppers, residents of apartments or condominiums, students, or train riders. It is stated that this system is defined in the California Democratic Party (CDP) Platform, making it the official policy of the largest political, environmental, and public-policy-advocacy organization in California. It is also at the center of the Sierra Club's lawsuit against the San Diego County's Climate Action Plan (CAP). The court has found in multiple rulings that DAP is feasible mitigation.

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2. Per-capita driving must be reduced.

It is asserted that parking reform has a large role to play.

DAP is presented as a feasible, enforceable, mitigation measure for any Climate Action Plan or for any application where sustainability is a goal.

It shows documented driving reductions due to the pricing of parking. It notes that although the benefits of priced and shared parking are known, such parking has not been widely implemented, due to understandable concerns. It states that a system solution, called *Dividend-Account Parking*, can overcome these concerns, because it would be is easy to use, share, understand, and support. The system operates the parking to maximize the financial gain of those losing money because of the parking. Eight background informational items are provided, including how value-priced parking would help California achieve greenhouse gas (GHG) reduction targets. Arguments for less parking, shared parking, and priced parking are made. Barriers to progress are identified. The fair pricing of parking is described. Seven goals of *Dividend-Account Parking* are listed. Eleven definitions and concepts that define *Dividend-Account Parking* are given. This includes a method to compute a baseline price of parking and how to adjust that price instantaneously to keep the vacancy above 15%. That price adjustment implements "Congestion Pricing." This information is sufficient to support a "Request for Proposal" (RFP) process to get a *Dividend-Account Parking* design. An implementation strategy is provided.

INTRODUCTION:

It has been well established that appropriately priced parking will significantly reduce driving[1]. Most case studies presented in Table 1 are evaluations of the most general type of "car-parking cash-out": *a program that pays employees extra money each time they get to work without*

driving. They show that a price differential between using parking and not using parking will significantly reduce driving, even when transit is described as poor. Since driving *must* be reduced[2], the pricing of parking is desirable.

Shared parking is also recognized as desirable because it can sometimes result in less parking being needed.

Although the advantages of pricing and sharing parking have been recognized for many years, these practices are still rare. This paper identifies some of the reasons for this lack of progress. The pricing and sharing method of this paper has a natural transparency and ease of use that would reduce many of the concerns. This paper also suggests that those governments that have the necessary resources can take the lead role in developing and implementing the described systems. These governments will recover their investments, over time.

This paper describes how parking facilities could be tied together and operated in an optimum system, named *Dividend Account Parking (DAP)*. The description of *Dividend Account Parking (DAP)* is sufficient to support a "Request for Proposal" process, leading to full implementation.

There are two distinct parts to *Dividend Account Parking (DAP)*. The first is how to set the price. The second is how to distribute the earnings. Briefly, the earnings go to the individuals in the group for whom the parking is built.

Table 1 Eleven Cases of Pricing Impact on Parking Demand

Location	Number of Workers @ Number of Firms	1995 $'s Per Mo.	Parking Use Decrease
Group A: Areas with poor public transportation			
West Los Angeles	3500 @ 100+	$81	15%
Cornell University, Ithaca, NY	9000 Faculty & Staff	$34	26%
San Fernando Valley, Los Angeles	850 @ 1	$37	30%
Costa Mesa, CA	Not Shown	$37	22%
Average for Group		**$47**	**23%**
Group B: Areas with fair public transportation			
Los Angeles Civic Center	10,000+ @ "Several"	$125	36%
Mid-Wilshire Blvd, Los Angeles	1 "Mid-Size" Firm	$89	38%
Washington DC Suburbs	5,500 @ 3	$68	26%
Downtown Los Angeles	5,000 @ 118	$126	25%
Average for Group		**$102**	**31%**
Group C: Areas with good public transportation			
U. of Washington, Seattle, WA	50,000 employees, students	$18	24%
Downtown Ottawa, Canada	3,500 government staff	$72	18%
Bellevue, WA	430 @ 1	$54	39%*
Average for Group, except Bellevue, WA Case*		**$45**	**21%**
Overall Average, Excluding Bellevue, WA Case*			**25%**

* Bellevue, WA case was not used in the averages because its walk/bike facilities also improved and those improvements could have caused part of the decrease in driving.

PERTINENT BACKGROUND INFORMATION

- Vehicle miles traveled (VMT) are a major cause of global warming and pollution[2, 3].
- California's Metropolitan Planning Organizations (MPOs) will need to adopt strategies that reduce vehicle miles traveled (VMT), in order to meet SB375 GHG reduction targets, to be issued by the California Air Resources Board in late 2010, for years 2020 and 2035[2].
- The appropriate pricing of parking is one of the least costly documented tools to reduce VMT.
- New technologies, such as sensors feeding computer-generated billing, offer the potential to efficiently bill drivers for parking and alert law enforcement of trespassers.
- Reformed parking policies can increase fairness, so that, for example, people who use transit or walk do not have to pay higher prices or suffer reduced wages, due to parking.
- Methods to unbundle parking cost are inefficient unless they support the spontaneous sharing of parking spaces. Shared parking with unbundled cost would ultimately allow cities to require significantly less parking.
- Typical systems of timed parking and metered parking are far from ideal. Parking has no automated record keeping, so it is difficult to know where there is too much or too little.
- Good policies will eventually let cities turn parking minimums into parking maximums.

A GLIMPSE INTO A POSSIBLE FUTURE

Jason is driving to work for the first time in several years. He has decided to save money by carrying home a new 3-D, big-screen computer, which he plans to purchase at a store near his office after work. He wanted to avoid paying delivery charges.

Things have been changing around his office development since they unbundled the cost of parking at the near-by train station. Many people who caught the early trains and lived close to the station stopped driving and parking in the best parking spaces; demand for housing close to the station went up; and wealthy riders, who insisted on driving, did so, confidant that they could always find parking as close to the platform as their schedules required, due to congestion pricing. Who would have guessed how much those people were willing to pay? It was shocking. Parking-lot earnings, paid to round-trip train riders, meant that the net cost to ride the train went significantly down. Ridership and neighborhood vitality both went significantly up. All Jason knew was that the price to park at his office had been going up yearly because of increased land values. His parking-lot earnings from his office had been increasing almost every month, due to the ripple effect of train riders parking off-site at cheaper parking. Some of them were using his office parking.

As he pulls out of his driveway, he tells his GPS navigation unit his work hours (it already knew his office location), the location of the store where he plans to buy the computer, and his estimated arrival and departure times at the store. He tells the GPS unit he wants to park once, park no more than 1 block from the store, walk no more than 1 mile total, and pay no more than an average of $2 per hour to park. He is not surprised to hear the GPS tell him that his request is

impossible. He tells the GPS he will pay an average of $3 per hour and learns that the GPS has located parking.

It guides him into a church parking lot. He hopes the church will use his money wisely. The GPS tells him the location of a bus stop he could use to get to work and the bus's next arrival time at the stop. With automatic passenger identification and billing, the bus has become easy to use, except that it is often crowded. Jason gets out of the car and walks to work, with no action required regarding the parking.

Three weeks later, when Jason gets his monthly statement for his charges and income for automotive road use, transit use, parking charges, and parking earnings, he finds that the day's parking did indeed cost about $30 for the 10 total hours that he parked. He notes that the parking-lot earnings for his office parking averaged about $10 per day that month. He then notices the parking lot earnings from the store, where he spent about $1000 dollars. He sees that the parking-lot earnings percent for the store that month was 1.7%, giving him about $17. So for the day, Jason only spent a net of about $3 on parking. Then he realized that he should have had the computer delivered after all. If he would have bicycled that day, as he usually did, he would have still gotten the $27 earnings from the two parking facilities and he would have paid nothing for parking. So the choice to drive cost him $30. He remembers that the delivery would have only been $25 dollars. Oh well. He enjoyed his before-work and after-work walks.

THE CASE FOR LESS PARKING

Less parking will support more compact development.[1] This makes walking and biking more enjoyable and less time consuming. There would certainly be less "dead space", which is how parking lots feel to people, whether they arrive by car or not, after they become pedestrians.

Since parking can be expensive, less parking can reduce overhead costs significantly, such as leasing expense and parking-lot maintenance cost. Less overhead means more profit and less expense for everyone. A need for less parking can create redevelopment opportunities at existing developments and reduce project cost at new developments.

At new developments, car-parking costs could prevent a project from getting built.[2]

THE CASE FOR SHARED PARKING

Shared parking for mixed uses means that less parking is needed. For example, shared parking could be used mostly by employees during the day and mostly by residents at night.

Fully shared parking means that very little parking would be off limits to anyone. In a central business district with shared parking, drivers would be more likely to park one time per visit, even when going to several locations. Pedestrian activity adds vitality to any area.

THE CASE FOR APPROPRIATELY-PRICED PARKING

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[1] This is especially true of surface parking, which only accommodates 120 cars per acre.

[2] On September 23, 2008, a panel of developers reviewed the Oceanside, Ca. "Coast Highway Vision" http://www.ci.oceanside.ca.us/pdf/chv_finalvisionstrategicplan.pdf. Parts of this plan were described as smart growth.

At the review, developer Tom Wiegel said, "Parking is the number 1 reason to do nothing," where "do nothing" meant "build no project." The other developers at the meeting agreed.

To Reduce Driving Relative to Zero Pricing

Traditional Charging or Paying Cash-out Payments

As shown in the Introduction, this relationship (pricing parking reduces driving) is not new.[3]

Using results like Table 1, at least one study[4] has used an assumption of widespread pricing to show how driving reductions could help meet greenhouse gas (GHG) target reductions. Dr. Silva Send of EPIC http://www.sandiego.edu/epic/ghgpolicy/ assumes that all work locations with 100 employees or more in San Diego County will implement cash-out, to result in 12% less driving to work. Currently, almost all employees in San Diego County "park for free", unless they happen to work in a downtown core area.

Current, Best-Practice "Unbundling"

The "best-practice" use of the phrase, "unbundled parking cost", is to describe the case where either the cost of parking, for the case of a condominium, or the rent for parking, for the case of an apartment, is separated from either the purchase price and common fees or the rent of the dwelling unit.

This gives the resident families the choice of selecting the number of parking spaces they would like to rent or buy, including the choice of zero. This would tend to reduce the average number of cars owned per dwelling unit and, in this way, would also tend to reduce driving. Its major drawback is that this method does not encourage sharing.

To Increase Fairness and Protect the US Economy

It is stated above that almost all employees in San Diego County "park for free". Of course there is really no such thing as "parking for free". So-called "free parking" always reduces wages or increases costs. At a work site, it reduces everyone's wage, even those employees that never drive. At an apartment complex, so-called "free parking" increases the rent. Therefore, "free parking" at work or at apartments violates the fundamental rule of the free market, which is that people should pay for what they use and not be forced to pay for what they do not use. Parking should at least be priced to achieve fairness to non-drivers.

The US economy would also benefit. Reductions in driving would lead to reductions in oil imports, which would reduce the US trade deficit.[4]

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[3] For many years the Victoria Transport Policy Institute (VTPI) has been recognized as a source of reliable information on "Transportation Demand Management", or TDM.

From http://www.vtpi.org/tdm/tdm72.htm#_Price_Parking:

> Even a relatively small parking fee can cause significant travel impacts and provide significant TDM benefits.

"TDM Benefits" refers to the many public and private benefits of having fewer people choosing to drive.

[4] From http://en.wikipedia.org/wiki/Balance_of_trade#Warren_Buffett_on_trade_deficits, Warren Buffet wrote in 2006,

> "The U.S. trade deficit is a bigger threat to the domestic economy than either the federal budget deficit or consumer debt and could lead to political turmoil. Right now, the rest of the world owns $3 trillion more of us than we own of them."

BARRIERS TO PROGRESS

Given all this, it might seem that the widespread pricing of parking should have happened by now. However there are barriers. In 2007, a majority of the City Council of Cupertino, Ca. indicated that they wanted their City Manger to negotiate reduced parking requirements with any company that would agree to pay sufficient cash-out payments. To this date, no company, including Apple Inc., has expressed an interest. Most companies probably perceive cash-out as expensive. Even if they realize they could get a reduced parking requirement in exchange for paying sufficient cash-out amounts and even if the economics worked in support of this action (quite possible where land is expensive), they want to stay focused on their core business, instead of getting involved in new approaches to parking, real estate, and redevelopment.

On the other hand, simply charging for parking and then giving all the employees a pay raise is probably going to run into opposition from the employees, who will feel that they would be losing a useful benefit.

In addition, neighbors fear the intrusion of parked cars on their streets. Permit parking, which could offer protection, is not always embraced. City Council members know that a sizable fraction of voting citizens believe that there can actually never be too much "free parking", Professor Shoup's famous book[5] notwithstanding. Some Council members probably feel that way themselves.

It doesn't help that current methods of charging for downtown parking are often very inefficient.[5] For example, downtown Oceanside, California has parking meters that will only accept coins. Besides this, all their on-street, downtown parking is timed, with maximums from 10 minutes to 4 hours. These time limits are enforced by a city employee, who applies chalk from a tire to the street and then records the time. However, by watching the time and moving their car soon enough, drivers can avoid getting a ticket. Of course, they could instead drive to the mall and not have to worry about having coins or elapsed time since parking. It is not surprising that downtown merchants often object to charging for parking.

In summary, those that resist charging for parking, *based on their perceptions*, include

- Companies, *who fear the complexity and expense of paying cash-out payments*;
- Employees, *who fear losing a current benefit*;
- City leaders, *who fear the political repercussions*;
- Downtown patrons, *who dislike the inconvenience and worry*;
- Downtown business owners, *who fear that it will drive away customers*.

THE COST, VALUE, AND FAIR PRICE OF PARKING

Estimated and Actual Capital Cost

Surface Parking

One acre of surface parking will accommodate 120 cars. Land zoned for mixed use is sometimes expensive. At $1.2 million per acre, the land for a single parking space costs $10,000. Construction cost should be added to this to get the actual, as-built cost of each parking space.

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[5] According to Bern Grush, Chief Scientist of Skymeter Corporation http://www.skymetercorp.com/cms/index.php, often two-thirds of the money collected from parking meters is used for collection and enforcement costs.

Estimated cost can be determined by using appraised land value and construction estimates. For new developments, after the parking is constructed, it is important to note the actual, as-built cost.

Parking-Garage Parking

One acre of parking-garage will accommodate considerably more than 120 cars. The construction cost of the garage and the value of its land can be added together to get the total cost. Dividing that total cost by the number of parking spaces yields the total, as-built cost of each parking space. Adding levels to a parking garage may seem like a way to cut the cost of each parking space, for the case of expensive land. However, there is a limit to the usefulness of this strategy because the taller the parking garage, the more massive the supporting structural members must be on the lower levels, which increases total cost. Parking-garage parking spaces are often said to cost between $20,000 and $40,000. The actual costs should be noted.

Underground Parking

In order to compute an estimate for the cost of a parking space that is under a building, it is necessary to get an estimate of the building cost with and without the underground parking. The difference, divided by the number of parking spaces, yields the cost of each parking space. The cost or value of land plays no role in the cost of this parking. However, it does not follow that this parking is cheap. Underground parking spaces are often said to cost between $60,000 and $90,000 dollars each. Although there will be an “as built” cost of the building with the parking, there will never be an “as built” cost of the building without the parking. However, after the construction is done, the estimate for the cost of the underground parking should be reconsidered and re-estimated if that is needed. The final, best-estimate cost should be noted.

Value

Initially, value and cost are the same. For surface parking and parking-garage parking, the value would initially be the same as the as-built cost. For underground parking, the value would initially be the same as the best-estimate cost. However, over time, the value must be updated. Both construction costs and land-value costs will change. The value assigned to a parking place should always be based on the current conditions.

Fair Pricing

Parking space “values”, as described above, must first be converted to a yearly price by using a reasonable conversion factor. This conversion factor could be based on either the “cost of money” or the “earnings potential of money”. It is expected that this conversion factor would be 2% to 5% during times of low interest rates and slow growth; but could be over 10% during times of high-interest and high growth. For example, if the surface parking value is $12,000 and it is agreed upon to use 5% as the conversion factor, then each parking spot should generate $600 per year, just to cover capital costs. The amount needed for operations, collection, maintenance, depreciation, and any special applicable tax is then added to the amount that covers capital cost. This sum is the amount that needs to be generated in a year, by the parking space.

The yearly amount of money to cover capital cost needs to be re-calculated every year or so, since both the value and the conversion factor will, in general, change each year. The cost of operations, collection, maintenance, depreciation, and any special applicable tax will also need to be reconsidered.

Once the amount generated per year is known, the base price, per unit year, can be computed by dividing it (the amount generated per year) by the estimated fraction of time that the space will

be occupied, over a year. For example, if a parking space needs to generate $900 per year but it will only be occupied 50% of the time, the time rate charge is $1800 per year. This charge rate per year can then be converted to an hourly or even a per-minute rate. The estimated fraction of time that the parking is occupied over a year will need to be reconsidered at least yearly.

NEW DEFINITIONS TO PROMOTE AN OBJECTIVE VIEW OF PRICING

- The "fair price" means the price that accounts for all costs.
- The "baseline amount of driving" means the driving that results from the application of the fair price.
- "Zero transportation demand management" ("zero TDM") is the amount of demand management that results when the fair price is used. It will result in the baseline amount of driving.
- "Negative TDM" refers to the case where the price is set below the fair price. This will cause driving to exceed the baseline amount. Since TDM is commonly thought to be an action that reduces driving, it follows that negative TDM would have the opposite effect.
- "Positive TDM" refers to the case where the price is set above the fair price. This would cause the amount of driving to fall below the baseline amount.

Clearly, so-called "free parking" is an extreme case of negative TDM. The only way to further encourage driving would be to have a system that pays a driver for the time their car is parked.

GOALS OF THE "DIVIDEND ACCOUNT PARKING" CAR-PARKING SYSTEM (FORMERLY "*INTELLIGENT PARKING")*

- There is only one third-party vendor (or several, collaborating so closely that users are unaffected compared to a single operator) operating all parking. ("All parking" does not include driveways and garages in single-family homes.) *Dividend Account Parking* is designed and installed by regional or state government, using low-bid contractors, with design and start-up costs covered by the overhead portion of collection fees.
- Nearly all parking is shared. Almost always, anyone can park anywhere. Those who want exclusive rights to parking will pay "24/7" (all day, every day).
- Parking is operated so that the potential users of parking will escape the expense of parking by choosing to not use the parking. This characteristic is named "unbundled" because the cost of parking is effectively unbundled from other costs.
- Parking is priced and marketed to eliminate the need to drive around looking for parking.
- Parking at any desired price is made as easy as possible to find and use.
- Records of the use of each parking space are kept, to facilitate decisions to either add or subtract parking spaces.
- The special needs of disabled drivers, the privacy of all drivers, and, if desired, the economic interests of low-income drivers are protected.

DEFINITIONS & CONCEPTS OF *DIVIDEND ACCOUNT PARKING (DAP)*

Parking Beneficiary Groups

There are at least 7 types of beneficiary groups. Note that in all cases, members of beneficiary groups must be old enough to drive.

1.) People who have already paid for the capital cost of parking. An example of this type of beneficiary group would be the owners of condominiums, where parking has been built and the cost is included in the price of the condominium. Note that although they have technically already paid for the parking, if they borrowed money to pay for some portion of the price, the cost is built into their monthly payment. This illustrates why the value of parking and the cost of borrowing money (rate of return on money) are key input variables to use to compute the appropriate base, hourly charge for parking.

2.) People who are incurring on-going costs of parking. An example of this type of beneficiary group is a set of office workers, where the cost of 'their" parking is contained in either the building lease or the cost of the building. Either way, the parking costs are reducing the wages that can be paid to these employees.[6]

3.) People who are purchasing or renting something where the cost of the parking is included in the price. Examples of this beneficiary group are people that rent hotel rooms, rent an apartment, buy items, or dine in establishments that have parking.

4.) People who own off-street parking as a business. They could be the individual investors or could be a government or government-formed entity.

5.) People who are said to benefit from parking, even though the money for the parking has been supplied by a source that may have very little relationship to those that are said to benefit. An example of this group would be train riders that make round trips from a station which has parking that is said to be "for riders". Students at a school with parking would be another example.

6.) People who are considered by many to be the logical beneficiaries of on-street parking. Owners of single-family homes are the beneficiaries of the parking that is along the boundaries of their property. The same status is given to residents of multi-family housing.

7.) Governments. Since they build and maintain the streets, they should get a significant benefit from on-street parking.

Unbundled Cost and Spontaneous Sharing

"Unbundled cost" means those who use the parking can see exactly what it costs and those who don't use the parking will either avoid its cost entirely or will get earnings to make up for the hidden parking cost they had to pay. This conforms to the usual rule of the free market where a person only pays for what they choose to use. Unbundled cost is fair.

"Spontaneous sharing" means that anyone can park anywhere at any time and for any length of time. Proper pricing makes this feasible.

How to Unbundle

The method of unbundling can be simply stated, using the concept of "beneficiary group" as discussed above. First, the fair price for the parking is charged. The resulting earnings[7] amount is

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[6] Such parking is often said to be "for the benefit of the employees". Defining this beneficiary group will tend to make this statement true, as opposed to the common situation where the employees benefit only in proportion to their use of the parking.

[7] The earnings amount is the revenue collected minus the collection cost and any other costs that will have to be paid due to the implementation of *Dividend Account Parking (DAP)*. The costs associated with the parking, paid *before*

given to the members of the beneficiary group in a manner that is fair to each member. Methods are described below.

Why this Supports Sharing

Members of a beneficiary group benefit financially when "their" parking is used. They will appreciate users increasing their earnings. They are also not obligated to park in "their" parking. If there is less-expensive parking within a reasonable distance, they might park there, to save money. This is fine, because all parking is included in the *Dividend Account Parking (DAP)* system.

Computing the Earnings for Individuals

Dividend Account Parking (DAP) must be rigorous in paying out earnings[7]. For a mixed use, the total number of parking spaces must first be allocated to the various beneficiary groups. For example in an office/housing complex, 63.5% of the parking might have been sold with the office. If so, the housing portion must be paying for the other 36.5%. For this case, it would follow that the first step is to allocate 63.5% of the earnings to the workers and 36.5% to the residents.

How the monthly earnings are divided up among the members of the beneficiary group depends on the beneficiary group type. For each member, the group's total monthly earnings amount is always multiplied by a quantity and divided by the sum (the sum is the denominator) of that quantity, for all members.

For example, for each employee, the multiplier is the number of hours that the employee worked over the month while the denominator is the total number of hours worked by all employees over the month. At a school, for each student, the numerator is the total time spent at the school, over the month, while the denominator is the sum of the same quantity, for all the students.

For a train station with parking being supplied for passengers that ride on round trips of one day or less, the numerator is the passenger's monthly hours spent on such round trips, over the month; while the denominator is the total number of hours spent by all passengers on such round trips, over the month. Radio Frequency Identification (RFID) units on passengers could support an automated calculation of monthly charges for fares, as well as monthly hours on round trips.

At a shopping center, the numerator is the sum of the money spent by the shopper, over the month, while the denominator is the total amount of money spent by all shoppers over the month.

At a condominium, the numerator is the number of parking places that were paid for (directly or indirectly) by the resident family and the denominator is the total number of parking places at the condominium project; similarly, for apartment complexes.

Where Earnings Are Low

The goal is that if someone doesn't park, they don't pay, either directly or indirectly, because the earnings that they get will balance out their losses (like reduced wages, for example). However, charging for parking that few want to use will not sufficiently compensate the people that have been forced, or are being forced, to pay for such parking. The only remedy in this case is to redevelop the parking or lease the parking in some other way, for storage, for example. The

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the implementation of *Dividend Account Parking (DAP)*, should *not* be subtracted from the revenue because they will continue to be paid as they were before the implementation of *Dividend Account Parking (DAP)*. Therefore, these costs will continue to reduce wages and increase the prices of goods and services.

earnings from the new use should go to those that are in the beneficiary group that was associated with the low-performing parking.

Why This Method of Unbundling Will Feel Familiar to Leaders

Developers will still be required to provide parking and will still pass this cost on, as has been discussed. There will be no need to force an owner of an exiting office with parking to break his single business into two separate businesses (office and parking).

Parking beneficiaries are identified that conform to traditional ideas about who should benefit from parking.[8]

Unbundling the Cost of On-Street Parking

The revenue from on-street parking in front of businesses will be split evenly between the city and the business's parking beneficiaries. All of the earnings from on-street parking in front of apartments or single-family homes will be given to the resident families.[9]

Special Considerations for Condominiums

Unbundling for a condominium owner means that, although their allocated amount of parking has added to their initial cost, their allocated amount of parking also earns money for them. Unbundling for a condominium could also mean that an owner can choose to have control over a single or several parking places. Such parking spaces could be equipped with a red light and a green light. If the red light is lit, this will mean that the space is not available for parking, except for the person who is controlling the spot. If the green light is lit, it will mean that the space is available to anyone. A space that is being reserved with a red light is charged at the full price to the condominium owner that has control over the space. The owner that controls these spaces can change the state of the parking space (available or not available) by either a phone call, on line, or at any pay station system that might be in use for the system. After condominium owners experience the cost of reserving a space for themselves, they might give up on the idea of having their own, personal, unshared parking space; especially since *Dividend Account Parking (DAP)* will give most owners and their guests all the flexibility they need in terms of parking their cars.

Some people think that condominium parking should be gated, for security reasons. However, parking within parking garages needs to be patrolled at the same frequency level as on-street parking, which is enough to ensure that crime around either type of parking is very rare. Cameras can help make parking garages that are open to the public safe from criminal activity.

Special Considerations for Renters

Unbundling for renters means that, although their allocated amount of parking increases their rent, their allocated amount of parking also earns money for them. Therefore, their traditional rent (includes parking) is effectively reduced by the money earned by those parking spaces allocated to them. Renters will be motivated to either not own a car or to park in a cheaper

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[8] Showing exactly where parking earnings go will reduce the political difficulties of adopting pay parking in a democracy where the high cost of parking is often hidden and rarely discussed.

[9] Although governments own the streets, often, back in history, developers paid for them and this cost became embedded in property values. Admittedly, how to allocate on-street parking earnings is somewhat arbitrary. With congestion pricing and efficient methods, governments may earn significantly more than they are under current practices.

location. Parking in a cheaper location is not a problem because all parking is part of the *Dividend Account Parking (DAP)* system. Renters will welcome anyone to park in "their" parking, because it will increase their earnings.

Special Considerations for Employers

At first, companies may want the option of offering "free parking" to their employees so as to be able to compete with traditional job sites. This means giving employees that drive every single day an "add-in" amount of pay so that the sum of the add-in and their parking-lot earnings equals their charge, for any given monthly statement. The operator of the parking, which sends out statements, can pay out the "add in" amount, in accordance with the company's instruction. The company will then be billed for these amounts. There could be no requirement for the company to provide any such "add-in" amount to the employees that don't drive every day. This would allow the company to treat its every-day drivers better than other employees and so this would be a negative TDM. However, this economic discrimination would be substantially less than the current, status-quo, economic discrimination, where drivers get "free" parking and non-drivers get nothing.

Clusters of Parking

Clusters are a contiguous set of parking spaces that are nearly equal in desirability and thus can be assigned the same price. They should probably consist of from 20 to 40 spaces. For off-street parking, they could be on either side of the access lane to the parking spaces, so that an observer could see the 20 to 40 cars, and get a feel for the vacancy rate. At a train station, clusters will normally be organized so that their parking spaces are approximately an equal distance from the boarding area. On-street clusters would normally conform to our current understanding of what a block is, which is to say from one cross street to the next cross street. The width of the street and the length of the block should be taken into account in defining on-street clusters of parking and in deciding if the parking on either side of the street should or should not be in the same cluster of parking spaces.

Examples of Good and Bad Technology

Parking Meters or Pay Stations

Parking meters are a relic of an earlier period, before computers. Pay stations do not add enough usefulness to merit their inclusion in *Dividend Account Parking (DAP)*, except as a bridge technology. Once good systems are set up, pay stations should cost additional money to use because of their expense. It would be best to devise an implementation strategy that will minimize their use when the system is first put into effect and will take them out of service as soon as possible.

Radio Frequency Identification Backed Up by Video-Based "Car Present" and License Recognition

Government will eventually enter into an RFID (Radio Frequency Identification) age. Organizers of large athletic events already have. Organizers that put on large open-water swims, foot races, and bike rides have routinely used RFID for many years.[10] An RFID vendor in San Diego[11]

[10] For example, over 20,000 people ran the 2008 Bay-to-Breakers foot race in San Francisco. Each runner had a "chip" in their shoe lace. Each runner's start time and finish time were recorded and all results were available as soon as the last runner crossed the finish line.

states that passive RFID units cost less than $5, are reliable, are durable, and they could be used to identify cars as well as people. He also sees no problem in implementing most of the features of *Dividend Account Parking (DAP).*[12]

Automatic Data Collection and Sending Out Statements

Note that the "back end database" of Dr. Carta's written statement[12] refers to the ability to send statements of earnings and billing to students.[13]

Putting it Together

Certainly, government, and in particular transit agencies and parking agencies, could use RFID-based technology. For example, when a person with an RFID unit which is tied to a billable address or a credit card with an open account gets on a bus or a train, they should not have to pay at that time, visit a pay station, or "swipe a card" that has a positive balance. Utility customers that pay their bills are not required to pre-pay. The same courtesy should be extended to transit riders, people that drive on roads, people that get parking-lot earnings, and people that park cars. There should be one monthly bill or statement, for all four activities.

Global Positioning Systems GPS

An alternative model is to have GPS systems in cars that would detect the car's parking location, that location's current charge rate, and would perform all of the charging functions in the car. The only information the parking-lot-enforcement system would need is whether or not a car being parked is owned by a bill-paying owner. The car owner's responsibility would be to pay the bills indicated by the box in the car. The box would need to process a signal that a bill had been paid. It would also need to process pricing signals.

Not Picking Winners

The purpose of this report is to describe what an ideal system would do, *not* how it is done. How a proposed system works is left to the systems, software, and hardware engineers that work together to submit a proposal based on this description of what an ideal system does.

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[11]David R. Carta, PhD, CEO Telaeris Inc., 858-449-3454

[12] Concerning a Final Environmental Impact Report-approved and funded new high school in Carlsbad, California, where the School Board has signed a *Settlement Agreement* to consider "*unbundled parking*", "*cash-out*", and "*pricing*", Dr. Carta wrote, in a January 13th, 2010 written statement to the Board,

> I wanted to send a quick note discussing the technical feasibility of tracking cars into a lot without impacting students or requiring the need for gates. Mike Bullock and I have discussed this project; it can be accomplished straightforwardly by utilizing Radio Frequency Identification and/or Video Cameras integrated with automated license recognition systems. The cars would need to register with the system at the start, but it would be fairly painless for the users after the initial installation. The back end database system can also be implemented both straightforwardly and at a reasonable price.
>
> This is not necessarily a recommendation of the proposal for unbundled parking. Rather it is strictly an unbiased view of the technical feasibility of the proposal to easily and unobtrusively track cars, both registered and unregistered, into a fixed lot.

[13] In an earlier email on this subject, Dr. Carta wrote,

> This is not too tough - we probably would integrate with a service that already sends physical mail from an electronic submission instead of re-inventing this wheel.

Privacy

Privacy means that no one can see where someone has parked, without a search warrant. Also, the level of the detail of information that appears on a bill is selected by the customer.[14]

Ease of Use for Drivers

For credit-worthy drivers that have followed the rules of the system, pay parking will not require any actions other than parking. Paying for all parking fees over a month is then done in response to a monthly billing statement. Parking will feel to the consumer like a service provided by a municipality, such as water, energy, or garbage. One important difference is that users belonging to a "beneficiary group" will get an earnings amount in their monthly statement. Those that earn more than what they are charged will receive a check for the difference. This ease of use will make all parking less stressful.

Base Price

Off-Street

Off-street parking is priced so that even if demand does not threaten to fill the parking beyond 85%, the money generated will at least equate to an agreed-upon return on the parking value and pay all yearly costs. Equation 1 shows the calculation of the hourly rate.

$$r_{BaselineHourly} = \frac{(r_{Investment} \times v_{Parking}) + c_{YOPD}}{(n_{HoursPerYear} \times f_{TO})} \quad \textbf{(Eq. 1)}$$

where:

$r_{BaselineHourly}$	=	the computed baseline hourly rate to park
$r_{Investment}$	=	yearly return on investment, such as .06
$v_{Parking}$	=	value of a parking space, such as (parking garage) $40,000
c_{YOPD}	=	yearly operations[15] plus depreciation, per space, such as $100
$n_{HoursPerYear}$	=	number of hours per year, 24 x 365 = 8760 Hours per Year
f_{TO}	=	fraction of time occupied, such as 0.55.

For the example values given, the base hourly rate of parking, to cover the cost of the investment, operations[15], and depreciation is $0.519 per hour. This could be rounded up to $0.52 per hour. This price could also be increased to result in positive TDM, to reduce driving more than the fair-price, zero-TDM amount.

On-Street

[14] License plates that have no RFID tags fail to use the best technology to accomplish the primary purpose of license plates, which is to identify and help intercept cars used in a crime. Identifying cars is a legitimate government goal. Protecting privacy is also a legitimate goal. Both goals can be realized with good laws, good enforcement, and good systems engineering.

[15] This includes money for policing, cleaning, maintenance, any applicable parking tax, and all collection costs. Collection costs will need to include an amount to recover the development and installation costs of *Dividend Account Parking (DAP)*.

If on-street parking is located within walking distance (one-quarter mile) of off-street parking, its base price is set equal to the closest off-street parking's base price. Otherwise, it is set to some agreed-upon value, like fifty cents per hour. However, on-street parking has a special meaning for downtown merchants and for neighborhoods, two powerful political forces in any city. Merchants that have few cars parking on their street, even though it is permitted, are probably failing in their businesses. They would like free parking to help draw visitors to their store front. Neighborhoods that are not impacted by parking would probably prefer no pricing. For these reasons, for any on-street parking cluster, no price is charged until the cluster occupancy reaches 50%. (Time of day is irrelevant.)

Congestion Pricing

The time-rate price of parking is dynamically set on each cluster of parking, to prevent the occupancy rate from exceeding 85% (to reduce the need to drive around looking for parking). An 85% occupancy rate (15% vacancy) results in just over one vacant parking space per city block[5]. If the vacancy rate is above 30%, the price is left at the baseline hourly rate. If vacancies fall below 30%, the price can be calculated in a stair-step method, such as shown in Table 2.

Equation 2 is an alternative method.

In either case, the total charge is time parked, multiplied by the time-averaged, time-rate price. The base multiplier would be adjusted to be just large enough to keep the vacancy rate from falling below a desired level, such as 15%, so it is always easy to find parking.

Table 2 Hourly Rates for 2 Base Multipliers and a Baseline Hourly Rate of $0.52

Vacancy Rate	Base Multiplier = 2			Base Multiplier = 2.5		
	Multiplication		Hourly	Multiplication		Hourly
	Formula	Value	Rate	Formula	Value	Rate
Above 30%	2^0	1	$0.52	2.5^0	1	$0.52
25% to 30%	2^1	2	$1.04	2.5^1	2.5	$1.30
20% to 25%	2^2	4	$2.08	2.5^2	6.25	$3.25
15% to 20%	2^3	8	$4.16	2.5^3	15.625	$8.13
10% to 15%	2^4	16	$8.32	2.5^4	39.0625	$20.31
5% to 10%	2^5	32	$16.64	2.5^5	97.6563	$50.78
Below 5%	2^6	64	$33.28	2.5^6	244.1406	$126.95

$$r_{HourlyRate} = r_{BaselineHourly} \times \left(B^{(30-V)/5}\right), for\ V < 30;\ r_{BaslineHourly}, otherwise \quad \textbf{(Eq. 2)}$$

where:

$r_{HourlyRate}$ = the congestion-priced hourly rate to park

$r_{BaselineHourly}$ = the baseline hourly rate to park, such as $0.52 per hour (taken from from Eq. 1.

B = the base of the multiplier being computed, such as 2.50

V = the vacancy rate percent, such as 17.5, for 7 vacancies in a cluster of 40 spaces, 100*(7/40) = 17.5

For the example values given, the hourly rate of parking would be $9.88 per hour.

Pricing Predictions and Notifications

Drivers will develop strategies for their routine trips. The computer system that keeps records of parking use will also provide help for users. The *Dividend Account Parking (DAP)* website will direct a user to an appropriate cluster of parking if the user provides the destination location or locations, the time and date, and the hourly rate they wish to pay. If the walk is going to be long, the website could suggest using transit to get from the cheaply-priced parking to the destination. In such cases, the website may also suggest using transit for the entire trip.

Another user option is to specify the time, location, and the distance the user is willing to walk. In this case, the computer would give the cheapest cluster of parking available at the specified walk distance. The price prediction would be provided.

All price predictions would also have a probability of correctness associated with them. If a user can show that a computer has predicted a much lower price than what actually occurred, with a sufficiently high probability, it would be reasonable to charge the user the predicted price rather than the actual price.

Websites could routinely inform viewers when occupancy rates are expected to be unusually high, due to a special event (for example, a sporting event). The parking system website will always give current and predicted hourly rates for all locations. The hourly rates of parking will also be available at a phone number and possibly at pay stations. The base-price hourly rate, for any parking cluster, would be stable and could therefore be shown on signs. Parking garage entrances could have large video screens showing both predicted and existing price. Users will also learn to look at parking and judge whether congestion pricing applies, or could apply, while their car is parked. It would not be long before these capabilities are added into GPS navigation systems.

Prepaid RFID

To be inclusive, pay stations or convenience stores will offer a pre-paid RFID that can be set on the dashboard of a car. This will support drivers with poor credit or drivers who have not obtained the necessary equipment to support the normal, trouble-free methods. This will also work for drivers that do not trust the system to protect their privacy for a certain trip (by removing or disabling the permanent RFID) or for all trips. No billing would occur.

Enforcement

The system would notify the appropriate law enforcement agency if an unauthorized car was parked. Authorized cars would need either a pre-paid RFID or equipment indicating that their owners had *Dividend Account Parking (DAP)* accounts and were sufficiently paid up on their bills.

IMPLEMENTATION

This description of *Dividend Account Parking (DAP)* will help to implement efficient parking systems. Parking at train stations, schools, and government buildings could introduce many of these concepts. This description of *Dividend Account Parking (DAP)* is sufficient to support a “Request for Proposal” process, which could lead to full implementation. Widespread

installation should be done by a government agency, to minimize actions required on the part of the private sector. Laws would simply require the cooperation of all private-sector and government entities.

SUMMARY

A parking plan, *Dividend Account Parking (DAP)* has been described.

1. Technology will make it easy to use for most drivers.
2. Its parking is almost always shared, to support mixed uses.
3. It unbundles cost by charging and having earnings go to the parking beneficiaries.
4. Traditional groups, such as single-family home owners, employees, tenants, train riders, and students benefit from parking. The benefit is equal for drivers and non-drivers.
5. Baseline prices are computed primarily from the value of the parking and an agreed-upon rate of return. On-street parking is free until it is half full, at which time its base price often matches that of the closest off-street parking.
6. For all parking, price is dynamically increased to guarantee availability. Earnings are therefore only limited by what people are willing to pay.
7. Technology helps drivers find parking and decide if they want to drive or use transit.
8. Prepaid RFIDs provide service to those who have poor credit or don't want to be billed.
9. Disabled and perhaps low-income drivers will have accounts that allow them to park at reduced prices and perhaps avoid congestion pricing. Specially designated spots might also be required for disabled drivers.
10. The system will provide reports showing where additional parking would be a good investment and where it would be wise to convert existing parking to some other use.
11. Privacy will be protected. Law enforcement officials would need a search warrant to see where someone's car has been parked. The level of detail on billing would be selected by the car's owner.
12. Implementations could begin in carefully selected locations and expand.

Global warming, air pollution, trade deficits, and fairness are some of the significant reasons that governments have a responsibility to implement *Dividend Account Parking (DAP).*

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KEYWORDS

A&WMA, Parking, Unbundled, Shared, TDM, cash-out, pricing, beneficiary, greenhouse gas, GHG, GPS, RFID

Eliminating the Harm of Bundled-Cost or Bundled-Benefit Parking

- Definitions of Parking Systems
- New System: *Dividend-Account Parking*
  - Motivations for change
  - Definition and features
  - A demonstration project

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A *Bundled-Cost* Parking System

The most common of all parking systems. Erroneously called "free"

The cost of the parking is hidden within some other payment, such as:

- **Rent**
- **Train fare (at least 1 train station with so-called "free" parking)**
- **Price of consumer items, including food**

A Bundled-Benefit Parking System

The 2nd most common of all parking systems. Erroneously called "free"

The parking is part of a benefit package being provided, such as:

- **Compensation for work**
- **Public or private education**

Bundled-Cost **and** ***Bundled-Benefit*** **systems take** ***money*** **from people without their knowledge or consent.**

They increase the choice to drive alone.

Sierra Club California: **Appropriate pricing of parking is the least costly way to reduce vehicle miles travelled.**

Bundled-Cost or *Bundled-Benefit* systems should be replaced with the *DAP* Car-Parking system!

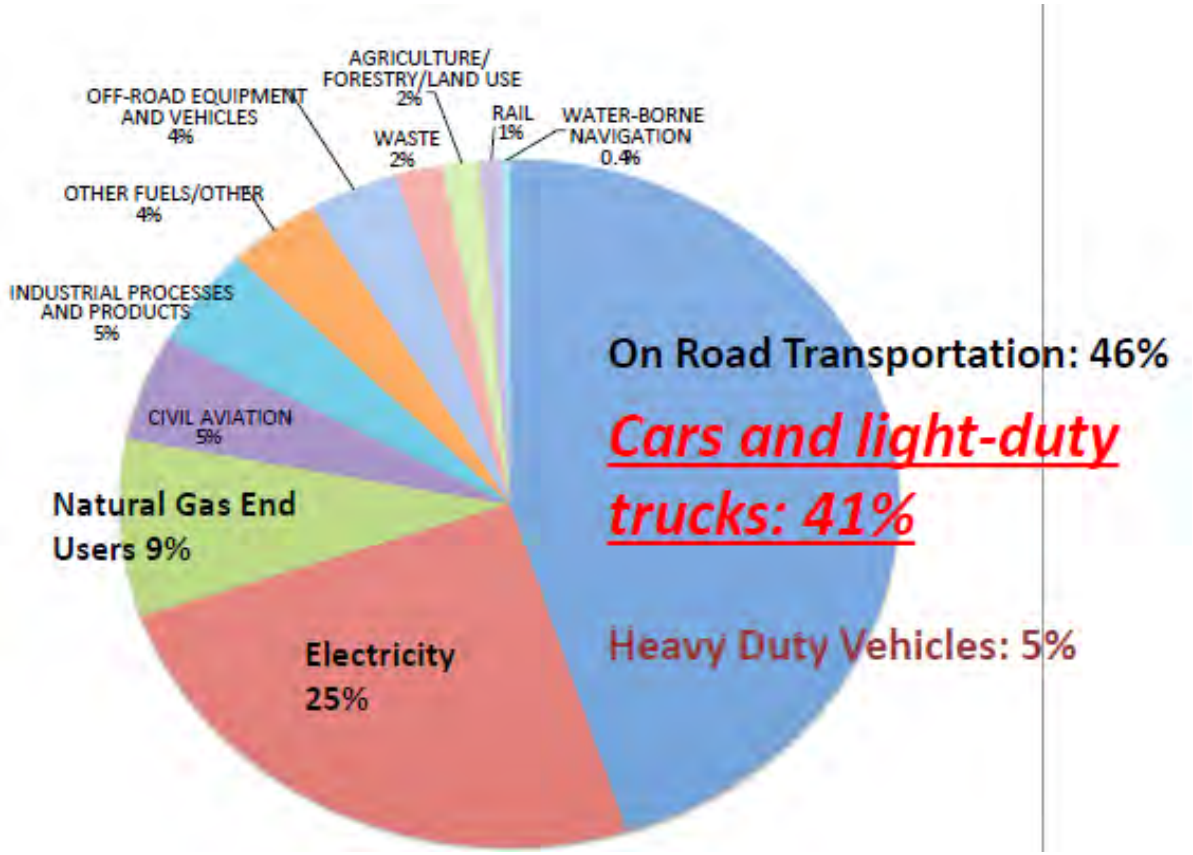
Dividend Account Parking (DAP)

Brief System Definition

1. **Automated (nothing to do; just park)**
2. **Value-priced, with a congestion-pricing option**
3. **It generates earnings for those who are losing money because of the parking**
4. **Cars parked are associated with an Account**
5. **Parking is available to those having an Account (shared parking)**

Motivation for Change, 1 of 4

Cars and Light-duty vehicles (LDVs) emit the most GHG of any category



Motivation for Change, 2 of 4

- ***Fleet Efficiency Will Not Come Soon Enough, as shown in this peer-reviewed report:***

2020 Air & Waste Management Association (AWMA) Report

Deriving Climate-Stabilizing Solution Sets of Fleet-Efficiency and Driving-Level Requirements, for California Light-Duty Vehicles*

***Available upon request from mike_bullock@earthlink.net**

Motivation for Change, 3 of 4

Climate-Stabilizing Requirements, for Four Cases

Difficult but possible

	Case Designations			
	Balanced_1	Balanced_2	2005 Driving	Mary Nichols
% Renewable Elecricity	85.0%	90.0%	90.0%	90.00%
% ZEVs, Year 2016	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2017	2.0%	2.0%	2.0%	2.70%
% ZEVs, Year 2018	3.0%	3.0%	3.0%	5.11%
% ZEVs, Year 2019	4.0%	4.0%	4.0%	7.53%
% ZEVs, Year 2020	8.0%	8.0%	8.0%	9.94%
% ZEVs, Year 2021	20.0%	15.0%	82.0%	12.35%
% ZEVs, Year 2022	35.0%	25.0%	97.0%	14.76%
% ZEVs, Year 2023	55.0%	45.0%	99.0%	17.18%
% ZEVs, Year 2024	80.0%	70.0%	99.0%	19.59%
% ZEVs, Year 2025	94.0%	95.0%	99.0%	22.00%
% ZEVs, Year 2026	97.0%	97.0%	99.0%	37.60%
% ZEVs, Year 2027	98.0%	98.0%	99.0%	53.20%
% ZEVs, Year 2028	99.0%	99.0%	99.0%	68.80%
% ZEVs, Year 2029	99.0%	99.0%	99.0%	84.40%
% ZEVs, Year 2030	99.0%	99.0%	99.0%	100.00%
% Reduction in Per-Capita Driving With Respect to Year 2005	32.0%	32.0%	0.0%	50.5%

Driving as much as we did in 2005 might seem nice, but these % ZEV jumps are not possible

Air Resources Board Mary Nichols has a nice electrification schedule but it would require a very difficult reduction in driving.

Motivation for Change, 4 of 4

Requirements to Achieve the Needed 32% Reduction in Per-Capita Driving, With Respect to 2005

Driving-Reduction Requirments	Per-Cent Reduction	Factor
Legislated (SB 375) Plans to Reduce Driving	12%	0.88
Value-Priced Road Use Charge (RUC)	10%	0.90
Dividend Account Parking	**8%**	**0.92**
Transfer Highway Expansion Funds to Transit	2%	0.98
Increase Height & Density by Transit Stations	2%	0.98
"Complete Streets", "Road Diet" (walk/bike)	1%	0.99
*Pay-to-Graduat*e Bicycle Traffic-Skills Class	1%	0.99
Bicycle Projects to Improve Access	1%	0.99
Product of Factors		**0.68**
% Reduction		**32%**

A *Dividend-Account Parking System* for Oceanside's Civic Center Garage

A System to Eliminate the Harm of Bundled-Benefit Car Parking for City Employees

300 North Coast Highway

- Top-Level Outcome & Overview
- Some Top-Level Calculations
- Who gets to use the system
- Overcoming problems & perceptions
- Outcomes of a new incentive
- Cash flow ("Hey, where does the $$ come from?")

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Top-Level Outcomes

- Employees that drive every day, break even **(Lose no money!)**
- Employees get *paid to not drive* **(Make more money!)**
- Fewer employees drive, reducing Greenhouse Gas (GHG) emissions **(Less GHG!)**

Overview

- Fully-automated parking system, implemented by a 3rd-party vendor (RFP selection process)
- operated for the financial gain of employees
  - Earnings = Money Generated Minus Vendor Earnings
  - Earnings go to employees
- Price is cost per minute
  - Such as 1.85 cents per minute (= $1.11 per hour= $10 per 9 hours at the workplace)
- An employee's **Earnings** ("**Dividend**") is proportional to their time at the work site

Calculations of an Employee's Earnings

- An employee's earning is proportional to time spent at work (automatic collection of enter/exit times, using employee RFID)

Definitions to Compute an Employee's Monthly Earnings	
$T_{Employee}$	The Employee's Monthly Time at the Work Site
$T_{AllEmployees}$	Total Monthly Time at the Work Site, All Employees
$E_{AllEmployees}$	Total Monthly Earnings from the Employee Parking

$$\text{Employee Earnings} = E_{AllEmployees} \times (T_{Employee} / T_{AllEmployees})$$

"Add In" Payment so Those that Drive Every Day Will Lose No Money

Note: This is for an individual employee

The employee's Parking Payment =

The employee's Earnings – The employee's parking charge + The employee's "Add In"

"Add In" is zero, unless it must take on a positive value so that the employee loses nothing

"Add In" payments will be easily covered by Dividend Account Parking parkers that are not employees.

Charge, Earnings, & Add-In, Payment *For Each Employee*

- **Charge**
  - Total Minutes Parked x Cost per Minute
- **Earnings**
  - As shown on earlier slide (proportional to employee's time spent at work)
- **Add-In**
  - If **Charge** > **Earnings**, **Add-In** = **Charge** – **Earnings**
  - **Otherwise, Add-In = zero**
- **Payment** = **Earnings** – **Charge** + **Add-In**

Who Gets To Use Dividend-Account Parking

- ***Anyone*** (not necessarily an employee) driving a car registered in the system
  - There is a person with an account associated with the car
  - The car will be identified
    - License plate reader and/or
    - RFID tag not needed
  - Account can be established on the spot, in less than 5 minutes: credit card info and license number

Employee Behavior 1 of 2

Employees Must Park in Their Parking Lot if they Drive to Work

Measures to Reduce "Cheating" = Parking in the Neighborhood

Not Stated in Presentation to Stay within 15 minutes

Russ was worried!

- Soft, pre-emptive measure: messaging
  - **Perceived integrity** is every employee's responsibility
  - **Insufficient perceived integrity** can cost employees
    - Reduced chance of promotion
    - Smaller pay raises
    - More chance of terminated employment
  - Parking free in the neighborhood will not be tolerated
  - The City wants to be a good neighbor: this is the reason for off-street parking ordinances

Employee Behavior 2 of 2

Employees Must Park in Their Parking Lot if they Drive to Work

Measures to Reduce "Cheating" = Parking in the Neighborhood

Not stated in presentation to stay within 15 minutes

- Soft, pre-operational measure: data collection
  - Operate the system for a time, perhaps even a year, before actually collecting or distributing money
  - Self-identified non-drivers are recognized, thanked, and asked to provide details as to how they are getting to work without driving
- Soft, In-Operation Mode: New non-drivers are thanked and interrogated as to how they do it
- **Hard: cameras or RFID sensors can identify employees walking into the work perimeter from the neighborhoods**

Russ was worried!

Difficult-to-Not-Drive Example
Fictional, Simplified Case with Pricing and Payout Considered per Day, *Page 1*

- Employment Center (factory and office)
- Outside Hemet, California
- 100 employees; parking lot has 100 spaces
- No Transit, 110-degree temperature with poor roads for biking, culture of not car-pooling
- Before installing
  - 99 drive
  - 1 bikes

Difficult-to-Not-Drive Example

Fictional, Simplified Case with Pricing and Payout Considered per Day, *Page 2*

- Dividend-Account Parking charges $10/day
- After installing
  - 99 drive
  - 1 bikes
- Total collected each day: $990
- Each employee gets $9.90 earnings per day ($990/100)
- Each driver loses 10 cents per day
- The “crazy” bike rider gets $9.90 per day extra

Hey, isn’t this an improvement? I would say the “crazy” bike rider is earning his money!

If another employee bikes, the drivers would lose 20 cents per day and the bike riders would get $9.80 per day. If the company president rented out the 2 extra spaces for $10 per day, the drivers would lose nothing and the bike riders would get $10 per day. Biking would increase by 100%! **What’s wrong with that?**

Results of 3 Actions, Including Cash-out

Case (#1), Reference Patrick Siegman's article in Bicycle Pedestrian Federation

- Company: CH2M Hill
  - Location: Bellevue, WA (Seattle suburb)
  - Engineering Firm with 430 employees
- Actions
  - $54/month (1995 $'s), *to not drive*
  - Improved Transit
  - Improved Bike/Ped facilities

CH2M Hill Work Trips		
Mode	***Before***	***After***
Drive Alone	**89%**	**54%**
Carpool	**9%**	**12%**
Bus	**1%**	**17%**
Bike, Walk	**1%**	**17%**
	100%	***100%***

Since these changes are brought about by more than just cashout, this case is not used in the tabulation of cashout results (next chart)

Cash-Out Results

(11 Locations, 3 Groups, 1995 Dollars)

Money Matters !!!!!

- Reference: *How to Get Paid to Bike to Work: A Guide to Low-traffic, High- Profit Development* by Patrick Siegman*. Published in *Bicycle Pedestrian Federation of America*, 1995.
- 3 Largest Responses
  - 38%, 36%, 31%
- 3 Smallest Responses
  - **15%** , 18%, 24%
- Responses are the *change;* car vacancy rates would be larger

*Patrick Siegman, of Nelson Nygaard

Impact of Financial Incentives on Parking Demand

Location	Scope	1995 dollars per mo.	Parking Use Decrease[1]
Group A: Areas with little or no public transportation			
CenturyCityDistrict, West Los Angeles	3500 employees at 100+ firms	$81	15%
Cornell University, Ithaca, NY	9000 faculty & staff	$34	26%
San Fernando Valley, Los Angeles	1 employer, 850 employees	$37	30%
Costa Mesa, CA		$37	22%
Average for Group		**$47**	**23%**
Group B: Areas with fair public transportation			
Los Angeles Civic Center	10000+ employees, several firms	$125	36%
Mid-Wilshire Blvd., Los Angleles	1 mid-size firm	$89	38%
Washington DC Suburbs	5500 employees at 3 worksites	$68	26%
Downtown Los Angeles	5000 employees, 118 firms	$126	25%
Average for Group		**$102**	**31%**
Group C: Areas with good public transportation			
University of Washington, Seattle Wa.	50,000 faculty, staff & students	$18	24%
Downtown Ottowa, Canada	3500+ government staff	$72	18%
Bellevue, WA	1 firm with 430 employees	$54	39%[2]
Average for Group, but not Bellevue Washington		**$45**	**21%**
Over All Average, Excluding Bellevue Washington			**25%**

[1] **Parking vacancy would be higher!** [2] **Not used, since transit & walk/bike facilities also improved.**

Dividend-Account Parking, Oceanside

Civic Center Parking Garage

Money Flow Calculations

Simplifying Assumptions:

1. **Workers work 8 hours, with a one-hour lunch, for 9 total hours at the work location, each day they work**
2. **They only work from 8 AM to 5 PM**
3. **Evening hours, when parking can earn money from the public, are (only) from 5 PM to 9 PM**
4. **Week-end workers also work on weekdays, for a total of 7*9 = 63 hours, at the work location, per week**

Dividend-Account Parking

Money Flow Calculations

Notation Conventions	
Letters	**Meaning**
N	Number
DAP	Dividend Account Parking
VP	Value Priced
WE	Week End
WD	Week Day
WH	Work Hours, Meaning 8 AM to 5 PM
AH	After Hours, Meaning 5 PM to 9 PM

Dividend-Account Parking

Money Flow Calculations

Assume This is the "Value-Price" of the Parking

Use $10 per 9 Hours at the Work Site

Value	Units
1.8519	Cents per Minute
1.11	Dollars per Hour

Dividend-Account Parking

Money Flow Calculations

Assumed Values Used in the Following Performance Assesment		
Description	**Name**	**Value**
Number of parking places	N_DAP	250
Number or employees	N_Emp	250
% employees that drive on week day & week end	%Drive	80
Value-price to park, per 9 hours day (8 hours work + lunch)	VP_9Hrs	$ 10.00
% employees that work on Sat. and on Sun.	%WE	20
Yearly bonus paid to all workers	Y_Bonus	$100.00
Non-Workers Use This Per-Cent of the Parking That Is Not Used by Workers		
Week Day, Work Hours	%NonWrkWDWH	50
Week Day, After Hours (5 to 9)	%NonWrkWDAH	30
Week End, Work Hours	%NonWrkWEWH	50
Week End, After Hours (5 to 9)	%NonWrkWEAH	30

Dividend-Account Parking

Money Flow Calculations

Calculations to get the Weekly Earnings From Employees & the Weekly "AddIns" Required, per Employee			
Description	**Formula**	**Name**	**Value**
Number of Employees That Drive on a Week Day	N_Emp * %Drive / 100	**N_DrWD**	200
Money From Employees on a Week Day	VP_9Hrs * N_DrWD	**$_AllE_WD**	$ 2,000
Number of Employees That Work on a Week End	N_Emp * %WE / 100	**N_WrkWE**	50
Number of Employees Driving on a Week-End Day	N_WrkWE * %Drive / 100	**N_DrWE**	40
Money From All Employees Each Week-End Day	VP_9Hrs * N_DrWE	**$_AllWE**	$ 400
Weekly Money From Employees From Both the Week End & the Week Days	5 * $AllE_WD + 2 * $_AllWE	**$_AllE**	$ 10,800
Total Hours at This Location Per Week	N_Emp * 9 * 5 + N_Emp * %WE / 100 * 9 * 2	**HrsPerWeek**	12150
Weekly Earnings for an Employee at the Location for 45 Hours	$_AllE * 45 / HrsPerWeek	**PerWeek45**	$ 40.00
AddIn for an Employee at the Location for 45 Hours per Week	5 * VP_9Hrs - PerWeek45	**AddIn45**	$ 10.00
Weekly earnings for an employee at the location for 63 hours	$_AllE * 63 / HrsPerWeek	**PerWeek63**	$ 56.00
Per Week AddIn for an Employee at the location for 63 Hours per week	7 * VP_9Hrs - PerWeek63	**AddIn63**	$ 14.00

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week Day Work Hours (8 to 5)			
Description	**Formula**	**Name**	**Value**
Spaces Available for Non-Workers, Work Day, Work Hours	N_DAP - N_DrWD	**S_4NW_WDWH**	50
Spaces Used by Non-Workers, Work Day Work Hours	S_4NW_WDWH * %NonWrkWDWH / 100	**SNW_WDWH**	25
Money from Spaces Used by Non-Workers Per Day	SNW_WDWH * VP_9Hrs	**$NW_WDWH**	$ 250
Money from Spaces Used by Non-Workers Per Week	5 * $NW_WDWH	**W$NW_WDWH**	$ 1,250

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week Day After Hours (5 to 9)			
Spaces Available for Non-Workers, Work Day, 5 to 9, AKA After Hours	N_DAP	**S_4NW_WDAH**	250
Spaces Used by Non-Workers, Week Day After Hours	S_4NW_WDAH * %NonWrkWDAH / 100	**SNW_WDAH**	75
Money From Spaces Not Used by Workers, Week Day After Hours	(4/9) * VP_9Hrs * SNW_WDAH	**$NW_WDAH**	$ 333
Money per Week from Spaces Not Used by Workers, Week Day After Hours	5 * $NW_WDAH	**W$NW_WDAH**	$ 1,667

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week End Work Hours (8 to 5)			
Spaces Available for Non-Workers, Week End Work Hours	N_DAP - N_DrWE	**S_4NW_WEWH**	210
Spaces Used by Non-Workers, Week End Work Hours	S_4NW_WEWH * %NonWrkWEWH / 100	**SNW_WEWH**	105
Money From Spaces Used by Non-workers Per Week-End Day, Work Hours	SNW_WEWH * VP_9Hrs	**$NW_WEWH**	$ 1,050
Money From Spaces Used by Non-workers On the Week End After Hours, Per Week	2* $NW_WEWH	**W$NW_WEWH**	$ 2,100

Dividend-Account Parking

Money Flow Calculations

Calculation of the Weekly Amount Generated by Spaces Not Used by Workers, Week End After Hours (5 to 9)			
Spaces Available for Non-Workers, Week End After Hours	N_DAP	**S_4NW_WDAH**	250
Spaces Used by Non-Workers, Week End After Hours	S_4NW_WDAH*%NonWrk WDAH/100	**SNW_WDAH**	75
Money From Spaces Used by Non-workers Per Week-End Day After Hours	4/9 * SNW_WDAH * VP_9Hrs	**$NW_WDAH**	$ 333
Money From Spaces Used by Non-workers on Week-End Days After Hours, Per Week	2 * $NW_WDAH	**W$NW_WDAH**	$ 667

Dividend-Account Parking

Money Flow Calculations

The Weekly Earnings From Non-Employees, the Weekly "AddIns" Required, the Weekly Surplus Generated, the Yearly Surplus, and the Yearly Surplus After Giving Employees a $100 Per Year Bonus			
Description	**Formula**	**Name**	**Value**
Weekly Money Earned by the spaces not taken by workers	W$NW_WDWH + W$NW_WDAH + W$NW_WEWH + W$NW_WEAH	**W$NW**	$ 5,683
Weekly Money Required to Pay All of the AddIn Amounts	N_DrWD * AddIn45 + N_DrWE * AddIn63	**AddInPerWeek**	$ 2,560
Weekly Money Left Over After Paying Add Ins	W$NW - AddInPerWeek	**$PerWeek**	$ 3,123
Yearly Money After Paying Add Ins From the Money From Non-Workers	52 * $PerWeek	**$PerYear**	**$ 162,413**
Yearly Money After Paying Add Ins and Also a $100 Bonus Per Year for Each Employee	$PerYear - $100 * N_Emp	**$PerYear**	**$ 137,413**

Dividend-Account Parking

Money Flow Calculations

3 Cases of Dividend-Account Parking Performance Oceanside Civic Center Garage			
	Baseline	**Worse**	**Better**
% employees that drive on week day & week end	80%	85%	75%
% employees that work on Sat. and on Sun.	20%	25%	15%
% Parking Not Used by Workers, That is Used by Non-Workers			
Week Day, Work Hours	50%	45%	55%
Week Day, After Hours (5 to 9)	30%	25%	35%
Week End, Work Hours	50%	45%	55%
Week End, After Hours (5 to 9)	30%	25%	35%
Yearly Amount Left Over After Paying Add-Ins	**$162,413**	**$125,242**	**$210,374**
Amount Left After Paying Add-Ins & $100 Bonus	**$137,413**	**$100,242**	**$185,374**

Conclusion 1

Given our climate emergency, we need this parking system to spread to all parking, to include offices, on-street, apartments, "big box", shopping centers, and mixed use.

Conclusion 2

Society needs a corporation to specialize in managing and optimizing parking

Skills Needed Include:

1. Data collection, computing, marketing, archiving, transferring money, protecting privacy, and generating financial statements
2. Monetizing unused parking and data
3. **Financing and building solar canopies, roof top solar, and charging stations**
4. **Selling electricity**

Conclusion 3

This could be an enforceable mitigation measure in a city's Climate Action Plan, to reduce driving, perhaps in its Transportation Demand Management (TDM) Section.

Back up Slides

Conclusion & Path Forward

- A big part of the needed 32% reduction needs to come from car-parking reform.
- The first step could be a demonstration project of a car-parking system, at a work location.

From the California Democratic Party (CDP) 2018 Platform

From: https://www.cadem.org/our-party/standing-committees/body/CDP-Platform-2018.pdf

Transportation Sub-Plank Statement

- Work for **shared**, convenient, and **value-priced** parking, operated with a system that **provides financial support** to those paying higher costs or getting a reduced wage, due to the cost of providing the parking ***Note: this is DAP!***

1500-Character Extended Abstract

The presentation starts with the definition of two commonly-used, car-parking systems: the bundled-price system and the bundled-cost system. The flaws of these systems are exposed. The Dividend Account Parking (DAP) parking system is introduced; with the motivation for its implementation: the importance of cars in reducing GHG and how DAP fits into a plan to ensure that cars support climate-stabilization.

The rest of the slides present a specific DAP proposal, in downtown Oceanside, CA, for city employees. Outcomes, an overview, and a definition of DAP are given. Charge & payout formulations are specified. Methods to prevent cheating are described. A brief, simplified example of a DAP implementation is shown, where it would be difficult to not drive to work, showing DAP to still be a good choice. Results from cases of car parking cash-out (where employees are paid to get to work without driving) are given, showing that if a price differential (between driving and not driving to work) is introduced (DAP does this), driving alone to work is significantly reduced.

Money cash flow calculations are presented, using reasonable simplifying assumptions and then reasonably-conservative assumptions of how much money could be earned from employee parking, whenever it is not being used by an employee. The results from three cases (“Baseline”, “Worse”, and “Better”) are shown.

Twenty six back up slides appear, but they are NOT part of the presentation.

Measures to Get 32%

	Estimated Reduction
• Predictions, Regional Transportation Plans	10%
• Stop expanding most roads and all freeways	2%
– No need, Eliminate congestion with less driving	
• Reallocate freeway-expansion $$$ to **transit**	2%
• **Payment methods**, **to increase fairness & choice**	
– Demonstration projects: Dividend-Account Parking	
– **Legislation**	
• Replace Bundled-Cost or Bundled-Benefit Parking	8%
• Equitable and environmentally-sound road-use fees	8%
• **Smarter growth**, complete streets, bike classes	2%
	32%

Climate Literacy

THEREFORE BE IT RESOLVED, that the California Democratic Party reinforces the need for all high school students to know, before they graduate, and elected officials to know, acknowledge, and address, as soon as possible, (1) both the existence of and the reason for anthropogenic climate change; (2) its potential for harm; (3) the difference between stabilizing the climate at a livable level and destabilization; (4) science-based, climate-stabilizing, GHG reduction targets; (5) the primary variables and considerations in identifying those targets and (6) the approximate amount of life style and technology change required to achieve those climate-stabilizing targets.

XXX Implementation Example

The City could have the vendor operate the system, for the first 10 years. Over those years, the vendor would be motived to debug the system and continue to look for operational efficiencies. The vendor could receive 10% of the revenue, for the first 5 years; 5% of the revenue, for the next 3 years; and 2%, for the final 2 years. If 600 cars are parked for 8 hours, 200 days per year, at 50 cents per hour, then the yearly revenue would be $480,000. The vendor would collect $240,000 over the first 5 years, $72,000 over the next 3 years, and $28,800 over the last two years.

How Bad Could It Get?

Governor Brown to the Pope:

Humanity must

Reverse Course* **or** ***Face Extinction***

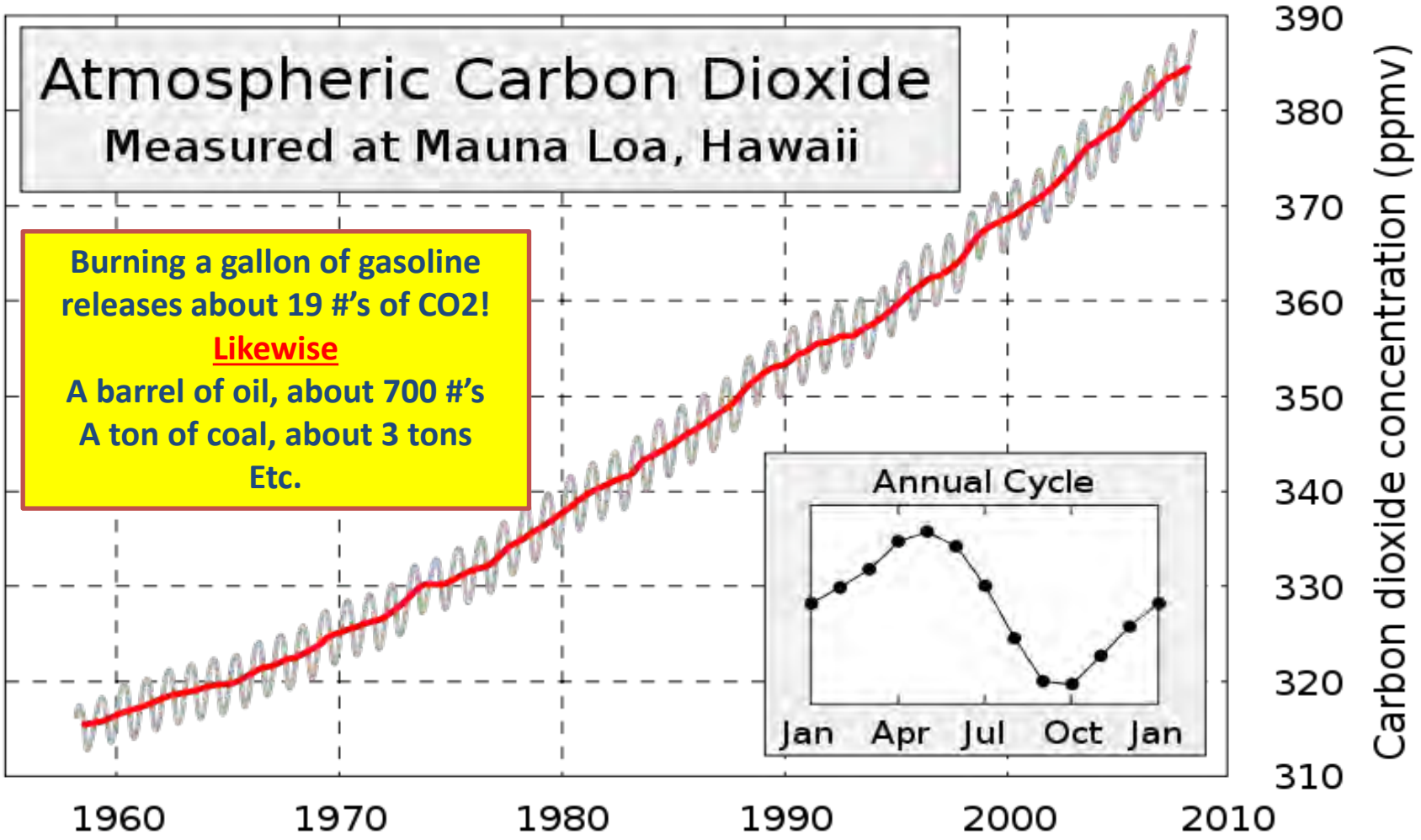
*** Must be quantified***

Climate Data

Currently 400 PPM! *

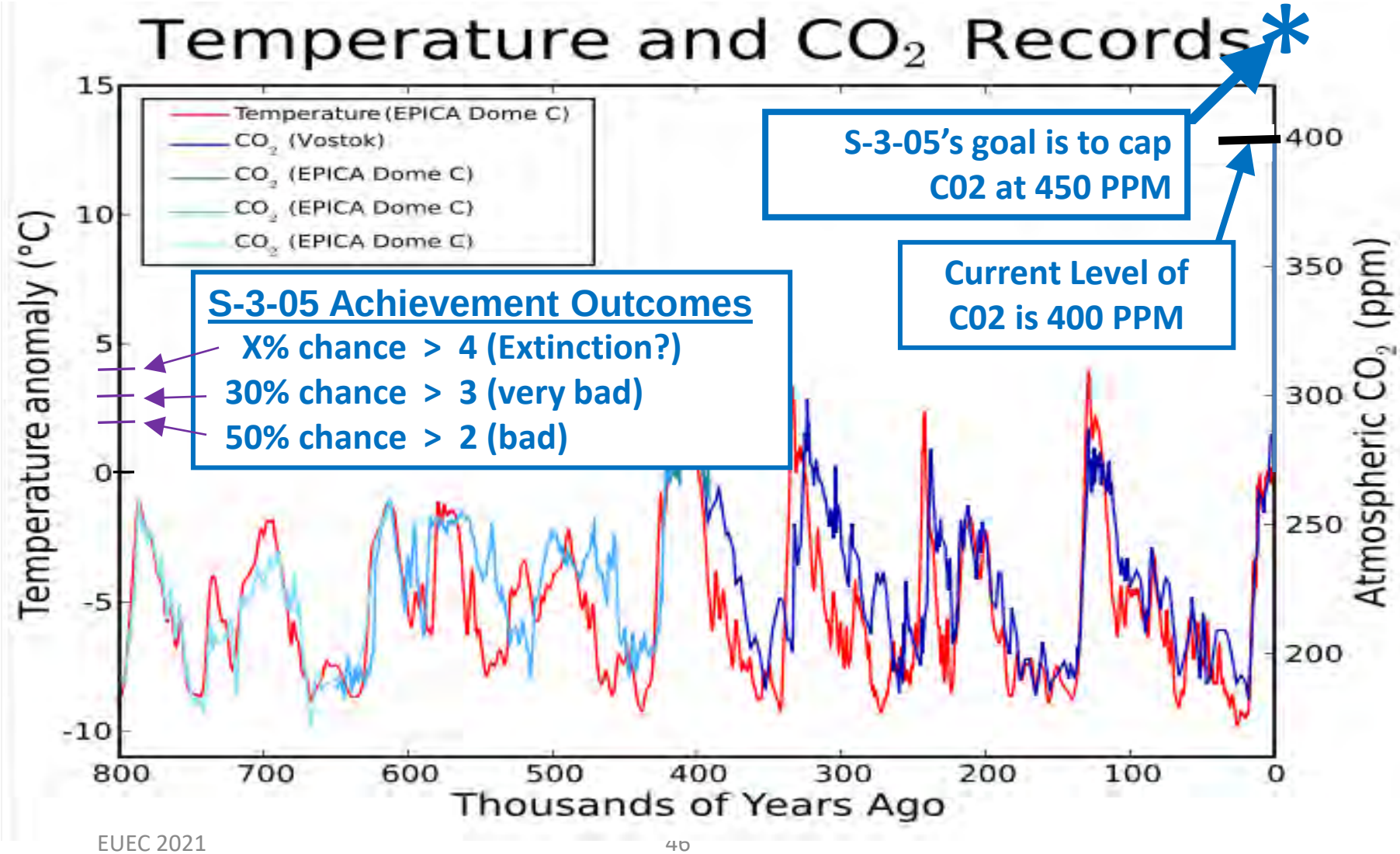
- Keeling Curve:

  http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis



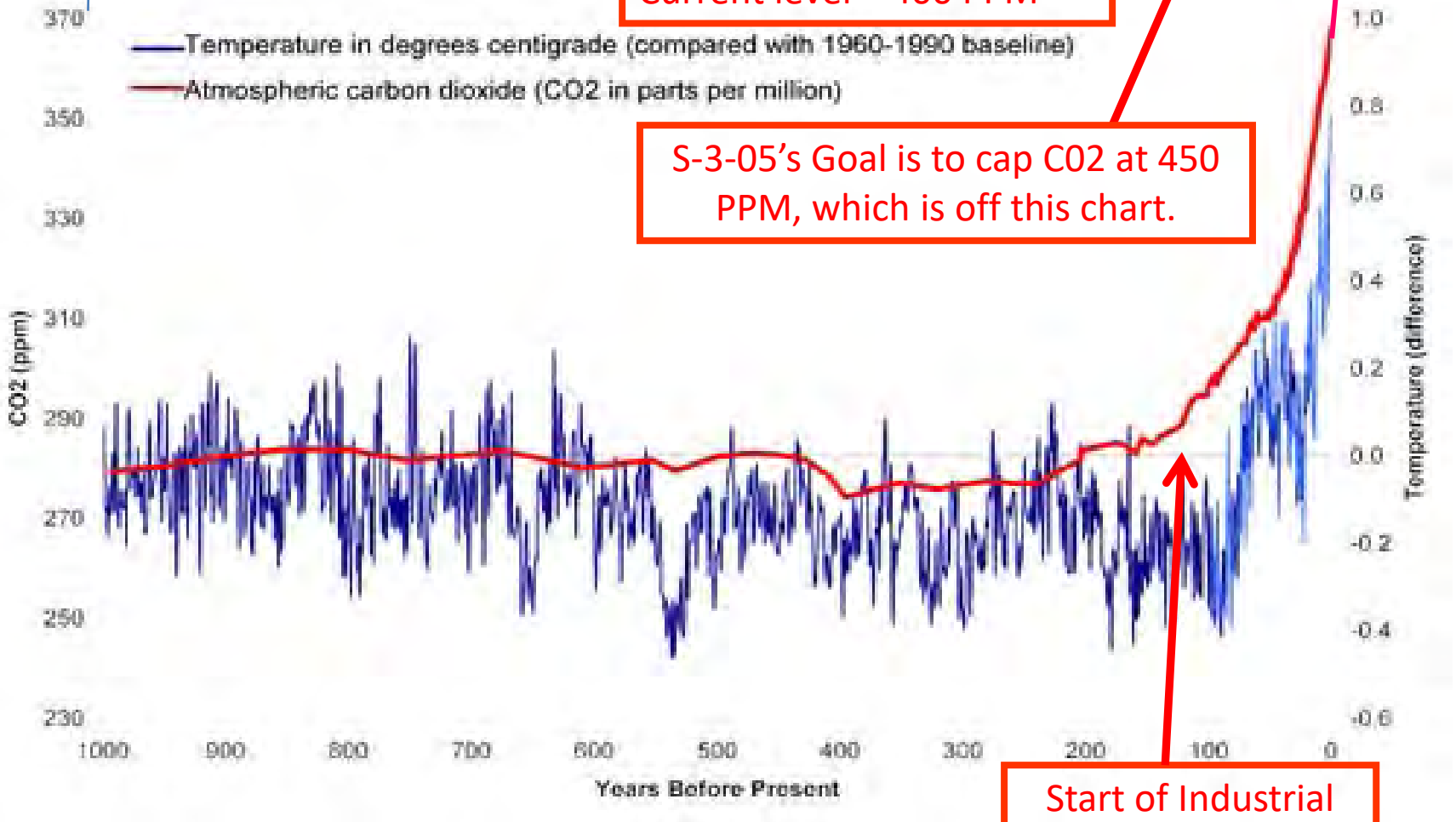
Our Climate Crisis

- From: http://en.wikipedia.org/wiki/An_Inconvenient_Truth#Scientific_basis



Our Climate Crisis

- Earth & Space Research (ESR) website: http://www.esr.org/outreach/climate_change/mans_impact/man1.html



Fixing the Problem

We must stabilize the value of the earth's atmospheric CO2_e

CO2_e Emissions | **Sequestration (Photosynthesis)**

$E_N + E_A + E_{WFB}$ **>** → **Positive Slope**

$E_N + E_A + E_{WFB}$ **=** → Zero Slope

$E_N + E_A + E_{WFB}$ **<** → **Negative Slope**

S

Growth of plants on Earth

Natural: rotting, fire, digestion. respiration

Anthropogenic: combustion of fossil fuel, methane, other

Warming **F**eed **B**ack: such as methane from melting permafrost

The Warming Feed Back term is the wild card. It must not become dominant.

If Anthropogenic emissions were to be sufficiently low (80% below 1990 levels has been allocated to developed countries), the slope would be zero, thus capping the value of the Earth's atmospheric CO2_e

Motivation for Change

- Fairness to individuals
  - Costs no longer hidden
  - Costs avoided or recovered, by not using parking
- Less driving, to reduce environmental harm
  - Motivates choosing alternative modes
  - Less driving to find parking
- Cost Effective Development
  - Less parking needed reduces land and building costs

Goals, 1 of 2

- One agency operates all parking
- Nearly all parking is shared
- Parking costs are effectively unbundled
  - From wages and rents
  - From costs of goods and services
- No change to how parking gets built
  - Generally, municipalities require & developers build

Goals, 2 of 2

- Priced right
  - Value Priced: Base price derived from costs
  - Driver demand determines a congestion price
- No need to search for parking
  - Directions to parking that meets user's needs
  - Accurate price predictions
- Each parking space's use is archived
  - Supports informed decisions
- Privacy and the needs of the disabled are supported

Definitions and Methods, 1 of 6

- Definition & Examples of ***Parking Beneficiary Group***
  - Owners
    - Private investors or governments operating public parking
  - Those losing money due to provided parking
    - Employees
    - Apartment renters or condominium owners
    - Hotel or restaurant patrons
    - Shoppers
  - Those offered specific parking
    - Driving-age students at a school with parking
    - Driving-age train riders using a station with parking

Definitions and Methods 2 of 6

- How to Effectively Unbundle the Cost or the Benefit
  - Price charged per minute
    - Base price rate established to cover all costs
    - Congestion price rate
      - Dynamically set as a function of occupancy rate
      - Charge is time average, if rate changes, while car is parked
  - Parking generally available to all drivers
  - Earnings distributed to members of *Beneficiary Group*
    - Calculation of individual's earnings depends on situation

Definitions and Methods, 3 of 6

- Calculation of monthly earnings
  - If parking is provided for several groups, each group's portion of the earnings is proportional to its original contribution to cost (Mixed use case)
  - Each beneficiary group's total is divided up among its members
    - Condominium owners: proportional to spaces effectively purchased
    - Renters: proportional to spaces effectively renting
    - Shoppers: proportional to money spent
    - Employees or students of driving age: proportional to time spent at work or school
    - Train riders of driving age: proportional to time spent on round trips

Definitions and Methods, 4 of 6

- For congestion pricing, *define* ***Cluster of Parking***
  - 20 to 40 contiguous spaces nearly equal in desirability
  - Assigned the same price
- Pricing
  - Base price
    - Covers all costs $r_{BaselineHourly} = \frac{(r_{Invesment} \times v_{Parking}) + c_{YOPD}}{(n_{HoursPerYear} \times f_{TO})}$
    - Report's Page 13 & 14 provides details
  - Congestion price, for each cluster

$$r_{HourlyRate} = r_{BaselineHourly} \times \left(B^{(30-V)/5}\right), for\ V < 30;\ r_{BaslineHourly}, otherwise$$

- B is nominally 2; adjusted to keep vacancy above 15%
- V is the vacancy % rate (Report's Eq. 2, Table 2, Pages 14 & 15)

Definitions and Methods, 5 of 6

- Pricing predictions
  - For any set of dates, start times, durations, and destinations
  - Availability of predictions
    - Broadcast into navigational units
    - Website or phone
- Help to find desired parking
  - Driver gives times and locations and stipulates . . .
    - Max price, to get space at minimum walk distance
    - Max walk distance, to get space at minimum price
  - Voice-activated navigational system for ease and safety

Definitions and Methods, 6 of 6

- Monthly statements
  - All parking charges and earnings
    - First, within state
    - Then, within nation
    - Finally, within North and South America
  - Customer selects presentation detail
    - Less detail for ease and more privacy
    - More detail to know and adjust parking decisions
  - Packaged with other statements
    - All utilities, transit use, road use

Implementation Plan, 1 of 3

- Prototype design
  - Most likely a Climate Action Plan Mitigation Measure
- Requirements document to support request for proposal (RFP)
- Winning proposal leads to design
  - Hardware selection and design
  - Software generation
- Prototype installation
  - Most likely a Climate Action Plan Mitigation Measure
  - Debug
  - Adjustments to satisfy stakeholders

Implementation Plan, 2 of 3

- Government agency develops and executes full installation strategy
  - To minimize impact on institutions
  - To maximize early success and driving reductions
    - Large employment centers with “free” parking
    - Train stations with large, “free” parking lots
  - Supported by new law that requires cooperation but very little effort, from . . .
    - Private and public institutions
    - Individuals

Implementation Plan, 3 of 3

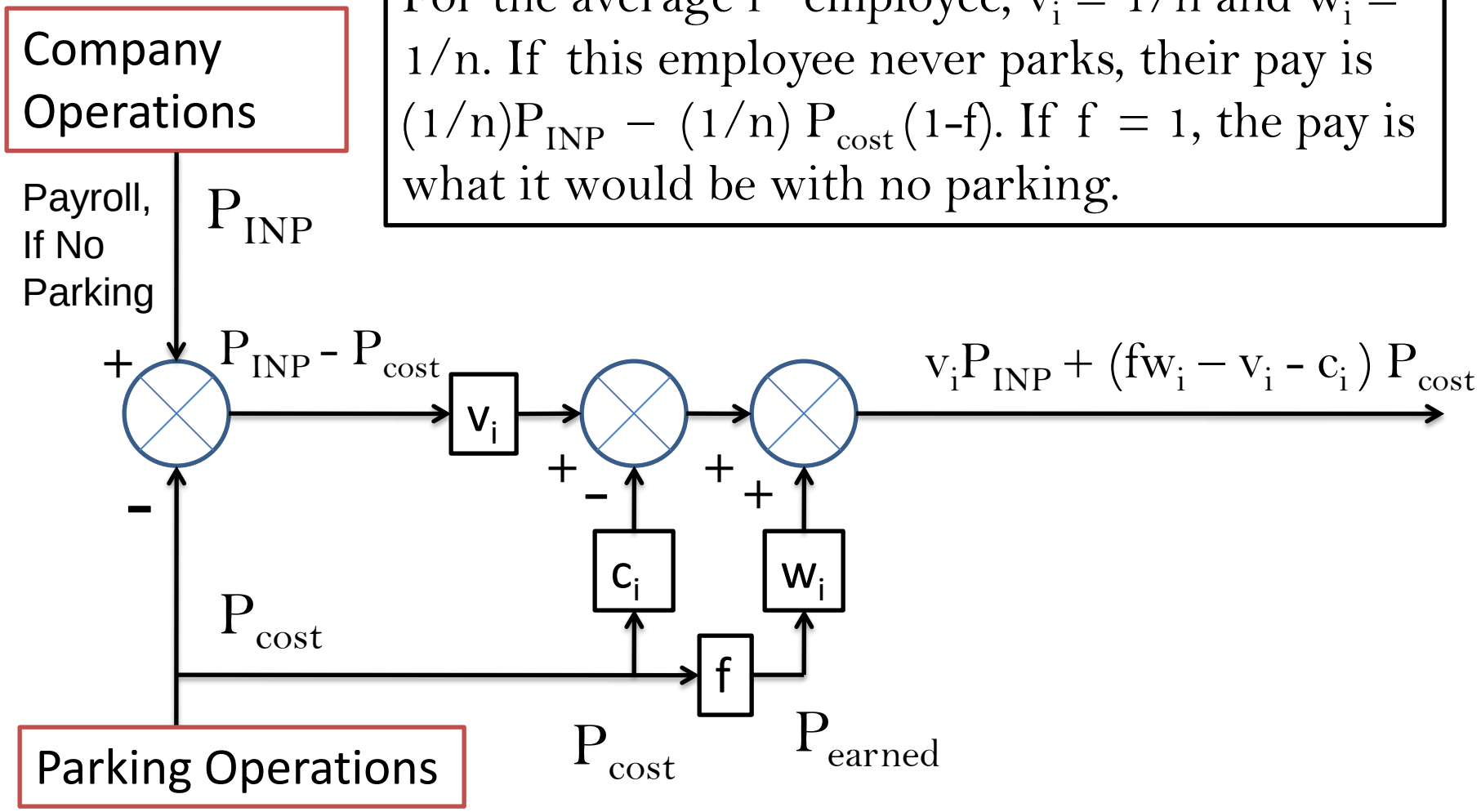
- Basis for a new law supporting installations
  - To provide equal protection of the law
    - Government has required parking for 50 years
    - Those driving less than average often lose money
  - Prototype will have demonstrated feasibility
  - Global warming considerations show subsidized parking to be a public nuisance
    - Global warming will likely cause a human catastrophe
    - Short term strategies are critical
    - Electric cars and getting most electricity from renewables will take decades
    - Properly pricing parking is relatively cheap and quick (5 years)

Unbundle Flow Diagram Definitions

Variable	Definition
P_{INP}	Company payroll if there were no parking costs
P_{cost}	Total parking cost. Price will be sized to recover this.
P_{earned}	Parking earnings equals parking cost minus collection cost
v_i	Employee value. Fraction of available pay. For the average employee, 1/n
c_i	Fraction of parking cost paid. Zero, if the employee never parks.
f	Parking earnings divided by parking cost. Close to 1 for efficient collection
w_i	time worked divided by total time worked of all employees. If average, this is 1/n.

Unbundle Flow Diagram

For the average i^{th} employee, $v_i = 1/n$ and $w_i = 1/n$. If this employee never parks, their pay is $(1/n)P_{INP} - (1/n)\,P_{cost}(1\text{-}f)$. If $f = 1$, the pay is what it would be with no parking.



Mike Bullock, 1 of 2

- Personal
  - Married, two daughters, 3 grand daughters, 1 grandson
    - Daughter Laura Bullock White (Berkeley)
    - Heidi Bullock (Oceanside)
  - Moved from Cupertino to Oceanside in April 2007
  - Oceanside home (1800 Bayberry Dr) and 4-plex (506 N. Ditmar)
  - Swims with and competes for Oceanside Swim Masters
- Education
  - BSEE, Lamar University
  - MSE, University of Texas at El Paso
- Professional
  - Lockheed Martin Systems Engineer, 1971 to 2007
    - Last 2 years, Space Based Infrared System (SBIRS, satellite to detect and track missiles)
    - 10 Years previous: Milstar (communication satellite)
      - Verification of antenna pointing accuracy
      - Antenna pointing calibration

Mike Bullock, 2 of 2

- Most Recent Activities
  - California Democratic Party
    - Delegate, 76TH AD
    - Elected member of the San Diego County Central Committee
    - CDP Resolutions and Platform

San Diego County's Climate Action Plan Misadventures

- The Sierra Club proposed Dividend-Account parking, as a demonstration project for County employees
- The County argued it was infeasible
- Superior Court Judge Taylor ruled that the County failed to show it was infeasible
- The County appealed on a 3-2 vote
- This is the 2nd failed CAP for the County. The first was ordered rescinded on the same issue and resulted in a published Appellant Court Ruling

DRAFT

These entities or others may become interested in issuing a Request for Information as described herein

City of Encinitas in cooperation with the cities of Oceanside, Carlsbad, Solana Beach, and Del Mar, the United States Marine Corps Base at Camp Pendleton, and North County Transit District

REQUEST FOR INFORMATION (RFI) OR A REQUEST FOR AN INDICATION OF INTEREST (RFIOI) IN RESPONDING TO AN RFI

Design, Install, and Operate a Dividend-Account Car Parking System at Selected Work Locations for Employees

CM RFI 18-XX

Date Issued: Month j, 2018 or 2019
Questions Due: Month k, 2018, 5:00 PM
Proposals Due: Month l, 2018, 2:00 PM

IF YOU DID NOT DOWNLOAD, OR DIRECTLY RECEIVE THIS DOCUMENT FROM THE XXX WEBSITE AT WWW.xxx.GOV/BIDS, YOU ARE NOT LISTED AS AN OFFICIAL DOCUMENT HOLDER FOR THIS SOLICITATION AND WILL NOT BE NOTIFIED BY THE CITY OF ADDENDA ISSUED. YOU MUST ACKNOWLEDGE ANY ADDENDA ISSUED IN YOUR SUBMITTAL OR RISK BEING CONSIDERED NON RESPONSIVE. PLEASE BE SURE TO VISIT THE WEBSITE ABOVE TO REGISTER AS A DOCUMENT HOLDER FOR THIS SOLICITATION.

City of XXX
City Manager's Department – Environmental Services
Attn: YYY

Table of Contents

I. INTRODUCTION

The City of Encinitas, or one of the other entities shown above, may want, at some future date, to request information that will aid in the selection of a vendor for a possible Dividend-Account Car-Parking System Demonstration pilot on behalf of the themselves and other entities, such as Oceanside, Carlsbad, Encinitas, Solana Beach, and Del Mar, the United States Marine Corps Base at Camp Pendleton, and the North County Transit District (collectively referred to as "Partners"). The Partners may seek to evaluate the benefits, effectiveness, and popularity of a Dividend-Account Car Parking System for employees in the north coastal region of San Diego County through the operation of a temporary pilot program lasting from twelve (12) to thirty-six (36) months. It could become the goal of the Partners to determine whether permanent Dividend-Account Car-Parking systems would be successful in our region based on the outcome of a pilot program. Partners may decide to be actively coordinating with the San Diego Association of Governments (SANDAG), the agency that may be leading regional Dividend-Account Car-Parking Systems coordination around topics including data collection and monitoring, public outreach, policy/regulations. The partners are more likely to want to proceed if there is an identified interest on the part of vendors to respond to an actual RFI. To save time, the rest of this document is written as if one of the Partners has already decided to issue an RFI. However, that is not currently the case. This document, perhaps best described as Request for Indication of Interest has been adapted from a dock-less bike share RFI. Thank you for considering this concept. Please indicate if you would be interested in designing and operating such a system.

Mike Bullock

Oceanside, CA 92054
760-754-8025; Cell: 760-421-9482

A. Location

The study area includes the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, and Del Mar, and the United States Marine Corps Base at Camp Pendleton, all of which are located in northern San Diego County along the coast. The region has a mild climate with average temperatures ranging from the mid-60s in the winter to mid-80s in the summer. The terrain is relatively flat along the coast, particularly when traveling in the north-south directions. Each of the cities have dense urban centers of varying sizes with grid street plans and relatively flat terrain. Generally, most of the cities in the study area have more hilly terrain and a suburban layout east of Interstate 5 (I-5). The combined population of the cities is approximately 365,000 and the combined geographical area of the cities is approximately 106 square miles. Highway 101 runs along the coast through each of the cities for a contiguous distance of approximately 20 miles. Highway 101 is one of the most popular bicycling routes in the San Diego region. North County Transit District (NCTD) operates two rail lines and 34 bus routes throughout North County. Thirteen rail and/or bus transit centers are located within the study area. Total annual NCTD ridership is approximately 10.7 million passengers. The Camp Pendleton Marine Corps base is located just north of Oceanside and serves as a major employer for both enlisted and non-enlisted personnel. The southwest corner of the base adjacent to Oceanside Harbor and west of I-5 features relatively flat terrain and could benefit from increased biking connections.

Table 1: General information about the region

	Population[1]	Employment[2]	Size (sq. mi.)	Coastline (mi.)
Oceanside	175,948	35,662	42	3.5
Carlsbad	112,930	66,596	39	6.3
Encinitas	61,928	22,443	20	6
Solana Beach	13,494	7,843	3.6	1.5
Del Mar	4,274	3,474	1.8	2.9

[1]SANDAG Current Estimates, 2016
[2]U.S. Census Bureau, 2015

B. Background

The cities in the North County coastal region of San Diego County are increasingly aware of the need to reduce local greenhouse gas (GHG) emissions to limit the effects of climate change

while offering viable transportation alternatives to driving alone. Many of the cities have adopted Climate Action Plans (CAPs) or are in the process of developing CAPs. CAPs establish environmental initiatives by which cities aim to achieve GHG emissions reduction goals and targets. Transportation, especially travel via single occupancy vehicle, is a major source of GHG emissions in North County. Facilitating safe, convenient, and affordable alternative transportation options is often a component of these plans and initiatives. Car parking systems that increase economic fairness and choice, compared to bundled-employee-benefit car parking systems (erroneously called "free parking") at places of employment will reduce single occupancy vehicle (SOV) commuting and increase the need for first/last mile solutions. For this reason, this RFI will be provided to those firms that would benefit from increasing the demand for first/last mile solutions.

The Marine Corps Mobility Transformation Strategy calls for demonstration projects at installations like Camp Pendleton to meet official business mobility with capabilities that are smarter, more efficient, more accessible, and cheaper.

Partners will seek to coordinate with SANDAG on Dividend-Account Car-Parking Systems data analysis while ensuring the selected Dividend-Account Car-Parking Systems vendor can meet data sharing requirements that assist in quantifying the impacts of Dividend-Account Car-Parking Systems on vehicle miles traveled (VMT), access to transit, economic development, and other benefits.

Offering and promoting programs, like Dividend-Account Car-Parking Systems, that replace vehicle trips with active transportation and/or transit trips, is one of the ways the Partners can help to reduce emissions while offering more efficient and more affordable transportation modes for residents, employees, and visitors. A Dividend-Account Car-Parking System is a system which operates employee car parking for the financial gain of the employees by value-pricing the parking and distributing the earnings, which are the revenue minus a fair cost of operation, among employees. The earnings are provided in proportion to the time an employee spends on the work premises. There may also be an "add in" payment provided by either the employer or from a grant, such as a Greenhouse Gas Reduction Fund (GGRF) grant, sized so that an employee that continues to drive every day will lose no money under the system. This system will in effect pay each employee an additional amount of income for each day they get to work without relying on the single occupancy vehicle (SOV) mode. See Reference 1 for more details on the Dividend-Account Car Parking System. The References are listed at the end of Section II, Request for Information.

C. Purpose and Objectives of the RFI

The purpose of this Request for Information (RFI) is to identify vendors with the resources to pilot a Dividend-Account Car-Parking System program in the Partners' jurisdictions, in accordance with the objectives set forth in this RFI.

The Partners seek a qualified vendor to design, establish, implement, operate, and maintain an innovative, valuable, and mutually-beneficial Dividend-Account Car-Parking System pilot program. The pilot should enable and encourage residents, employees, and visitors to affordably and conveniently travel by car pool, transit, active transportation or some combination of these modes. The pilot should also facilitate a decrease in vehicular parking demand, vehicular traffic, and (GHG) emissions, while promoting active and healthy transportation options.

Qualified vendors are invited to submit proposals based on the information provided in this RFI.

This RFI is a mechanism for gathering information and does not constitute a binding procurement process, however, selection of goods and/or services may result from information obtained through this RFI process, where deemed appropriate. The Partners, jointly or individually, are not obligated to make an award or issue a Request for Proposal as part of this process. In addition, the Partners, in their sole discretion, may decide to engage in direct question and answer sessions with one or more vendors and may decide to enter into an agreement or issue permits based upon those discussions/interviews or a resulting proposal.

If a single demonstration pilot project or multiple demonstration pilot projects were successful, given the severity of our anthropogenic climate change crisis, it is anticipated that other employers will decide to install Dividend-Account car-parking systems. Since municipal governments are required under CEQA to adopt General Plan Updates (GPUs) that include, perhaps using a Climate Action Plan, a set of enforceable measures that will achieve climate-stabilizing targets, and since cars and light-duty trucks (LDVs) are the largest category of GHG emissions, it is further anticipated that municipal governments will, over time, update their off-street parking ordinances to include requirements for Dividend-Account Car Parking systems. Reference 2 shows that this system is adaptable to all types of parking. A selected vendor would have access to a market of more than 365,000 residents living in the north coastal region, more than 135,000 employees that work in the region, and others that visit the region for leisure.

Potential Dividend-Account Car-Parking Systems program marketing opportunities may include, but are not limited to: being listed as a preferred vendor on the Partners websites, co-branded sustainability campaigns, signage, event sponsorship, press releases, and social media announcements.

D. Obtaining RFI Documents

The website for this RFI and related documents is: PlanetBids (http://www.encinitasca.gov/bids). All correspondence will be posted on the PlanetBids website. It is the responsibility of Proposers to check the website regularly for information updates and RFI clarifications, as well as any RFI addenda. To submit a proposal, a Proposer must be registered with the City of Encinitas as a vendor. To register as a vendor, go to the following link (http://www.encinitasca.gov/bids), and then proceed to the "New Vendor Registration" link. All addenda will be available on the PlanetBids website.

E. RFI Contact

The City of Encinitas will receive questions and information requests on this RFI up to **5:00 p.m. on some TBD Month "n", 2018**. All questions regarding the RFI documents shall be submitted through PlanetBids. All project correspondence will be posted on the PlanetBids website. It is the responsibility of the Proposers to check the website regularly for information updates, clarifications, and addenda.

II. REQUEST FOR INFORMATION or REQUEST FOR INDICATION OF INTEREST

This section describes the information being requested by the Partners to learn about prospective **Dividend-Account Car-Parking System ("System")** vendors and optionally to select a vendor to operate in the Partners' jurisdictions. Interested vendors must include all

information outlined below in a submitted proposal.

A. Dividend-Account Car-Parking System ("System") Pilot Program Requirements

Vendors responding to this RFI must describe their proposed system that is capable of providing the following services and shall describe these services in their submission:

1. System pilot program(s), as described in Reference 1, to include the following installed and maintained capabilities:
2. A capability to establish and maintain a database of System Vehicles, System Members, System Parking and System Accounts. A System Account includes the mailing name and address of a person that has agreed to receive payments and pay bills that are the result of the implementation of the System and the actions taken by the person, or some other person driving the System Vehicle or System Vehicles, as described herein. Such a person is a "System Member." A "System Vehicle" is one that can be identified when it is parked in the System and one that is associated with a System Account and System Member. A System Member may take responsibility to pay for the cost of parking for multiple System Vehicles.
3. A capability to provide an easy method for Employees and others to become System Members by establishing a System Account with their chosen System Vehicles.
4. A capability to provide signage to designate System Parking areas well enough to prevent nearly all accidental entries by unauthorized vehicles, meaning vehicles that are not System Vehicles.
5. A capability to provide written materials to explain to employees and others that may want to become System Members how the System will work and why it is an important improvement to economic fairness and environmental outcomes, assuming a reasonable level of cooperation with the City and other affected groups, such as City vendors and sub-contractors.
6. A capability to operate the system for an agreed-upon amount of time, with no money exchanges, to establish a pre-install database of commute behavior including using questionnaires to determine how non-drivers say they are getting to work.
7. A capability to identify a System Vehicle within a minute of its being parked in a System Parking space and to store the System Vehicle identifier and the time it was recognized as being parked.
8. A capability to recognize when a System Vehicle exits a System Parking space, within a minute and to store the vehicle identifier and the recognized exit time.
9. A capability to identify vehicles that are NOT System Vehicles when they are in the System Parking area and are therefore trespassing, while they are in the System Parking area.
10. A capability to record the start time and end time of the trespassing vehicle's trespassing, to within an accuracy of 1 minute, as well as its license plate image, sufficient to support a conviction of trespassing.
11. A capability to send the license plate of the trespassing vehicle and its start time and end time of its trespassing to law enforcement officials with 5 minutes of the recorded start time of the trespass.
12. A capability to provide notice and evidence of this trespassing in real time and as stored

information for law enforcement so that they can then ticket and prosecute the owners of any and all vehicles that have been illegally parked in a System Parking space. It is anticipated that this would include the capture and storage of the license plate numbers of the vehicles that are parked in the System Parking lot whenever it is the case that the vehicle is not a System Vehicle.

13. A capability to compute an instantaneous charge rate (cost per minute) for the case of an application of “congestion pricing”, whereby an agreed-upon base price is increased by an agreed-upon congestion-pricing algorithm, designed to prevent the occupancy rate from exceeding an agreed-upon upper bound value, such as 90% occupied. An example of such an algorithm is in Reference 2.
14. A capability to compute and store the time that the charge rate changes, for the case of an application of a congestion-pricing algorithm. Note that this time is called the Rate Change Time. At these times, the rate could either increase, by the addition of a car being parked in a System Space or the rate could be decreased, by the subtraction of a car in a System Space.
15. A capability to accumulate a total charge for each System Member, where the total charge is the sum of the products of each parked duration time over which a fixed charge rate applies and the length of that time duration, for all the System Vehicles associated with the System Member, over a month. This total charge is called the System Member Monthly Charge (“SMMC”). Note that the Member may or may not be an employee.
16. A capability to compute the total charges, for all System Members over a month for the System. This amount is the Total System Monthly Charge (“TSMC”).
17. A capability to compute a Total System Monthly Earnings (“TSME”), which is the TSMC, reduced by a agree-to amount, such as 5%, where the 5% is taken out of the TSMC to cover the operator’s expenses.
18. A capability to record all the times an employee enters and leaves the work premises. One way to do this is to require employees to have an RFID. There may also be an GPS or a license plate reading solution. Note that a privacy requirement will prevent this information from being shared, with the employer, for example, with the exception of providing it to a law enforcement person, in the event a warrant is signed by a presiding judge.
19. A capability to use the times an employee enters and leaves the work premises to compute the time, over a month, an employee has spent at or within the work premises. This time is known as the Employee Monthly Time (“EMT”).
20. A capability to compute the total time all employees spent at the premises over a month, to be known as the Total Employee Monthly Time (“TEMT”).
21. A capability to compute an Employee’s Monthly System Earnings (“EMSE”) as the Total System Monthly Earnings (“TSME”), multiplied by the employee’s Employee Monthly Time, EMT divided by the TEMT. This is also described in Reference 1.
22. A capability to compute an Employee’s Add-In “EAI”, as follows. If the employee’s System Member Monthly Charge, SMMC, value is greater than the employee’s earnings, TSME; then, for that case, the EAI is equal to the employee’s SMMC minus the employee’s TSME. If the employee’s System Member Monthly Charge, SMMC value is not greater than the employee’s earnings, TSME; then the employee’s EAI is equal to zero. This is also described in Reference 1.
23. A capability to accept Employee’s Add-In, EAI money from the Employer, with the

expectation that the money would originate from a grant funded by, for example, the Greenhouse Gas Reduction Fund (GGRF), or could come from the Employer's budget, as a Climate Action Plan (CAP) or other expense. It could also be generated by converting some "free" parking to be a different Account Parking System Parking (System Parking), thereby generating new money to the City.

24. A capability to compute an employee's monthly payment ("EMP"), as follows: It is equal to the Employee's Monthly System Earnings, EMSE plus the employee's Add-In, EAI minus the System Member Monthly Charge, SMMC. This is also described in Reference 1.
25. A capability to automatically send out monthly statements to all System Members. System Members who are not employees will receive a bill if they have parked in the System parking during the month. The bill will then be for the member's SMMC. Each employee will receive a statement showing SMMC, EMSE, and EAI. If the employee's EAI is zero, then the employee will receive a payment in the form of cashable check for the employee's EMP. This is also explained in Reference 1.
26. A capability to protect employee privacy where privacy means that the employee's data will never be shared, with the sole exception of sharing with law enforcement officials in accordance with a valid court order requesting the data. For example, at no time will the data be shared with other employees, including those working in the management of the employer that is providing the employee parking that is the System Parking.
27. A capability to protect System Member privacy where privacy means that the System Member's data will never be shared, with the sole exception of sharing with law enforcement officials in accordance with a valid court order requesting the data.
28. A capability to allow visitors, vendors, and others, that are identified by the Company management, to be treated as employees. There could also be "visitor" parking that is not associated with the System.
29. A capability to identify System Vehicles that are parked in the visitor parking or other inappropriate parking places, since it is expected that it will required as a part of City Policy that System Vehicles that are associated with employees will be required to be parked in the System Parking. Since employees are earning money from the System Parking, it would be inappropriate for them to not use the System Parking. This information would be shared with City Management, as soon as it is collected.
30. A capability to perform regular inspection, maintenance, and repair of all System Parking facilities and associated capabilities often enough to eliminate nearly all system failures.
31. A capability to perform vendor-managed methods of enforcement.
32. A capability to have demonstrated secured financial backing with the ability to operate at full capacity for the life of the pilot program and beyond with a sustainable business model.
33. A capability to provide close coordination with all Partners, including real-time sharing of System Parking data collected, active promotion of the Dividend-Account Car-Parking Systems program in coordination with each Partner, and timely response to any complaints received or requests made by the Partners and Dividend-Account Car-Parking Systems users. Describe the type of data that is collected and can be provided to the Partners. Promotion and advertisement of the Dividend-Account Car-Parking Systems program must comply with all Partners' municipal codes and ordinances.
34. A capability to offer a Dividend-Account Car-Parking Systems program that can be deployed, operated, managed, and maintained by the vendor at no cost, except for the

possibility of the EAI payments, to the Partners and with minimal oversight needed from the Partners.

35. A capability to establish and operated multiple Dividend-Account Car-Parking Systems programs including for for cases other than employee parking, as described in Reference 2, that can be deployed, operated, managed, and maintained by the vendor at no cost, except for the EAI payment, for employee parking, to the Partners and with minimal oversight needed from the Partners.
36. A capability to conform to contract specifications, including general liability insurance, worker's compensation, automobile liability insurance, indemnification, and termination clauses. Sample contract attached.

B. Proposal Elements

Vendors interested in responding to this RFI must prepare a proposal that includes the following information:

1. Describe how drivers can become System Members.

2. Provide a detailed System maintenance plan.

3. Describe the vendor's capability to provide data and reports to the Partners, including raw and summarized data. Summarized data could include both user data (e.g., demographics, trip purpose, repeat usage, percent of trips starting and ending in close proximity to transit, mode shift, and transit usage) and trip data (e.g., average trip length, average trip time, trip start and end hotspots, trip path, estimated GHG emissions per trip). Ideally, this data should be provided via a publicly accessible API in your suggested General Dividend-Account Car-Parking Systems Feed Specification (GBFS) format. Describe vendor's ability to collect quantitative and qualitative data and report out findings from users (e.g. in-app surveys).

4. Describe how the vendor will employ anti-theft and anti-vandalism measures to ensure Systems do not pose a nuisance to the community.

5. Since the establishment of Dividend-Account Parking systems will increase bike usage, describe how the vendor will address bicycle safety concerns, including helmet use, riding at night and other safety concerns that may or may not be regulated by state vehicle codes.

6. Describe how the Dividend-Account Car-Parking Systems program may operate in conjunction with existing bike rental businesses operating in the Partners' cities.

7. Describe the vendor's plans for future growth and expansion, including possible anticipated increases in demand for good car parking systems as the public becomes more aware of the threat of anthropogenic climate change and how good systems improve economic fairness, etc.

8. Provide an estimated timeline for a twelve-to-twenty-four-month pilot Dividend-Account Car-Parking System program, including any needed permitting, set-up, promotion, advertising, maintenance and servicing, data delivery to Partners, summary and reporting on the outcome of the pilot program and possible continuation of the program.

9. Describe a recommended minimum Dividend-Account Car-Parking Systems size for the North County Coastal operating area.

10. Describe strategies for effectively educating users on proper System Parking use and the reason that society needs to improve the way we pay for the use of car parking.

11. Describe any approach you would recommend to enhance access and fairness for disadvantaged communities.

12. Describe time required to deploy a Dividend-Account Car-Parking Systems pilot program if selected based on System Parking size, etc.

13. Describe an approach to increasing the use of Dividend-Account Parking to include most city car parking, then across City boundaries, and then across County, State, and international boundaries, with the final system being one wherein nearly all System Vehicles have a single, world-wide, System Account.

References Providing Additional Description

1. ***Eliminating the Harm of Bundled-Cost or Bundled-Benefit Parking***, Presentation to the 2018 Energy Utility Environment Conference (EUEC), Mike Bullock, March 2018
2. ***A Plan to Efficiently and Conveniently Unbundle Car Parking Costs***, paper presented to the Air and Waste Management Association (AWMA) Conference in 2010, Mike Bullock and Jim Stewart, June 2010
3. ***Oceanside Civic Center Garage Space Allocation***, EXCEL Spread Sheet, Bullock, based on a file provided by Oceanside staff, July 2018

III. INSTRUCTIONS

A. Proposal Due Date

Proposals must be submitted electronically no later than **5:00 p.m. on TBD Month 2018 or 2019**. Proposals must be submitted electronically via the PlanetBids system used to download the RFI. The maximum file size for submittal is 50 megabytes, and the file type shall be Portable Document Format (PDF). The electronic system will close submissions exactly at the date and time set forth in the RFI or as changed by addenda.

B. Proposal Acceptance

Respondents are responsible for submitting and having their submittal accepted before the closing time set forth in this RFI or as changed by addenda. NOTE: Pushing the submit button on the electronic system may not be instantaneous; it may take time for the Respondent's documents to upload and transmit before the submittal is accepted. It is the Respondent's sole responsibility to ensure their document(s) are uploaded, transmitted, and arrive in time electronically. The City of Encinitas will have no responsibility for submittals that no not arrive in a timely manner, no matter what the reason.

C. Page Limit

No submissions exceeding twenty-five (25) pages will be accepted (excluding attachments). In addition, attachments may not exceed twenty-five (25) pages. The City of Encinitas discourages "padding" of proposals with brochures, extensive literature, and boilerplate material not applicable to a pilot Dividend-Account Car-Parking Systems program.

D. Proposal Format

Proposals must be organized in the following format and include the following content:

1. Letter of transmittal signed by an individual authorized to bind the proposing entity stating the firm has read and will comply with all terms and conditions of the RFI.

2. General information about the firm, including the size of the organization, location of offices, number of years in business, organizational chart, name of owners and principal parties, number and position titles of staff.

3. Qualifications of principals, project managers and key personnel who would be assigned to this project. Include their position in the firm, and types and amount of relevant experience operating a Dividend-Account Car-Parking Systems program or similar program. Identify the primary contact that will be the overall project manager. Resumes are not required, but may be included as attachments. The selected respondent may not substitute personnel without written authorization from the Partners.

4. A work plan that establishes the Respondent's understanding of, and ability to satisfy Partners' objectives. Respondent shall succinctly describe the proposed approach for implementing a Dividend-Account Car-Parking Systems program, outlining the activities, including innovative ideas that would be undertaken in completing the various tasks and specifying who would perform them.

5. A preliminary estimated schedule for deployment of a pilot Dividend-Account Car-Parking Systems program. Show all critical paths, major milestones, and decision points in pilot schedule.

6. A list of the municipal or other government agencies your firm has worked with during the past three years. Provide the following information for at least one operational system that has at least some of the similar components as would a Dividend-Account Car-Parking System program that is managed by the respondent:

    a) Name, address, and telephone number of the agency;
    b) Time period for the project;
    c) Brief description of the scope of the services provided;
    d) Identify the staff members on the project and their specific responsibilities; and
    e) Person and contact information for a reference.

IV. PROPOSAL EVALUATION

A. Proposal Evaluation

A review committee comprised of representatives from each of the potential Partner cities will judge the merit of proposals received in accordance with the general criteria defined herein. Failure of proposers to provide in their proposal any information requested in this RFI may result in disqualification of the proposal. The sole objective of the review committee will be to select the proposal that is most responsive to the Partners' needs. The Partners reserve the right to elect to not proceed with a pilot Dividend-Account Car-Parking System program and reject all proposals received through this RFI process.

1. Experience of the vendor and proposed staff. Experience of project staff with similar scope of services. Level of education, training, licensing and certification of staff

2. Approach to the project. Demonstrated understanding of the Partners' needs and solicitation requirements. Approach is well organized and presented in a clear, concise and logical manner.

3. Availability and proposed use of technology and methodologies. Quality control and thoroughness is well defined.

4. Capability to Perform. Ability to complete work within deadlines. Availability and continuity of staff during the course of the project, if selected. Unsatisfactory past performance with the City of Encinitas (or any of the Partner cities) may be considered as determined by the City of Encinitas (or any of the Partner cities) in their sole and absolute discretion.

5. Relevant Experience. Experience in performing similar services for organizations of similar size to the Partner cities. Experience with public agencies. Years of experience with these types of services.

6. Innovation. Innovative ideas on the development, operation, promotion, and sustainability of Dividend-Account Car-Parking System programs.

B. Final Negotiation

As reflected above, vendor selection will be based on a combination of factors as determined to be in the best interest of the Partners. After evaluating the proposals and discussing them further with the finalists, or the tentatively selected vendor, the City of Encinitas reserves the right to further negotiate the proposed program.

V. CONDITIONS GOVERNING THIS PROCUREMENT

A. Scope Changes, Additions and Deletions

All changes in proposal documents shall be through written addendum and furnished to all proposers. Verbal information obtained otherwise will NOT be considered in the evaluation process.

B. Rejection of Proposals

The City of Encinitas reserves the right to reject any or all Proposals and to waive informalities and minor irregularities in Proposals received and to accept any portion of Proposal or all items of Proposal if deemed in the best interest of the City of Encinitas to do so.

C. Proprietary Information

Any restrictions on the use of data contained within a Proposal must be clearly stated in the Proposal itself. Proprietary information submitted in response to this RFI will be handled in accordance with applicable City of Encinitas Procurement Regulations and the California Public Records Act.

D. Response Materials Ownership

All materials submitted regarding this RFI become the property of the City of Encinitas. Responses may be reviewed by any person at Proposal opening time and after final selection has been made. The City of Encinitas has the right to use any or all ideas presented in reply to this request, subject to the limitations outlined in Proprietary Information above. Disqualification of a proposer does not eliminate this right.

E. Acceptance of Proposal Content

The contents of the Proposal of the successful proposer will become contractual obligations if contractual agreements action ensues. Failure of the successful proposer to accept these obligations in a permit to operate, purchase agreement, purchase order, contract, delivery order or similar acquisition instrument may result in cancellation of the award and such proposer may be removed from future solicitations.

F. Cost of Proposal Preparation

The City of Encinitas shall not be liable for any pre-contractual expenses incurred by any submitting vendor. Each submitting vendor shall protect, defend, indemnify, and hold harmless the City of Encinitas from any and all liability, claims or expenses whosoever incurred by, or on behalf of, the entity participating in the preparation of its response to this RFI. Pre-contractual expenses are defined as expenses incurred by vendors in:

1. Preparing the proposal in response to this RFI;
2. Cost to acquire a permit; and
3. All other expenses incurred by a vendor related to preparation of proposal or establishment of a Dividend-Account Car-Parking System program.

G. Interview

Interviews with the top respondents may be requested. The selection of vendors invited to interview will be solely based on the Partners' discretion. The vendors asked to interview will be notified in advance.

ATTACHMENT 1

Sample License Agreement for Dividend-Account Parking Services

This License Agreement for Dividend-Account Car-Parking Sytsem Services (“Agreement”) is made this this day of September 2017, by and between the City of Encinitas ("City") and ____ ("Dividend-Account Car-Parking System Vendor").

RECITALS

1. A goal of City is to provide safe and affordable multi-modal transportation options to all residents, reduce traffic congestion, and maximize carbon free mobility.
2. Dividend-Account Car-Parking System services are a component to help the City achieve its transportation goals and the City desires to make this System available to residents and those who work or otherwise drive and park in the City.
3. Dividend-Account Car-Parking System Vendor proposes to operate a Dividend-Account Car Parking program within the City at an agreed-to location with an agree-to number of System parking spaces within the designated location or locations. As an example, based on Reference 3, there could be 239 spaces designated as System Parking, out of a total of 284 spaces in the Oceanside Civic Center Parking Garage. Note further, that if there are 259 employees that work for the City and are given parking spaces, there would be a need to establish 20 additional System Parking spaces outside of the Oceanside Civic Center Parking Garage.
4. Dividend-Account Car-Parking System Vendor will abide by all City ordinances and rules governing the use of public space.
5. Dividend-Account Car-Parking System Vendor possesses the technology necessary to install operate, maintain, and expand such a system and multiple systems as demand expands.

AGREEMENT

1. Initial Term. This Agreement is effective for twelve to eighteen months from the date of execution (“Initial Term, Phase 1”), which will include a duration of installation during which no money is exchanged so as to establish a baseline of modal splits for employee commuting, and then a year of full operation to document the modal split changes and an estimated amount of greenhouse gas (GHG) emissions saved by the program. At the conclusion of the Initial Term Phase 1, the Agreement may be extended by mutual written agreement of the parties for an additional two-year term (Initial Term, Phase 2), subject to any new terms agreed between the parties, unless either party notifies the other party of its intent not to continue with the Agreement no later than 30 days before the expiration of the Initial Term, Phase 1 and Phase 2.
2. Exclusive Operator. During the Initial Term’s Phase 1 and Phase 2, the City designates Dividend-Account Car-Parking Systems Vendor as the exclusive provider of the System services within its city limits. This designation is personal to Dividend-Account Car-Parking Systems Vendor and may not be assigned or transferred to any party. This exclusivity provision shall expire and not be renewed past the Initial Term’s Phase 1 and Phase 2 unless agreed in writing by the parties.

3. Use of City Property. City authorizes Dividend-Account Car-Parking Systems Vendor to use ("License") City property, including the public right-of-way and System Parking areas that are suitable, solely for the purposes set forth in Section 4 of this Agreement. This authorization is not a lease or an easement, and is not intended and shall not be construed to transfer any real property interest in City Property.

4. Permitted Use. Dividend-Account Car-Parking System's System Members may use City Property solely for parking System Vehicles. The City Property is maintained by the City. Dividend-Account Car-Parking Systems Vendor may operate an agree-to amount of System Parking places on City Property as set forth in Exhibit A. If at any time during the term of the Agreement Dividend-Account Car-Parking Systems Vendor desires to place additional System Parking within the City limits, Dividend-Account Car-Parking Parking Systems Vendor must request and receive authorization from the city to do so in writing. The City may limit the number of System Parking places upon identifying a potential harm to public health or safety. Dividend-Account Car-Parking Systems Vendor shall not place or attach any personal property, fixtures, or structures to City Property without the prior written consent of City.

    a. Use of City Property and Dividend-Account Car-Parking Systems Vendor's operations within the City, shall, at a minimum: a) not adversely affect City Property or the City's streets, or sidewalks; b) not adversely affect the property of any third parties; c) not inhibit pedestrian or vehicular movement, as applicable, within City Property or along other property or rights-of-way owned or controlled by the City; d) not create conditions which are a threat to public safety and security. Dividend-Account Car-Parking Systems Vendor shall instruct its customers not to park or leave any System Vehicle where they would impede pedestrian or vehicular traffic.

    b. Upon termination of this Agreement by either party, Dividend-Account Car-Parking Systems Vendor shall, at its sole cost and expense, immediately restore City Property to a condition which is visually and structurally indistinguishable from the immediately surrounding area.

5. System Parking. The City, at its own discretion, may support the System with the installation of signs and painting to further the orderly operation of the System Parking.

6. Condition of City Property

    a. City makes City Property available to Dividend-Account Car-Parking Systems Vendor in an "as is" condition. City makes no representations or warranties concerning the condition of City Property or its suitability for use by Dividend-Account Car-Parking Systems Vendor or its customers, and assumes no duty to warn either Dividend-Account Car-Parking Systems Vendor or the System Members concerning conditions that exist now or may arise in the future.

    b. City assumes no liability for loss or damage to Dividend-Account Car-Parking Systems System Members. Dividend-Account Car-Parking Systems Vendor agrees that City is not responsible for providing security at any location where Dividend-Account Car-Parking Systems Vendor's System Vehicles are parked, and Dividend-Account Car-Parking Systems Vendor hereby waives any claim against City in the event Dividend-Account Car-Parking System's System Vehicles or other property are lost, stolen, or damaged.

7. Maintenance and Care of Portion of City Property; Dividend-Account Car-Parking Systems Vendor shall be solely responsible for: (i) maintaining City Property to the City standards applicable for use by the Dividend-Account Car-Parking Systems Vendor as

permitted under Section 3; and (ii) obtaining from the City any applicable permits or approvals required by the City. Dividend-Account Car-Parking Systems Vendor shall exercise due care in the use of City Property and shall be responsible for maintaining City Property in good condition and repair. Dividend-Account Car-Parking Systems Vendor shall not act, or fail to act, in any way that result in excessive wear or damage to City Property. Dividend-Account Car-Parking Systems Vendor expressly agrees to repair, replace or otherwise restore any part or item of real or personal property that is damaged, lost or destroyed as a result of the Dividend-Account Car-Parking Systems Vendor's use of City Property. Should the Dividend-Account Car-Parking Systems Vendor fail to repair, replace or otherwise restore such real or personal property, Dividend-Account Car-Parking Systems Vendor expressly agrees to pay City's costs in making such repairs, replacements or restorations. The obligations under this Section apply to all City facilities, infrastructure, or appurtenances located on City Property.

8. Operations & Maintenance. Dividend-Account Car-Parking Systems Vendor will cover all maintenance costs for the System and maintenance to minimum level of service and reporting outlined in Exhibit A.

9. License Fee. The parties intend to agree to a license fee before the Agreement may be extended beyond the Initial Term.

10. Indemnification. Dividend-Account Car-Parking Systems Vendor shall defend, pay, indemnify and hold harmless City, its officers, officials, employees, agents, invitees, and volunteers (collectively "City Parties") from all claims, suits, actions, damages, demands, costs or expenses of any kind or nature by or in favor of anyone whomsoever and from and against any and all costs and expenses, including without limitation court costs and reasonable attorneys' fees, resulting from or in connection with loss of life, bodily or personal injury or property damage arising directly or indirectly out of or from or on account of:

    a. Any occurrence upon, at or from City Property or occasioned wholly or in part by the entry, use or presence upon City Property by Dividend-Account Car-Parking Systems Vendor or by anyone making use of City Property at the invitation or sufferance of Dividend-Account Car-Parking Systems Vendor, except such loss or damage which was caused by the sole negligence or willful misconduct of City.

    b. Use of Dividend-Account Car-Parking Systems Vendor's System Parking by any individual, regardless of whether such use was with or without the permission of Dividend-Account Car-Parking Systems Vendor.

11. Insurance. Dividend-Account Car-Parking Systems Vendor shall procure and maintain for the duration of this agreement insurance against claims for which Dividend-Account Car-Parking Systems Vendor has indemnified the City pursuant to Section 10 of this Agreement. Dividend-Account Car-Parking Systems Vendor shall maintain general liability and automobile liability insurance policies with limits of no less than one million dollars ($1,000,000.00) per occurrence for bodily injury or death, personal injury and property damage, and two million dollars ($2,000,000.00) aggregate. Each insurance policy shall name the City as an additional insured and it shall be endorsed to state that:

    (i) coverage shall not be suspended, voided, or cancelled by either party, or reduced in coverage or in limits except after thirty (30) calendar days prior written notice by certified mail, return receipt requested, has been given to City; and (ii) for any covered claims, the Dividend-Account Car-Parking Systems Vendor's insurance coverage shall be primary insurance as respects the City and any insurance or self-insurance maintained by the City shall be in excess of the Dividend-Account Car-Parking Systems Vendor's

insurance and shall not contribute with it. The insurance required to be provided herein, shall be procured by an insurance company approved by City, which approval shall not be unreasonably withheld. Additionally, before Dividend-Account Car-Parking Systems Vendor shall employ any person or persons in the performance of the Agreement, Dividend-Account Car-Parking Systems Vendor shall procure a policy of workers' compensation insurance as required by the Labor Code of the State of California, or shall obtain a certificate of self-insurance from the Department of Industrial Relations.

12. Compliance with Law. Dividend-Account Car-Parking Systems Vendor at its own cost and expense, shall comply with all statutes, ordinances, regulations, and requirements of all governmental entities applicable to its use of City Property and the operation of its System program, including but not limited to laws governing operation of vehicles. If any license, permit, or other governmental authorization is required for Dividend-Account Car-Parking Systems Vendor's lawful use or occupancy of City Property or any portion thereof, Dividend-Account Car-Parking Systems Vendor shall procure and maintain such license, permit and/or governmental authorization throughout the term of this Agreement. City shall reasonably cooperate with Dividend-Account Car-Parking Systems Vendor, at no additional cost to City, such that Dividend-Account Car-Parking Systems Vendor can properly comply with this Section and be allowed to use City Property as specified in Section 4, above.

13. Business License. Dividend-Account Car-Parking Systems Vendor is required to obtain and maintain a City Business License during the duration of this Agreement.

14. Required Reports. Dividend-Account Car-Parking Systems Vendor shall provide reports to the City concerning utilization of its System Parking not less than monthly, and shall cooperate with the City in the collection and analysis of any aggregated data concerning its operations.

15. No Joint Venture. Nothing herein contained shall be in any way construed as expressing or implying that the parties hereto have joined together in any joint venture or liability company or in any manner have agreed to or are contemplating the sharing of profits and losses among themselves in relation to any matter relating to this Agreement.

16. Termination. This Agreement may be terminated prior to the expiration date set forth in Section 1, above, upon the occurrence of any of the following conditions:

    a. Upon delivery of written notice from City to the Dividend-Account Car-Parking Systems Vendor terminating this agreement for any reason, or for no reason, by giving at least sixty (60) days' notice to the Dividend-Account Car-Parking Systems Vendor of such termination.

    b. An attempt to transfer or assign this Agreement.

    Dividend-Account Car-Parking Systems Vendor shall not terminate this Agreement without first by giving at least 180 days' written notice of plans for termination.

17. Amendment. This Agreement may be amended by mutual agreement of the parties. Such amendments shall only be effective if incorporated in written amendments to this agreement and executed by duly authorized representatives of the parties.

18. Applicable Law and Venue. The laws of the State of California shall govern the interpretation and enforcement of this Agreement. Any action to interpret or enforce the terms or conditions of this Agreement shall be brought in the Superior Court for the County of San Diego, or in the United States District Court for the Southern District of California. Dividend-Account Car-Parking Systems Vendor hereby waives any right to remove any such action from San Diego County as is otherwise permitted under

California Code of Civil Procedure Section 394.

19. Counterparts. This Agreement may be executed simultaneously or in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same agreement.

IN WITNESS WHEREOF THE PARTIES HERETO have executed this Agreement on date first above written.

CITY OF ENCINITAS	**DIVIDEND-ACCOUNT CAR-PARKING SYSTEMS VENDOR**
_____	_____
Karen Brust, City Manager	[Title]
_____	_____
Date	Date

ATTEST:

_____

City Attorney

Exhibit A

Description of Dividend-Account Car-Parking Systems Vendor's Service Level Agreement

The following performance indicators shall be met and reported to help the City measure our success serving its citizens and improving the livability and mobility of Encinitas. Dividend-Account Car-Parking Systems Vendor will maintain it's System in an excellent state of functionality and repair, with a minimum of error-free operation 95% of the time.

Performance Indicator	Description	Measurement Tool	Minimum Performance Standard	Reporting Frequency
App & customer service support portal: phone and internet. The portal will support the establishment of an account and editing an account	A new account can be entered and audited. It can be edited and an audit can verify the edits. The time and method of the submissions can be retrieved	Tool to audit accounts either by name or unique account number	Accurate 99.5% uptime.	monthly
Ability to set the value price of the parking, a per minute value	The system can accept a "value price" and use the number as described in this report	Tool to audit the fact of and the proper use of the value price	Accurate 99.5% uptime.	monthly
Ability to set the base multiplier, which is used in the congestion pricing algorithm as shown in Table 2 of Reference 2. It is expected to be a number between 1.5 and 2.5. It can be adjusted upwards if the parking is getting too full too often	The system can accept a "base multiplier" and use the number as described in Table 2 of Reference 2.	Tool to audit the fact of and the proper use of the value base multiplier	99.5% of the time	monthly
Ability to report out monthly statements	A feature to display each statement that	Interface to allow a specification of	Statements can be viewed and verified for accuracy with an accuracy of 99.5%	monthly

	was sent out to all employees and all users that are not employees, to verify accuracy	account and month to view the statement that was mailed, for verification		
Ability to accept money into an account and to pay earnings and “add-ins”, out of the account, as described in this report	Most of the money accepted will be car-parking charge but there will also money that is sent in to cover the “Add-in” payments. Most of the money will be via an automated transfere as is done for dockless bike rentals. However, an ability to accept a mailed check will also be required	Transactions will be put into a file that can be audited	Money transfers will occur and be observable with an accuracy of 99.5%	Monthlyt
Ability to report out the percent of employees at their work location that are using their allocated parking over any duration, from specific days to longer specified durations	This tool supports a request for the percent of employees that are at work without using car parking in the employee parking spaces	Software interface that will show the results on a screen and allows for the result file to be stored or printed	Functional 99.5% of the time	monthly

Ability to report out the total amount charged to employees, paid to employees as earnings and, separately, as “add ins”, over any duration, from specific days to longer specified durations	This tool supports a request for the described data	Software interface that will show the results on a screen and allows for the result file to be stored or printed	Functional 99.5% of the time	monthly
Parking spot usage rate	The monthly use rate is reported for any single parking place or for a set of parking places	The result can be viewed on screen or in a file that can be stored or printed	Data collection failure would be reported within two (2) hours during business hours between 8am to 8pm Monday through Friday except for State and Federal holidays. Direct 24/7 contact line for true emergencies, either by phone, text, and/or email Failure outside of business hours reported within two hours (2) of start of business hours	Monthly
System failure detected or reported by a member	Error either automatically reported to the person responsible and their back-ups, as a text on their phones and an email to their computer, to include the error report time	A program collects the time of the data error recognition and the time of the correction	Within two (2) hours during business hours between 8am to 8pm Monday through Friday except for State and Federal holidays. Direct 24/7 contact line for true emergencies, either by phone, text, and/or email For complaint outside of business hours, within two hours (2) of start of business hours	Monthly

From:	Keith B. Jones
To:	mike_bullock@earthlink.net
Subject:	Re: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system
Date:	Friday, March 11, 2022 2:51:00 PM
Attachments:	image001.jpg

Mike,

Happy Friday afternoon to you. Thank you for your thoughtful and well crafted response.

Yes, please feel free to share ACE's interest in participating in an opportunity to provide these parking solutions.

Have a great weekend,
Keith

Keith B. Jones
Owner | ACE Parking
ACE Parking
645 Ash Street
San Diego, CA 92101
T: 619.233.6624

On Sat, Mar 5, 2022 at 5:41 PM <mike_bullock@earthlink.net> wrote:

> Keith,
>
> Thank you so much for getting back to me.
>
> No, there is no RFP.
>
> However, the North County Transit District (NCTD), the agency doing the Transit Center project, has a representative on the Oceanside Bike-Ped Committee who seems interested. The Bike-Ped Committee supports the Dividend Account Parking (DAP) system. The Chair of the NCTD, Tony Krantz, who is an Encinitas Councilman, should be supportive, but I have not presented to him. I have presented to the Mayor of Encinitas.
>
> I have put more work into this for the City of Oceanside, for their Civic Center

Parking Garage, which is supposed to be City Employee parking, but is also free to the public. On Thursdays, when Oceanside has its Farmers Market, late-arriving employees sometimes find no vacant parking and then park in the neighborhood. Oceanside is not planning to issue an RFP. However, I may be able to coax one out of them if they know you are interested. I need 3 votes and I estimate that I have only 1 right now. However, several on the Council have expressed interest in the Dividend Account Parking (DAP) system. At the Oceanside Climate Action Plan (CAP) meeting, where I was hoping to get three votes, only one Council Member expressed interest. If DAP were installed at the Civic Center Parking Garage, the Transit Center should follow. They are about 4 blocks away.

Most realize that our climate emergency is getting more acute. However, no city has ever done this, and it is tough to ask an elected official to do something new. Most Climate Action Plans have a Transportation Demand Management (TDM) ordinance, where DAP would fit.

Oceanside has parking meters and pay-station parking close to the Civic Center Parking Garage and close to the Transit Center. Both the parking meter parking and the pay-station parking could be automated with DAP, so the user could take their pick. I predict that younger people would tend to choose DAP; older drivers would tend to use the meters and the pay station. Over time, DAP would win out.

Regarding climate, humanity needs the private sector to do the design and operation of the needed systems (parking and roads.) (Where would we be without Elon Musk?)

Would it be OK for me to disclose your interest in submitting a proposal for a DAP system RFP? Your interest would be important, it seems to me. I have also raised this issue in Encinitas and Carlsbad. Barbara and I were strategizing on how to introduce this to San Diego, when the pandemic hit. San Diego is known to have a poor Climate Action Plan when it comes to driving. Driving is the category that emits the most GHG. A reduction of 10% at a location would be very significant and be a good verification of the system. And employees would have to be pleased with the new system.

The County might be interested, especially if they knew you were interested. DAP was ruled to be a feasible mitigation measure in the lawsuit against their first CAP. There are 3 members on the BOS who claim to be very concerned about climate. You have probably read about their “framework for decarbonization by 2035.” After

nearly 10 years of trying, the County still has no legal CAP.

Ukraine (Putin) has presented another argument for having meaningful TDM measures to reduce gasoline use. In any case, any measure adopted would need to increase choice and equity. DAP would do that.

Regards,

Mike Bullock
1800 Bayberry Drive
Oceanside, CA 92054
760-421-9482

Former California Democratic Party Delegate, 76th Assembly District

Former Elected (now Associate) Member of the San Diego County Democratic Party Central Committee

Satellite Systems Engineer, 36 years (Now Retired)

Air and Waste Management Association published and presented papers:

Author, ***The Development of California Light-Duty Vehicle (LDV) Requirements to Support Climate Stabilization: Fleet-Emission Rates & Per-Capita Driving***

Author, ***A Climate-Killing Regional Transportation Plan Winds Up in Court: Background and Remedies***

Co-author, ***A Plan to Efficiently and Conveniently Unbundle Car Parking Cost***

From: Keith B. Jones <kjones@aceparking.com>
Sent: Thursday, March 3, 2022 2:06 PM
To: mike_bullock@earthlink.net
Subject: Fwd: FW: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system

Mike,

Good afternoon. Barbara Bry sent me your email regarding Oceanside Transit Center. Is there an RFP for the car parking you suggest I respond to?

Thanks,

Keith

Keith B. Jones
Owner | ACE Parking
ACE Parking
645 Ash Street
San Diego, CA 92101
T: 619.233.6624

---------- Forwarded message ---------
From: **Barbara Bry** <bbry@blackbirdv.com>
Date: Sun, Feb 27, 2022 at 6:36 PM
Subject: FW: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system
To: Keith Jones <kjones@aceparking.com>

Fyi, from Mike Bullock, hope you're having a great time visiting islands!

Barbara Bry

Chief Operating Officer

Chief Financial Officer

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https://www.linkedin.com/in/barbarabry/

From: Mike Bullock <mike_bullock@earthlink.net>
Date: Sunday, February 27, 2022 at 4:24 PM
To: Barbara Bry <bbry@blackbirdv.com>
Subject: Oceanside Transit Center: Housing Retail Office = need for an intelligent car-parking system

http://enewspaper.sandiegouniontribune.com/infinity/article_share.aspx?guid=0dbb7ab6-0514-4bc1-b06b-4d7d1894f882

Please forward this to Keith. Would he submit a response to an RFP if the NCTD issued one for a good car-parking system? This is a bit of a chicken and egg situation.

Putin gives us one more reason to stop using a car-parking system that incentivizes driving. Our climate emergency is all the reason we need.

We need a car parking vendor to take over the world of bad car-parking systems.

Mike

APPENDIX E
SUSTAINABLE AND EQUITABLE COMMUNITIES

Policy Framework to Advance Sustainable and Equitable Communities

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1. Introduction

Californians deserve great places to live – inclusive urban, suburban, and rural communities throughout the many regions of California – that provide a range of affordable housing and transportation options, efficient access to a variety of jobs and services, clean air, opportunities to safely walk and bike, and open space and recreational opportunities. Current and future generations have the right to healthy environments, protected natural and working lands that support carbon sequestration and enhance climate resilience, and reduced overall demand for energy and other natural resources. These are the core characteristics of sustainable and equitable communities, and are achieved, in part, through the combination of more compact development and enhanced transportation options that together reduce individuals' need to drive.

Building more sustainable and equitable communities in this way can help California address two of its greatest challenges. The first is meeting the State's goal to achieve carbon neutrality no later than 2045 to prevent the most adverse impacts of climate change and provide Californians healthier air to breathe. The second challenge is building more inclusive and equitable places that prioritize providing low-income and Black, Indigenous, and People of Color (BIPOC) communities all the necessary opportunities to thrive and repairing the harms caused by decades of discriminatory transportation, land use, and housing policies and practices to people of low-income and BIPOC communities.

The next section of the appendix discusses impactful opportunities California can unlock by moving away from a cars-first model and building communities and infrastructure that enable a wider range of access and mobility choices. The third section of the appendix presents a policy framework across four strategy areas – transportation planning and funding, transportation system management, new mobility, and land use and development – for the State to create more sustainable and equitable communities that reduce driving. Each strategy area includes a vision, objectives, and potential actions developed by CARB and its State government partners, with the intent that the further development and implementation of each action would be subject to additional public processes and collaboration with key stakeholders. The framework of strategies discussed in this document does not and cannot mandate any specific action or create any legal obligations. This planning document provides a menu of critical potential actions and approaches that would need to be further developed through appropriate public processes.

While the State has taken steps in each of these strategy areas, this appendix presents ways to build on that work.

2. The Need for Sustainable and Equitable Communities

Many of California's cities, towns, suburbs, and rural areas were designed and built primarily around car travel, and the legacy of that vision has been codified in public policies, business practices, and cultural expectations. For most communities in California, choices made in the past and bolstered for decades have delivered land use

patterns that place daily needs far from each other along streets designed for high-speed driving. For decades, California has widened highways and roadways in an effort to address traffic congestion. By doing so, it has facilitated more car dependence and, ironically, more congestion, with resulting increases in vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions.

Efforts to advance more sustainable and equitable communities that reduce the need to drive have been ongoing in California for many years, most prominently under the State's 2008 Sustainable Communities and Climate Protection Act or Senate Bill (SB) 375 (Steinberg, Chapter 728, Statutes of 2008), under which Metropolitan Planning Organizations (MPOs) must show coordinated land use and transportation strategies to meet regional passenger vehicle GHG reduction targets. However, as CARB's recent progress report on implementation of SB 375 indicates, individuals are driving more miles per day than ever before, and California is not on track to meet its associated climate goals under SB 375.[1]

Beyond reducing driving, far too often in California's history, new highway and major roadway infrastructure displaced BIPOC communities, increased divisions in communities, and intensified noise, traffic, and air pollution in already impacted communities. California can advance inclusive and efficient places to live if it breaks away from an entrenched policy and cultural status quo that has perpetuated car dependence and caused a significant share of California's climate-changing GHG emissions.

2.1 Zero-emission vehicles are not enough to solve the climate crisis.

Contrary to popular belief, zero-emission vehicles (ZEV) alone are not enough to solve the climate crisis. The 2022 Scoping Plan illustrates that despite cleaner vehicles and low-carbon fuels, the path to carbon neutrality by 2045 also depends on reducing per capita VMT (the total passenger vehicle miles driven by an average person in California on any given day). To meet the carbon neutrality goal, the Scoping Plan proposes reducing VMT from 24.6 miles per day in 2019 to 18.4 miles by 2030 (a 25 percent reduction) and to 17.2 miles per day by 2045 (a 30 percent reduction).

Approximately 30 percent of light-duty vehicles on the road in 2045 will still burn fossil fuels even with all new car sales being ZEVs by 2035 through implementation of CARB's Advanced Clean Cars II regulations.[2] Additionally, driving, regardless of vehicle technology, will also continue to produce particulate emissions from brake and tire wear.

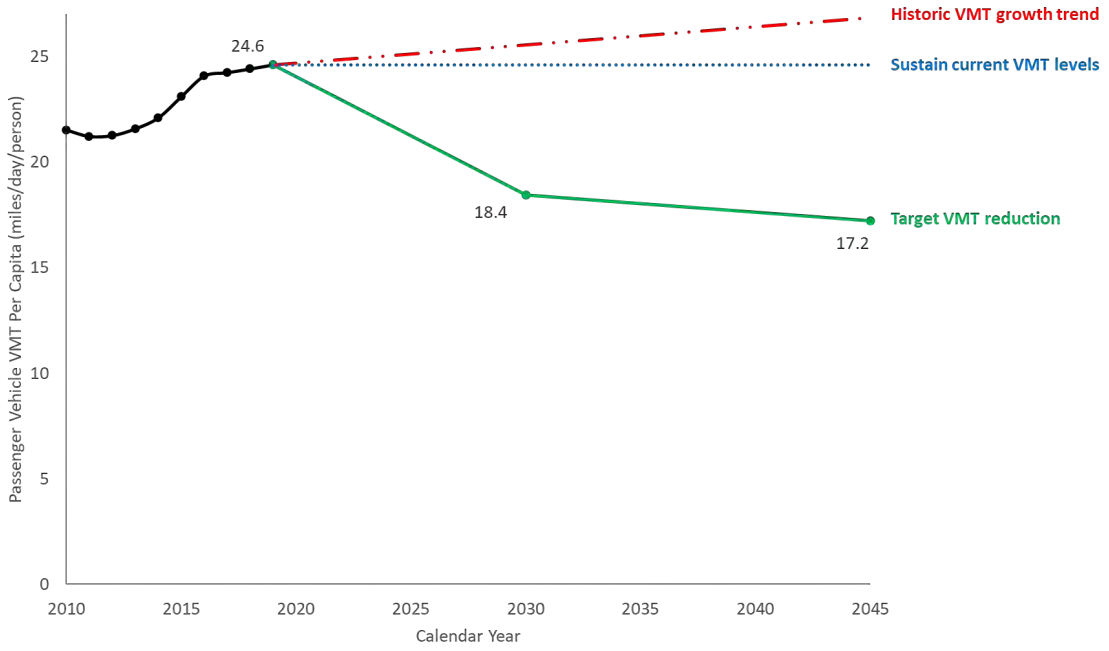
Figure W depicts the reduction in VMT identified by the Scoping Plan as necessary to help achieve the State's GHG reduction goals (green solid line), accompanied by a

[1] For more information on progress made toward achieving climate goals under SB 375 see: *https://ww2.arb.ca.gov/resources/documents/tracking-progress*

[2] For more information on the Advanced Clean Cars II regulations adopted by CARB's board on August 25, 2022, see: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii

trajectory whereby average per capita daily driving continues to increase at its historic average growth rate (red line with dashes and dots).[3] The blue dotted line shows a trajectory where average per capita daily driving remains unchanged from 2019 levels. Substantial and immediate action is needed to reverse current trends in order to reduce VMT to support achieving carbon neutrality by 2045.

Figure W. VMT trajectories and California's GHG goal



2.2 Sustainable and equitable communities reduce GHG emissions beyond the transportation sector, too.

Beyond having a direct impact on GHG emissions from cars, reducing individuals' need to drive to fulfill daily needs can also support emissions reductions in other sectors. For example, more compact infill development generally generates lower emissions because attached building types and smaller residential unit sizes require fewer emissions to construct and less energy to heat and cool.[4,5] Studies have estimated that infill development uses 10 to 20 percent less residential energy due to changes in unit types, sizes, and locations. Additional benefits include reduced heat island effects from paved

[3] There is considerable range in potential future VMT based on many exogenous, socioeconomic, and technological factors. This line represents historical VMT trends from 2001-2019 extended to 2045, normalized by the future forecasted population.

[4] Elkind, E. N., Galante, C., Decker, N., Chapple, K., Martin, A., & Hanson, M. 2017. "Right Type, Right Place: Assessing the Environmental and Economic Impacts of Infill Residential Development through 2030." Available at: https://ternercenter.berkeley.edu/research-and-policy/right-type-right-place/

[5] Ewing, Reid & Rong, Fang. 2008. "The impact of urban form on U.S. residential energy use." *Housing Policy Debate, 19(1), 1-30.* Available at: https://www.tandfonline.com/doi/abs/10.1080/10511482.2008.9521624

surfaces like parking lots, which lowers long-term building energy use, and reduced emissions from the construction of infrastructure.[6]

In contrast, the conversion of natural and working lands to residential or commercial development causes emissions from loss of carbon stored in these systems, as well as reduces the capacity of these lands to sequester carbon from the atmosphere.[7]

The 2022 Scoping Plan Update calls for reductions in GHG emissions from these sectors. More sustainable and equitable development patterns and transportation choices will support these reductions.

2.3 Departing from the status quo would ease inequitable burdens on California's low-income and BIPOC communities.

California can offer accessible, safe, and healthy communities for all by moving away from a legacy of transportation and land use decision-making that has marginalized all too many, but to a much greater extent BIPOC communities. California's transportation agencies have acknowledged that racist policies and decisions made when building and expanding the transportation system divided communities of color and primarily benefited white suburban commuters.[8] Discriminatory land use, lending, and real estate practices and policies also excluded and harmed BIPOC households and led to lasting inequality.

Some of these impacts have included less access to jobs and services, reduced household income and wealth generation, reduced social mobility, the burden of vehicle ownership, and the risk of job loss if a vehicle breaks down.

Rather than continuing these practices, California can make decisions that allow for integrated communities that are rich with services and culture. Shifting California's development patterns and transportation systems is critical to address existing injustices by making livable, affordable homes with multi-modal connections to jobs, services, open space, and education available to all Californians, not just the white and the wealthy.

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[6] Ford, Jonathan. 2010. "Smart Growth & Conventional Suburban Development: An infrastructure case study completed for the EPA." Adapted from "Comparative Infrastructure & Material Analysis" under EPA contract EP-W-05-25. Available at: *https://archive.epa.gov/epa/sites/production/files/2014-07/documents/mbd-epa-infrastructure.pdf*

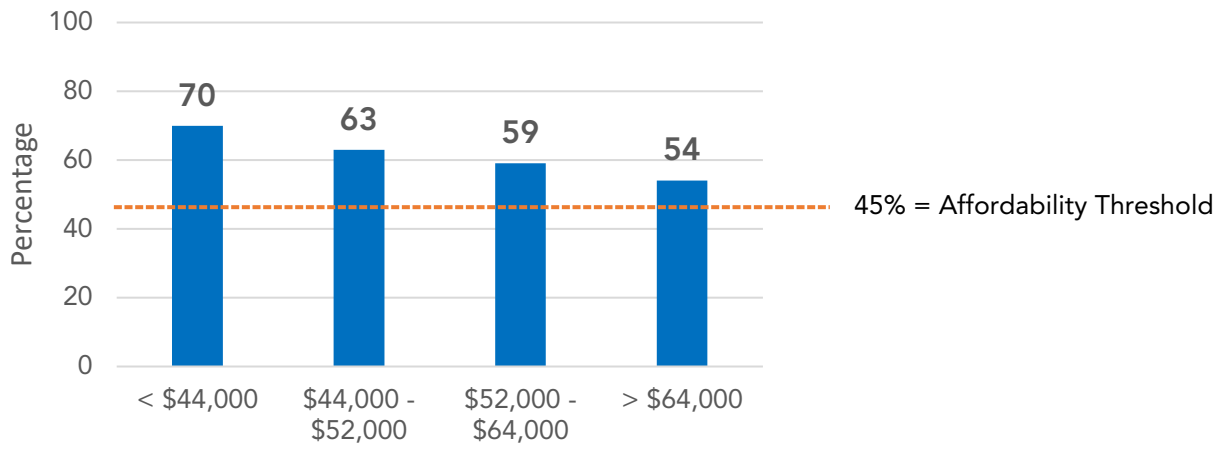
[7] California Air Resources Board. Accessed May 5, 2022. California Natural & Working Lands Inventory. Available at: *https://ww2.arb.ca.gov/nwl-inventory*.

[8] See the equity and VMT policy discussion beginning on page 107 of the California Air Resources Board's *2020 Mobile Source Strategy*, available at: https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf.

The Burden of Housing and Transportation Costs

An example of these racial and social inequities is the unequal impact of housing and transportation costs. Low-income households pay a significantly higher portion of household income for housing and transportation. In California counties that have a median household income of $44,000 or less, housing and transportation cost the average household over 70 percent of their income, when the recommended affordability threshold is 45 percent (Figure X).[9] Given the high cost of car ownership and operation, this housing and transportation cost burden has the highest impact on communities where people have few options but to drive.

Figure X. Percentage of Income Spent on Housing and Transportation in California by Median County Household Income



Source: H+T Index 2017, ACS 2015

2.4 Reducing the need to drive advances other quality of life outcomes and opportunities.

Communities with shorter driving distances and more options for active travel produce benefits beyond the environment and equity, including reduced financial burden, better access to opportunities, and improved public health.

- **Reduced financial burden:** Reducing the need to drive saves households substantial sums of money. U.S. households spent an average of nearly $10,000 in 2019 on vehicles and fuel.[10] Driving fewer miles reduces fuel and maintenance expenses and may even allow a household to reduce the number of vehicles owned.

[9] Center for Neighborhood Technology. Accessed May 5, 2022. Housing + Transportation Index. Available at: https://cnt.org/tools/housing-and-transportation-affordability-index.

[10] U.S. Department of Transportation, Bureau of Transportation Statistics. Accessed May 5, 2022. Transportation Economic Trends. Available at: https://www.bts.gov/product/transportation-economic-trends.

- **Better access to opportunities:** Changes to the built environment that increase alternatives to driving give households more and affordable options to access services, jobs, and other activities, and thus expand economic and social opportunities.[11] These changes empower people who do not own cars and people who cannot drive, such as seniors, children, and people with disabilities, protecting their ability to hold a job, run errands, or connect with others.
- **Economic efficiency:** A development pattern that enables the same level of economic interaction with less dependence on driving can sustain the economy at a far lower cost to the public by decreasing highway maintenance costs, which have ballooned to over $500 million per year in California.[12] Infill development can also reduce road and utility line lengths, as well as the travel distances needed to provide public services like police, garbage collection, and emergency response.[13,14,15] Across the U.S., congestion cost the equivalent of $190 billion in 2019 in fuel costs and lost time.[16] Being able to access destinations more efficiently will reduce these effects on the economy.

[11] Lucas, K. 2012. "Transport and social exclusion: Where are we now?" *Transport Policy, 20, 105-113.* Available at: *https://www.sciencedirect.com/science/article/pii/S0967070X12000145*

[12] U.S. Department of Transportation. Accessed May 5, 2022. Highway Statistics 2015. Available at: *https://www.fhwa.dot.gov/policyinformation/statistics/2015/sf12.cfm*

[13] Burchell, Robert W., & Mukherji, Sahan. 2003. "Conventional Development Versus Managed Growth: The Costs of Sprawl." *American Journal of Public Health, 93 (9), 1534-1540.* Available at: *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448006/*

[14] Busch, Chris, Lew, Erika, & DiStefano, Joe. 2015. "Moving California Forward: How Smart Growth Can Help California Reach Its 2030 Climate Target While Creating Economic and Environmental Co-Benefits." Joint report by Energy Innovation Policy and Technology LLC, and Calthorpe Analytics. Available at: *https://energyinnovation.org/wp-content/uploads/2015/11/Moving-California-Forward-Full-Report.pdf*

[15] Litman, Todd. 2016. "Understanding Smart Growth Savings: Evaluating Economic Savings and Benefits of Compact Development." Victoria Transport Policy Institute. Available at: *https://trid.trb.org/view/1685041*

[16] Texas A&M Transportation Institute. *2021 Urban Mobility Report.* Available at: *https://mobility.tamu.edu/umr/report/*

People want to drive less!

While many Californians find traveling by car a necessity, many would in fact prefer to drive less. A survey in Santa Clara County in 2020,[17] before the COVID-19 pandemic, showed that 89 percent of people believed they had to drive for daily needs, but fully half wanted to drive less. Twenty percent of respondents said owning a car was a financial strain, creating a burden on disadvantaged groups. Cars also created higher levels of stress, with 41 percent of drivers reporting that they find their daily travel stressful, but only 35 percent of bicyclists and 28 percent of transit riders feeling the same.

Furthermore, Public Policy Institute of California polls in 2019 and 2020 found that fully three quarters of respondents favored encouraging local governments to change land use and transportation planning so that people could drive less.[18]

3. Framework for Action

California's predominant development patterns and transportation systems are not conducive to building sustainable and equitable communities with low VMT. Reversing the current VMT growth trend to achieve carbon neutrality requires immediate and decisive steps to address the core issues that give individuals no choice but to drive. Accordingly, the framework for action detailed in this section aims to offer a set of key policy objectives and actions that can be attained within the planning horizon of the 2022 Scoping Plan Update to effectively support more compact development and increase transportation options that reduce VMT no later than 2045.

There is no single or immediate solution to transform the ways California builds and connects communities; instead, as all available models demonstrate, reducing VMT requires a broad range of actions across all levels of government that achieve multisectoral synergies in transportation, land use, and housing.[19,20]

This framework is structured around the following four strategy areas:

[17]Fang, Kevin. 2020. "Surveying Silicon Valley on Cycling, Travel Behavior, and Travel Attitudes." Mineta Transportation Institute. Available at: *https://transweb.sjsu.edu/research/1947-Survey-Silicon-Valley-Cycling*

[18] Baldassare, Mark, Bonner, Dean, Dykman, Alyssa, & Lawler, Rachel. 2019 and 2020. "Californians and the Environment." Public Policy Institute of California. Available at: *https://www.ppic.org/publication/ppic-statewide-survey-californians-and-the-environment-july-2019/* and *https://www.ppic.org/publication/ppic-statewide-survey-californians-and-the-environment-july-2020/*

[19] California Department of Transportation. *California Transportation Plan 2050*, pages 97-98. Available at: *https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf*

[20] Brown, A. L., Sperling, D., Austin, B., DeShazo, JR, Fulton, L., Lipman, T., et al. 2021. "Driving California's Transportation Emissions to Zero." UC Office of the President: University of California Institute of Transportation Studies. Available at: *https://escholarship.org/uc/item/3np3p2t0*

1. **Plan and invest in a sustainable transportation system.** Identify policies to address the way California plans, invests in, and funds its transportation system to reduce the need to drive and provide high-quality alternatives that are more convenient, efficient, and low-cost than driving.
2. **Manage the use of the transportation system to advance climate and equity goals.** Consider policies to optimize the use of California's transportation infrastructure by prioritizing the movement of people over vehicles.
3. **Shape the deployment of new mobility options**. Explore policies to leverage the potential of new mobility options to increase transportation choices, enable car-light lifestyles, and mitigate inherent risks that could increase car travel.
4. **Improve alignment of land use planning and development with climate and equity goals.** Consider policies to accelerate infill development, affirmatively further fair housing, and increase natural and working lands protection, in furtherance of the State's planning priorities.

For each strategy area, this framework offers: i) a vision for the year 2045 that would be consistent with meeting California's carbon neutrality goal while advancing equity; ii) policy objectives that should be achieved to deliver the vision for that strategy area; and iii) selected actions that should be taken as quickly as possible, especially by the State, to implement those policy objectives.

3.1 Strategy Area 1: Plan and Invest in a Sustainable Transportation System

The institutional framework for planning and funding California's transportation system has reflected and perpetuated a car-centric bias. For many decades, the majority of federal, State, and local transportation investments has been devoted to building, operating, and maintaining a network of highways, roads, and streets. While more recently other modes of transportation have received increased funding, the dominance of car-centric investments remains unchanged.[21]

In order to help meet the State's climate goals, the California Transportation Plan 2050 identifies the need to achieve a significant shift toward non-auto modes, amounting to 23 percent of trips occurring by bicycling, walking, transit, or other non-auto modes by 2050.[22] Achieving carbon neutrality no later than 2045 requires a transportation system that works more efficiently for all Californians, regardless of their income, race, ability, or where they live. This vision offers a future in which most individuals have access to high-

[21] Considering new capacity, operations, maintenance, and rehabilitation investments. For a historic review, see California Air Resources Board, *2018 Progress Report: California's Sustainable Communities and Climate Protection Act*, available at https://ww2.arb.ca.gov/sites/d89efault/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf. The more recent data is documented in the California Transportation Assessment (pursuant to AB 285), specifically Barbour, Elisa, et al, *MPO Planning and Implementation of State Policy Goals,* UC Berkeley: Institute of Transportation Studies at UC Berkeley, page 4, available at https://escholarship.org/uc/item/7p8096mh.

[22] California Department of Transportation. *California Transportation Plan 2050*, page 96. Available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf

quality rail and public transit services and high-quality active transportation infrastructure, so that driving is a choice and not the only option.

However, this vision will not be possible without effecting a structural realignment of the State's framework for planning and funding transportation to prioritize investing in rail, transit, active transportation, and building more sustainable communities.[23] The quality of rail, public transit services, and active transportation infrastructure needs to be improved so that these modes become more time- and cost-competitive to driving.

3.1.1 Vision

To help meet the State's carbon neutrality goal no later than 2045 and advance equity, the vision is for California to have:

A. Transportation planning and funding frameworks that are clearly aligned and prioritize the State's climate, air quality, and equity goals at all levels of government.
B. Affordable, accessible, and integrated rail and transit networks that deliver equal or higher levels of accessibility to key destinations as private cars.
C. Complete networks of safe and accessible bicycle and pedestrian infrastructure that make active transportation the preferred travel mode for short distances.

3.1.2 Objectives

To achieve this vision, the State should lead efforts to:

1. **Reimagine roadway projects that increase VMT in a way that meets community needs and reduces the need to drive.** The most critical step of this realignment of the structure for planning and investing in the transportation system will be reimagining roadway projects that increase VMT in a way that meets community needs and reduces the need to drive. It has been long proven that adding highways, interchanges, and major roadways in densely populated, suburban, and rapidly growing areas only alleviates congestion in the short-term, while increasing VMT, congestion, low-density and car-oriented development, and GHG emissions in the long-term.[24,25] Another reason to re-envision investments in highway and major roadway projects that induce VMT is that such investments take away

[23] Governor Newsom's Executive Order N-19-19 and the subsequent development of the Climate Action Plan for Transportation Infrastructure (CAPTI) call for this change and provide a general framework to achieve it, respectively. See California State Transportation Agency, *Climate Action Plan for Transportation Infrastructure*, available at: https://calsta.ca.gov/-/media/calsta-media/documents/capti-july-2021-a11y.pdf

[24] California Department of Transportation. *Transportation Analysis Framework, First Edition*, pages 28-29. Available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-09-10-1st-edition-taf-fnl-a11y.pdf

[25] Handy, Susan, & Boarnet, Marlon G. 2014. "Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions." California Air Resources Board Policy Brief. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impact_of_Highway_Capacity_and_Induced_Travel_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf

resources from investments in high-quality rail, transit, bicycling, and walking in both the short- and the long-term.[26] In other words, beyond the direct impact of inducing VMT, such projects can limit government's ability to improve transportation options that facilitate mode shift and help reduce VMT.

Actions:

- Adjust the present project pipeline of State transportation investments and reconfigure the California Department of Transportation's (Caltrans) planning processes to rescope VMT and GHG-increasing projects. Caltrans and other State agencies have committed to working with stakeholders to evolve projects in their design and suite of investments to address access and connectivity challenges while ensuring their alignment with the State's climate and equity goals and other key outcomes.
- Implement all the recommendations in the Climate Action Plan for Transportation Infrastructure (CAPTI)[27] and apply the CAPTI framework to other transportation investments to prioritize allocation of transportation funding based on projects' climate, equity, and safety impacts. This includes reviewing program eligibility criteria accordingly and advocating for legislation to support the CAPTI vision when necessary.
- Increase funding for State programs that are well-aligned with climate and equity goals, such as the Active Transportation Program (ATP), the Transit and Intercity Rail Capital Program (TIRCP), and the Low Carbon Transit Operations Program (LCTOP), as recommended in the Strategic Growth Council's California Transportation Assessment.

2. **Double local transit capacity and service frequencies by 2030**. The CTP 2050 determined that, to reach the target mode shifts that deliver the State's carbon neutrality goal, California needs to double the capacity and service frequencies of the existing local public transit networks. This type of expansion of transit services would be a massive undertaking in any time, but it is more so now given the loss of ridership and associated revenue during the COVID-19 pandemic, which forced transit service to contract. Transit's fiscal crisis has only exacerbated the adverse equity impacts of the pandemic, considering people with low-income, people with disabilities, and BIPOC communities are all commonly transit dependent populations and the services available to them are now more limited. Accordingly, securing the necessary funding to return transit operations to pre-pandemic levels in the short term needs to be considered both a priority climate and equity action for the State. Increasing equitable transit investment should serve as the

[26] Considering the budgetary impact of developing new highway infrastructure and the ensuing lifespan of operation and maintenance costs.

[27] California State Transportation Agency. *Climate Action Plan for Transportation Infrastructure*. Available at: *https://calsta.ca.gov/-/media/calsta-media/documents/capti-july-2021-a11y.pdf*

foundation for building a broader transit program that delivers the requisite doubling of capacity and frequencies by 2030. This type of improvement will amount to having transit stops much closer to where people need to go and offering (on average) 15-minute frequencies in urban areas, 30-minute frequencies in suburban areas, and 60-minute frequencies in rural areas for all services.

Actions:

- Secure the necessary funding to return transit operations to pre-pandemic levels in the short-term.
- Complete a new update of the State's Transit Strategic Plan by 2023, fleshing out how the proposed transit service expansion would be implemented to optimize efficiency, accessibility, climate, and equity outcomes. This Plan should be developed in close collaboration with underserved communities across local jurisdictions to prioritize improvements where needs are greatest. Beyond increasing service, additional investments will need to be made to ensure affordability for low-income and other disadvantaged populations.
- Reduce the voter approval threshold for future locally funded transportation sales tax measures that exclusively fund investments in transit or active transportation.
- Explore the feasibility of introducing consultation and reporting requirements that enhance transparency and clarity around local tax measure climate and equity impacts and mitigation strategies prior to a ballot vote.
- Remove California Constitution Article XIX restrictions on using gas tax monies for transit operational funding or other sustainable transportation-related uses.

3. **Complete the High-Speed Rail (HSR) System and other elements of the intercity rail network by 2040.** Providing efficient, high-quality alternatives to the car for intercity travel is another important element for enabling car-free and car-light lifestyles that reduce VMT and advance equity for those who do not have the means to own a car and for those who can use their car less. The California Transportation Plan 2050 (CTP 2050) identified the completion of the full 2018 State Rail Plan[28] vision by 2040 as a requirement to achieve the State's carbon neutrality goal.[29] This vision includes: the main HSR line connecting San Francisco, the Central Valley, and Los Angeles, and HSR extensions to Sacramento, the Inland Empire, and San Diego; the San Francisco Downtown Extension and a new Transbay tube; key corridor investments in the Los Angeles Basin; new regional

[28] California Department of Transportation. *California State Rail Plan*. Available at: https://dot.ca.gov/programs/rail-and-mass-transportation/california-state-rail-plan

[29] California Department of Transportation. *California Transportation Plan 2050*, page 86. Available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf

services in the Central Valley, on the Central Coast, and in the North Bay; and an overall intensification of services, with more frequencies and higher speeds.[30]

4. **Expand and complete planned networks of high-quality active transportation infrastructure.** The other piece of the puzzle to achieve the target mode shift away from car travel is supporting active transportation mode users, such as bicyclists and pedestrians. The vision is to ensure every city has fully realized networks of active transportation infrastructure that ensure coverage, connectivity, accessibility, and safety to all travelers, making active transportation the preferred choice for short distance travel, and improving access to public transit services. These improvements should be developed in collaboration with community-based organizations and local leaders to address the needs and priorities of historically marginalized and underserved communities.

   Actions:

   - Require complete street enhancements, including minimum space allocations for bicycle and pedestrian infrastructure, in all State-funded transportation investments.
   - Expand State funding for active transportation projects to support a broader set of project types and investments than currently funded through the Active Transportation Program.

5. **Increase availability and affordability of bikes, e-bikes, scooters, and other alternatives to light-duty vehicles, prioritizing needs of underserved communities.** One key action to increase access to opportunities and overcome the financial burden of driving or using transit and new mobility services is to increase low-income people's direct access to bikes, e-bikes, scooters, and other alternatives to light-duty vehicles. Similar to existing rebate programs for electric vehicles, the State and other levels of government could do more to subsidize discounts or the full purchase of these alternatives to light-duty vehicles, considering their potential contributions to both reducing VMT and advancing equity goals. As is the case with other objectives shared above, these programs should be developed in close collaboration with community-based organizations and community members to prioritize specific needs and priorities of low-income and disadvantaged communities at the local level.

   Actions:

   - Increase funding and expand eligibility of bikes, e-bikes, scooters, and other alternatives to light-duty vehicles in State incentive/rebate programs.

[30] The 2040 Vision projects 88 million daily passenger miles diverted to rail from highways, and an increase of 92 million daily passenger miles on rail as a result of the investments outlined in the California Department of Transportation's California State Rail Plan, page 14, available at: *https://dot.ca.gov/programs/rail-and-mass-transportation/california-state-rail-plan*

6. **Shift revenue generation for transportation projects away from the gas tax into more durable sources by 2030.** The need to implement a replacement to the gas tax was identified by the Legislature in 2014 through SB 1077 (DeSaulnier, Chapter 835, Statutes of 2014), which described the gas tax as an "ineffective mechanism for meeting California's long-term revenue needs."[31] SB 1077 appointed the CTC in consultation with CalSTA to form a technical advisory committee to study mileage-based fees, a system in which all drivers, regardless of the fuel used by their vehicles, pay their fair share for the road maintenance and repair needs associated with their VMT, as an alternative to the gas tax. Since then, the technical advisory committee has developed recommendations and implemented a first pilot; more pilot and demonstration work is scheduled for implementation in 2023. Implementing an alternative to the gas tax by 2030 is imperative to ensuring the viability of transportation funding that can be reinvested in sustainable transportation options.

   Actions:

   - Complete mileage-based fee pilots by 2025.

3.2 Strategy Area 2: Manage Use of the Transportation System to Advance Climate, Air Quality, and Equity Goals

In California, most of the highways, roads, and streets are utilized by single-occupancy vehicles (SOV),[32] which take up the highest amount of road space of any transportation mode relative to the amount of people moved.[33] Accordingly, the outcomes of this SOV-centric travel pattern are ever-growing levels of congestion, increasing VMT, economic inefficiency, and inequity in terms of who has easier access to jobs, services, and key destinations.[34]

As detailed in Strategy Area 1, building more roadway lanes is not an answer to these problems. Instead, the solution requires reframing the use of California's transportation infrastructure, and primarily its roadways, to maximize and prioritize getting more people where they need to go rather than prioritizing moving cars. For example, implementing

[31] Because over half of vehicles on the road by 2040 will be zero-emission vehicles that need not buy any gasoline, the Standardized Regulatory Impact Assessment (SRIA) for the Advanced Clean Cars II Regulations estimated cumulative losses through 2040 of $13.4 billion to local governments and $17.7 billion to the State. See Tables 55 and 56 on page SRIA-113 and SRIA-116 of the Advanced Clean Cars 2 SRIA (January 26, 2022).

[32] California Air Resources Board. *2018 Progress Report: California's Sustainable Communities and Climate Protection Act.* Available at: *https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf*

[33] This concept is best demonstrated through images comparing road space usage by mode. See a popular example developed by i-SUSTAIN for downtown Seattle, available at: *https://www.i-sustain.com/i-impact*. The National Association of City Transportation Officials makes a similar case comparing the carrying capacity of 10-foot lane by mode, as seen in their Transit Street Design Guide, available at: *https://nacto.org/publication/transit-street-design-guide/introduction/why/designing-move-people/*.

[34] Namely, those who can afford cars for all members of the household or the cost of housing in high accessibility locations.

dedicated bus lanes, transit signal priority schemes, and other measures could enhance transit operations on major thoroughfares and other key corridors. Likewise, it is essential to prioritize the expansion of bike lanes, sidewalks, and other active transportation pathways to increase system capacity and improve accessibility for all, including people using wheelchairs and other types of mobility devices. This shift would be effectuated by leveraging the existing infrastructure to optimize for accessibility, equity, and climate outcomes through prioritizing the needs of more efficient modes of transportation, such as transit, bicycling, and walking.

3.2.1 Vision

To help meet the State's carbon neutrality no later than 2045 and advance equity, the vision is for California to have:

A. A transportation system that clearly prioritizes the movement of people over cars.
B. Restructured pricing for all modes to clearly represent the costs and benefits that each mode represents to California.
C. The necessary road space for transit and active transportation to thrive and offer high-quality services.

3.2.2 Objectives

To achieve this vision, the State should lead efforts to:

1. **Authorize and implement roadway pricing strategies and reallocate revenues to equitably improve transit, bicycling, and other sustainable transportation choices.** Pricing strategies take many forms and can include fees for miles driven, cordon fees for operating vehicles in designated areas, parking fees, fees on congestion impact of ride-hailing services, and dynamic fees on highway lanes and other strategic roads to manage congestion.

   Authorizing transportation pricing strategies is essential to promote more efficient use of cars and to further transit and active transportation improvements. Pricing strategies present an opportunity to fund the transportation system in a more equitable and fiscally sustainable way than current funding sources, promote more efficient functioning of existing infrastructure, and fund new transportation options, especially for those who do not own a vehicle or do not drive. Some recent analyses indicate California will not meet its climate goals without implementing equitable roadway pricing strategies as these strategies are projected to achieve up to 27 to 37 percent of the needed per capita VMT reduction.[35] The four largest MPOs have included multiple pricing strategies in

[35] See Brown, A. L., Sperling, D., et al, 2021, "Driving California's Transportation Emissions to Zero," pages 237-253, UC Office of the President: University of California Institute of Transportation Studies, available at: https://escholarship.org/uc/item/3np3p2t0 and California Department of Transportation, *California Transportation Plan 2050*, page 86, available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf.

their adopted sustainable communities strategies (SCSs) to reduce regional GHG emissions.[36]

Pricing strategies would need to be implemented with an emphasis to ensure equitable outcomes, and in accordance with local needs and context. In particular, pricing strategies need to consider the potential travel options available for low-income and other disadvantaged populations to ensure they are not unduly impacted by the strategy.

Actions:

- Permit implementation of a suite of roadway pricing strategies by 2025 in support of adopted SCSs.

2. **Prioritize addressing key transit bottlenecks and other infrastructure investments to improve transit operational efficiency over investments that increase VMT.** Offering high-quality transit services that represent a viable alternative to driving will require multiple coordinated efforts. The proposed investments to expand service capacity and increase frequencies (described in Strategy Area 1) will be ineffective if those transit vehicles end up stuck in traffic or have limited space to operate efficiently. Transit agencies and local jurisdictions across California should come together to identify, plan, and implement strategies to prioritize transit speeds and reliability over general roadway level of service and private car needs. Those strategies, which include capital investments in the strategic redistribution of the right-of-way, signaling, and supportive traffic regulations, should be prioritized in federal and State funding programs and local investment plans.

   Actions:

   - Permit the conversion of general-purpose lanes to transit-only lanes or toll lanes and full facility tolling of state-owned facilities.
   - Establish requirements to demonstrate that addressing transit bottlenecks and other transit efficiency investments are a priority in local jurisdiction and transit agency investment plans, such as a prerequisite for overall transportation project funding eligibility.

3. **Develop and implement a statewide transportation demand management (TDM) framework with VMT mitigation requirements for large employers and large developments.** The goal of TDM is to provide people with information, incentives, and other support programs that help them utilize sustainable

[36] These metropolitan planning organizations are the Metropolitan Transportation Commission (MTC), the Sacramento Area Council of Governments (SACOG), the San Diego Association of Governments (SANDAG), and the Southern California Association of Governments (SCAG).

transportation options such as transit, ridesharing, bicycling, and walking and rely less on cars. A strategic point of focus for TDM program implementation could be large employers (more than 100 employees), which often incentivize driving alone by offering free parking, gas stipends, and similar perks, and do not offer similar levels of support to employees to take transit, ride their bicycle, or walk. Employer-based TDM strategies are needed to achieve widespread implementation for the State to meet its climate goals, including commute trip reduction programs, ride-sharing programs, on-site bicycle facilities, vanpool and shuttle services, transit fare subsidies, and parking cash-out. Another strategic point of focus for TDM programs could be large developments, particularly new ones, that through decisions such as their location, design, transportation, parking infrastructure, and their treatment and general interaction with their surrounding environment ingrain high or low VMT travel patterns for decades to come.

Actions:

- End the State's subsidies for employee parking and take additional actions to move away from subsidizing public spaces for car parking more generally while expanding efforts to promote pedestrian, bicycle, and transit travel. As the State of California employs over 200,000 people, it can expand its TDM programs, which currently vary by agency and employee union.
- Build on existing resources to further support the development and enforcement of local TDM ordinances and help begin developing a statewide TDM framework.[37]

3.3 Strategy Area 3: Shape the Deployment of New Mobility Options

In the last 20 years, California has been a hub for the development of new mobility services, new technologies, and new business models for how local transportation services can be both provided and consumed. These include, among others: shared-use mobility services such as car-share, ride-hailing, and micro-mobility services; app-based services for integrated trip planning, booking, and payment; and new travel technologies such as automated vehicles (AVs) and delivery robots and drones. These services have significantly improved mobility and access to opportunities for some people who do not own or want to rely on cars. However, without additional State actions these services could also increase VMT and GHG emissions and exacerbate equity issues related to access and costs.

Achieving carbon neutrality no later than 2045 will require leveraging the benefits of new mobility to offer high-quality alternatives to driving that reduce overall VMT, while

[37] Such as: California Air Pollution Control Officers Association. *Quantifying Greenhouse Gas Mitigation Measures - A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures.* Available at: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

mitigating its risks and negative impacts. For example, rather than competing with public transit, new mobility services should complement transit services, providing flexible options in locations and times of the day where and when fixed-route transit is not efficient, and facilitating trip planning, booking and payment for multimodal trips. No single mobility service alone is the answer for the diverse needs of any given community or individual; instead, the goal is to foster a rich ecosystem of strategically integrated mobility services, with transit playing the role of anchor mode, that together deliver high-quality solutions in accordance with travelers' needs.

Another critical step is ensuring equitable access and equitable impact of new mobility options. So far, new mobility's track record on equity is mixed. On the one hand, new mobility has made new forms of travel more readily available for numerous people, increasing access to key destinations for communities with limited transportation options. On the other hand, new mobility services have catered to more affluent customers and have been slow to offer special provisions for low-income customers, people with disabilities, and low-English proficiency populations, leaving many people unable to benefit.

3.3.1 Vision

To help meet the State's carbon neutrality goal no later than 2045 and advance equity, the vision is for California to have:

A. A transportation system that leverages the combined potential of new mobility, transit, and active transportation to offer high-quality travel alternatives that enable car-free or car-light lifestyles for all.
B. Seamless integration in trip planning, booking, and payment systems across all mobility providers, both public and private.
C. A new mobility ecosystem that, as a whole, offers equitable access to all Californians regardless of race, income, age, disability, or language proficiency to live, work, and play with ease.

3.3.2 Objectives

To achieve this vision, the State should lead efforts to:

1. **Prevent uncontrolled growth of autonomous vehicle (AV) VMT, particularly zero-passenger miles.** A critical objective of achieving this vision will be managing and regulating the use of private AVs and AV-based taxi services. AVs could offer important access, safety, and network performance benefits, such as opening the use of cars for people who cannot drive. However, according to modeling conducted for the CTP 2050 and the University of California's "Driving California's Transportation Emissions to Zero" report, the arrival of AVs will be one of the main sources of VMT increase in California during the next 25 years – the only question is by how much. Because AVs eliminate the need for a dedicated driver, they eliminate the labor costs of taxis and ride-hail services and enable individuals to conduct any number of activities (from working to resting) while traveling. This could make car travel more convenient for those with access to AVs, cause people

to shift away from public transit and non-motorized modes, and encourage people to live further from their destinations. Whether privately owned or as taxi services, AVs will have the ability to drop off passengers and either return to their owner's garage or roam around with zero occupants looking for new passengers, further increasing congestion and its adverse impacts. In response to this risk, the CTP 2050 recommends channeling the deployment of AVs to ensure that they are shared, electric, supportive of efficient land use, and aligned with key principles for healthy and sustainable communities.[38] This will require decisive action by the State, working with industry, to implement regulations and policies, including pricing policies, that drive a more efficient use of AVs and limit their potential negative impacts.

Actions:

- Authorize pricing of empty/zero-passenger miles at higher rates than for other levels of occupancy.

2. **Channel new mobility services towards pooled use models, transit complementarity, and lower VMT outcomes.** The State has demonstrated leadership in this area by implementing Senate Bill 1014 (SB 1014) (Skinner, Chapter 369, Statutes of 2018) and its associated Clean Miles Standard and Incentive Program,[39] which encourage ride-hail services to provide pooled services[40] and enable connections to transit. Additional funding and synergistic policy initiatives could help strengthen those use cases through lower rates, integrated fares, and strategic fleet deployments. Providers of other new mobility options, such as carshare and micro-mobility services, among others, could also be encouraged to pursue partnerships with transit providers as well as to curb the VMT impact of their operations. Similarly, there could also be opportunities to optimize the VMT impact of delivery service providers while upholding service quality.

Actions:

- Develop and adopt regulations and incentive programs that encourage new mobility providers to prioritize higher occupancy use, transit partnerships, and lower VMT impact.

[38] California Department of Transportation. *California Transportation Plan 2050*, page 120. Available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf

[39] California Air Resources Board. Accessed May 5, 2022. Clean Miles Standard. Available at: https://ww2.arb.ca.gov/our-work/programs/clean-miles-standard

[40] Pooled is an industry term used to refer to when multiple passengers that are not traveling together share a ride-hail vehicle.

3. **Establish an integrated statewide system for trip planning, booking, payment, and user accounts that enables efficient and equitable multimodal systems.** While the arrival of new mobility services has increased access to destinations for certain populations, their potential to reduce VMT relies on their ability to operate in an integrated manner with public transit services as well as with each other. The foundation for this integration is customers' ability to review schedules and availability, plan multimodal trips, book rides, pay fares, and access discounts in integrated platforms that bring together the universe of mobility services in any given region. Caltrans, through the California Integrated Travel Project (Cal-ITP),[41] aims to develop a statewide system that enables those multimodal connections, while some transit agencies are also conducting their own pilots on this front.

   Actions:

   - Provide adequate resources to support State and transit agency initiatives to continue building integrated systems to ultimately break down existing silos between providers and regions, create a consistent statewide structure, and ensure easy access to a multimodal ecosystem of mobility services for all.

4. **Provide financial support for low-income and disadvantaged Californians' use of transit and new mobility services.** Transit agencies throughout California offer reduced fares for low-income and other disadvantaged populations. However, no matter the location or the quality of the local public transit system, transit services cannot offer an efficient solution to all travel needs for every individual. This is particularly true for low-income people who often have less traditional work schedules or work or reside in places that do not have high-quality public transit services, and it commonly forces people to travel by car even though they cannot easily afford to. New mobility could be the solution for many of these people, given its extended service hours and potentially larger geographic reach. Unfortunately, the cost of new mobility services can be prohibitive, especially if used frequently. The key to unlocking this potential will be to develop and scale up programs to subsidize free or reduced costs for new mobility services for low-income and disadvantaged Californians. Some jurisdictions in California are already piloting this idea by creating a "mobility wallet," which provides a monthly budget that eligible users can apply to transit and new mobility services.

   Actions:

   - Increase funding to support low-income and disadvantaged Californians' use of transit and new mobility services and streamlining its operational support for "mobility wallet" programs.

[41] California Department of Transportation. Accessed May 5, 2022. CAL-ITP: A modern and consistent transportation experience throughout California. Available at: *https://www.calitp.org/*

5. **Expand universal design features for new mobility services.** There is a large community of Californians with disabilities who cannot drive, enter the passenger seat of a regular car without assistance, operate a regular bike, or use conventional smart phone applications, yet the new mobility industry, with some exceptions, seems to be growing without addressing the needs of these persons. For example, micro-mobility services lack inclusive alternatives such as tricycles, hand-pedaled cycles, or recumbent bicycles; ride-hail services do not offer equivalent quality of service on wheelchair accessible vehicles; and mobile phone apps may not be Americans with Disabilities Act (ADA) compliant. Addressing these issues and more is a crucial goal to advance equity and a more inclusive society and may also reduce reliance on often-strained paratransit services and costly private vehicles. New regulations, incentive programs, and pricing strategies could elevate universal design standards for new mobility providers, including support of and access to adaptive modes that are designed for people with disabilities and that can carry equipment like wheelchairs.

   Actions:

   - Require all new mobility providers to meet minimum fleet percentages of adaptive devices and placement requirements.

3.4 Strategy Area 4: Improve Alignment of Land Use Planning and Development with Climate and Equity Goals

Achieving carbon neutrality no later than 2045 requires land use planning and development activities that are consistent with and advance State planning priorities[42] by significantly augmenting growth in transportation-efficient, resource-rich, accessible, and inclusive communities for all Californians. This vision is aligned with the CTP 2050's and University of California researchers' latest modeling and analyses,[43] which indicated that California would not meet its climate goals without future growth in population and employment happening primarily within the state's most densely populated areas and improving the balance of housing, employment, shopping, and other key services within

[42] The State Planning Priorities generally include (1) promoting infill development, (2) protecting natural and working lands, and (3) encouraging efficient development patterns and investments that are consistent with adopted plans in areas appropriately planned for growth. The State Planning Priorities are "intended to promote equity, strengthen the economy, protect the environment, and promote public health and safety in the state, including in urban, suburban, and rural communities" The full text of the State Planning Priorities is defined in California Government Code, § 65041.1. "Statewide Environmental Goals and Policy Report." Available at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=65041.1

[43] See Brown, A. L., Sperling, D., Austin, B., DeShazo, JR, Fulton, L., Lipman, T., et al. 2021. "Driving California's Transportation Emissions to Zero." UC Office of the President: University of California Institute of Transportation Studies, page 236. Available at: *https://escholarship.org/uc/item/3np3p2t0* and California Department of Transportation. *California Transportation Plan 2050*, page 287. Available at: *https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf*

any given community. Although MPOs create SCSs that identify how each region may accommodate its growth in patterns that help meet GHG reduction targets set by CARB, these plans are not being fully implemented.[44]

Implementing the land use strategies in SCSs and moving towards improved planning frameworks would address the fact that local land use policies and development practices across California have often favored low-density, single-family zoning, and car-oriented development patterns and carry the legacy of racist government policies, covenants, and lending practices from the past.[45,46,47] These historic policies and practices have resulted in restricted infill development, limited access to opportunity, and disinvestment in existing neighborhoods for decades.[48,49,50] As such, they have played a key role in furthering car dependence, rising GHG emissions, and growing inequity in California's communities.

Barriers to infill development have been one factor fueling California's housing crisis, now a half century in the making. After decades of underproduction, supply is far behind need, and purchase and rental costs are soaring. Today, more than a third of households in the state cannot afford their housing costs,[51] forcing a growing number of households to either move to more remote locations with more affordable housing but more limited access to jobs, shopping, and other regular destinations, or to live in overcrowded conditions.

3.4.1 Vision

To help meet State's carbon neutrality goal no later than 2045 and advance equity, the vision is for California to have:

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[44] California Air Resources Board. *2018 Progress Report: California's Sustainable Communities and Climate Protection Act.* Available at: https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf

[45] Florida, R. 2016. "How Zoning Restrictions Make Segregation Worse." *Bloomberg.* Available at: https://www.bloomberg.com/news/articles/2016-01-04/how-zoning-restrictions-make-segregation-worse.

[46] California Environmental Protection Agency. 2021. Pollution and Prejudice: Redlining and Environmental Injustice in California. Available at: https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5.

[47] Rothstein, R. 2017. *The Color of Law: A Forgotten History of How Our Government Segregated America*.

[48] California Air Resources Board. *2020 Mobile Source Strategy*, page 107. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf.

[49] Jaffe, E. 2016. "Where Sprawl Makes It Tougher to Rise Up the Social Ranks." Bloomberg. Available at: https://www.bloomberg.com/news/articles/2016-01-27/where-urban-sprawl-makes-it-tougher-for-the-poor-to-rise-up-the-social-and-economic-ranks.

[50] Lucas, K. 2012. "Transport and social exclusion: Where are we now?" *Transport Policy*, 20, 105-113.

[51] One in three households in the state doesn't earn enough money to meet their basic needs, per the Statewide Housing Plan. California Department of Housing and Community Development. 2022. *Statewide Housing Plan.* Available at: https://www.hcd.ca.gov/docs/statewide-housing-plan.pdf

A. Future growth focused on infill sites and other climate-friendly, transportation-efficient areas appropriately planned for growth.[52]
B. The ability for every Californian to live, work, and play in climate-smart, transportation-efficient communities that provide travel choices and access to opportunity.[53]

3.4.2 Objectives

To achieve this vision, the State should:

1. **Accelerate infill development in existing transportation-efficient places and deploy strategic resources to create more transportation-efficient locations.** Notwithstanding the recent passage of laws that expand property owners' ability to create multiple units on single-family lots and limit local governments' ability to block new housing in certain circumstances, many barriers to infill development remain in place, discouraging this important development type in ways that need to be addressed. One critical barrier is the high cost of infill development, including the high cost of urban land, parking requirements, construction costs, and the necessary infrastructure upgrades to make sites development-ready.[54] Since the elimination of redevelopment agencies in California,[55] there is often not the fiscal capacity to take on these costs at the required scale. Also, insufficient land may be zoned for housing, and developers may have to navigate numerous and opaque regulatory hurdles and fees in the local approval process.[56] Implicit biases in real estate practices and deliberate action from current residents who are resistant to the addition of new residents and to neighborhood change also represent important obstacles to infill development and perpetuate present-day neighborhood disparities rooted in historic discriminatory housing and land use practices such as redlining.[57,58]

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[52] Building on the State's Planning Priorities as defined in California Government Code, § 65041.1. "Statewide Environmental Goals and Policy Report." Available at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=65041.1

[53] Building on California Department of Housing and Community Development's vision statement. Available at: https://www.hcd.ca.gov/about/mission.shtml.

[54] California Department of Housing and Community Development. 2022. *Statewide Housing Plan.* Available at: https://www.hcd.ca.gov/docs/statewide-housing-plan.pdf

[55] There are replacements to redevelopment, such as Enhanced Infrastructure Financing Districts (EIFDs), the Infill Infrastructure Grant Program (IIG), and impact fees; they are just much smaller, not widely utilized, and may offer their own barriers.

[56] California Department of Housing and Community Development. 2022. *Statewide Housing Plan.* Available at: https://www.hcd.ca.gov/docs/statewide-housing-plan.pdf

[57] Rothstein, R. 2017. *The Color of Law: A Forgotten History of How Our Government Segregated America*.

[58] California Environmental Protection Agency. 2021. Pollution and Prejudice: Redlining and Environmental Injustice in California. Available at: https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5.

To increase investment in under-resourced communities and expand access to high-resource neighborhoods, the State should pursue a combination of the following actions: i) providing financial and educational tools, resources, and incentives; ii) streamlining review processes; iii) strengthening protections for natural and working lands; iv) facilitating collaboration with key partners; and v) providing and requiring anti-displacement protections for existing residents and businesses.

Actions:

- Continue to commit State funding for existing and new programs supporting predevelopment work and infrastructure improvements that accelerate climate-smart and equitable infill development.
- Eliminate State funding of infrastructure, development, or leases outside of infill areas in locations that do not demonstrate clear alignment with State guidelines on VMT, climate, and equity outcomes. (For examples of this, see Appendix D on Local Actions).
- Expand tax increment financing options and other financing tools for infill-supportive infrastructure (e.g., water, sewer, electrical, telecommunications, active transportation, urban greening, and parks). Direct these financing tools to support affordable housing, local businesses, neighborhood services and amenities, and other community-identified priority projects with a focus on under-resourced and disinvested communities.
- Continue to encourage the utilization of underutilized public sites for mixed-use development, and expand opportunities for multi-modal transportation facilities.
- Establish guidance for regional and local agencies on how to administer SB 743 mitigation banking or exchanges and how revenue should be spent to support projects that reduce VMT.

2. **Encourage alignment in land use, housing, transportation, and conservation planning in adopted regional plans (RTP/SCS and RHNA) and local plans (e.g., general plans, zoning, and local transportation plans).** SCSs illustrate future land use and transportation changes that would lead to reductions in VMT and GHG emissions to meet the regional GHG emission reduction targets set by CARB. However, as noted earlier, SCS implementation is lagging significantly across the state. As detailed in the California Transportation Assessment Report (pursuant to AB 285 (Friedman, Chapter 605, Statutes of 2019)), MPOs, which develop the SCS plans, do not have adequate instruments to implement them and do not have the authority to ensure alignment of local land use decisions – as reflected in cities and counties' general plans – with the SCSs. The goal of this objective is to strengthen regional plan implementation and funding and the ability of regional plans to achieve regional GHG targets. Advancing California regions' visions for accelerating infill development and climate-smart housing production will require a collective discussion about establishing more coordinated MPO-local

government relationships that lead to codifying those regional visions into land use plans and ordinances at the local level.[59]

Actions:

- Establish a requirement that all local general plans demonstrate consistency with the assumptions and growth allocations in regional RTP/SCSs at least every 8 years consistent with existing RHNA and housing element update timelines.
- Explore measures to ensure or require greater consistency and alignment between regional RHNA allocations, SCSs, and regional plans such as strategic planning that prioritizes green space and conservation and encourage greater integration of state housing and conservation policy priorities to minimize/prevent conflict.

3. **Accelerate production of affordable housing in forms and locations that reduce VMT and affirmatively further fair housing policy objectives.** Another critical objective is to accelerate production of a greater diversity of housing types in climate-smart locations. According to the latest Statewide Housing Plan (SHP), California must build at least 2.5 million new homes in the current eight-year housing need cycle and no fewer than one million of those homes must meet the needs of lower-income households.[60] The State's vision, as articulated in the SHP, is to provide these homes in climate-smart areas, areas with high access to opportunities and services that reduce the need to drive and mitigate climate change while also reducing costs to government in infrastructure development, operations, and maintenance. Efforts to accelerate housing production should be complemented with bold initiatives to preserve existing affordable housing and protect vulnerable residents through continuation of expiring affordability covenants, anti-displacement and tenant protection services and resources, and climate adaptation upgrades to existing affordable housing.[61]

   Key actions are needed across multiple fronts including easing local and State barriers to increasing density and encouraging greater diversity of housing types in existing neighborhoods. Although research has shown that the California

[59] This type of coordination would also address the need for continued accountability in existing housing laws regarding additional density, affordability, and infill under the purview of California Housing and Community Development Department's Housing Accountability Unit or the Department of Justice.

[60] California Department of Housing and Community Development. 2022. *Statewide Housing Plan.* Available at: *https://www.hcd.ca.gov/docs/statewide-housing-plan.pdf*

[61] Potential conversion of affordable housing to market-rate housing is an ongoing and critical statewide problem. In California, there are approximately 149,000 units of privately owned, federally assisted, multifamily rental housing, plus additional tax-credit and mortgage-revenue bond properties, many with project-based rental assistance. A large percentage of these units may convert to market rate as subsidy contracts or regulatory agreements expire. These at-risk units are home to seniors and families with lower incomes who cannot afford to pay market-rate rents and who could be displaced if the developments convert. More info: *https://www.hcd.ca.gov/policy-research/preserving-existing-affordable-housing.shtml*.

Environmental Quality Act (CEQA) is not a primary barrier to infill housing relative to other challenges, further attention to issues in its implementation can help resolve any challenges it does pose.[62] Affordable housing should be prioritized in many types of communities, including those that are already resource-rich and transportation-efficient. Additionally, affordable housing should be coordinated with supportive community investments in under-resourced communities.

Actions:

- Further ease local regulatory and California Environmental Quality Act (CEQA) barriers to increasing density and affordable housing development, especially in transportation-efficient areas, and establish protections in the law against tactics to obstruct developments that advance State equity and climate goals.
- Increase funding for affordable housing and infill-supportive developments that accelerate VMT-reducing housing production in alignment with the SCS through programs such as Regional Early Action Planning of 2021 (REAP 2.0), Affordable Housing and Sustainable Communities (AHSC), and Transformative Climate Communities (TCC).
- Scale up factory-built housing production, including investing in workforce development, boosting participation in the construction industry, and establishing labor standards, to reduce the time and cost of delivering multifamily infill housing and accelerate the infill housing pipeline.
- Leverage the State's Prohousing designation by expanding incentives in State funding programs – including transportation and other non-housing programs – for local jurisdictions to adopt pro-housing policies, especially in ways that increase infill housing and reduce VMT.
- Support programs and policies to enable different housing ownership models to expand housing access such as through community land trusts, mutual housing, and cooperative ownership models.
- Incentivize conversion of a broader array of opportunity sites for affordable housing construction including redevelopment of aging malls, office parks, and other major reuse sites.

4. **Reduce or eliminate parking requirements (and/or enact parking maximums, as appropriate) and promote redevelopment of excess parking, especially in infill locations.** Building parking for infill development makes construction costs more prohibitive, considering parking can cost up to $100,000 per stall, which takes away both physical space and budget from the construction of housing and other needed services and amenities. Yet minimum requirements for parking in new developments are regularly set by local jurisdictions, financers, or others.

[62] O'Neill, Moira and Biber, Eric and Gualco-Nelson, Giulia and Marantz, Nicholas and Marantz, Nicholas. (September 18, 2021). *Examining Entitlement in California to Inform Policy and Process: Advancing Social Equity in Housing Development Patterns*. Available at SSRN: https://ssrn.com/abstract=3956250

Particularly where viable transportation alternatives are available, eliminating parking requirements and/or providing a "cap" on allowable parking can make infill development more financially feasible and is more conducive to lowering VMT. Measures to reduce parking in new developments can also be paired with funding or incentives for car share, electric vehicles, electric bikes and scooters, and other driving alternatives. AB 2097 (Friedman, Chapter 459, Statutes of 2022)[63] will help with this in certain areas, but there is still work to be done.

Actions:

- Develop financing and incentives programs that facilitate conversion of excess parking to housing and other strategic uses for communities.
- Enact parking maximums (caps).

5. **Preserve and protect existing affordable housing stock and protect existing residents and businesses from displacement and climate risk.** Identifying and preserving the existing affordable housing stock – both subsidized and "naturally occurring" affordable housing – is key to maintaining the economic accessibility and vitality of existing communities while investing in new development and ensuring that low-income residents are not displaced when new infill development occurs. Additionally, preserving all types of affordable housing requires climate mitigation and adaptation improvements to ensure the future safety and viability of those residences. One action the State could undertake could be to identify potential changes to federal and State policies to increase incentives to preserve existing affordable housing, implement climate adaptation improvements to existing affordable housing, and reduce and mitigate displacement of existing low-income residents.

   Actions:

   - Identify potential changes to federal and State policies to increase incentives to preserve existing affordable housing, implement climate adaptation improvements to existing affordable housing, and reduce and mitigate displacement of existing low-income residents.

[63] See https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB2097.