Greenhouse Gas Emissions Analysis Report

Draft Greenhouse Gas Emissions Analysis Report for the Culver Drive and Alton Parkway Intersection Improvement Project (CIP 311905) Irvine, California

January 8, 2020

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Abbreviations

AB	Assembly Bill
CAA	Clean Air Act
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CTP	California Transportation Plan
EO	Executive order
GHG	Greenhouse gas
GWP	Global warming potential
MT	metric ton
$MTCO_2e$	metric tons of carbon dioxide equivalent
$MTCO_2e$/yr	metric tons of carbon dioxide equivalent per year
N_2O	Nitrous oxide
RTP/SCS	Regional Transportation Plan/ Sustainable Community Strategy
SB	Senate bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
TMP	Traffic Management Plan
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

The Culver Drive and Alton Parkway Intersection Improvement Project (proposed Project) is one of the mitigations identified in the *2015 Irvine Business Complex Vision Plan Traffic Study* and the *2016 Citywide Traffic Operation & Traffic Management Study* that would improve circulation in the City of Irvine (City). The proposed Project will provide capacity enhancements and improve circulation to the intersection. Culver Drive is a six-lane major arterial roadway, and Alton Parkway is a four-lane primary arterial east of Culver Drive and a six-lane major arterial west of Culver Drive in the City's roadway network within the intersection vicinity. Figure 1 shows the location of proposed Project.

The project area is within the South Coast Air Basin and is under the jurisdiction of South Coast Air Quality Management District (SCAQMD). This greenhouse gas (GHG) emissions analysis report provides assessment of the potential impacts to GHG emissions that are related to the proposed Project.

The proposed roadway layout and associated improvements, including revised geometries for the Culver Drive and Alton Parkway intersection are summarized below. Each location describes the approach to the intersection and for the purpose of this description, Culver Drive is considered a north-south roadway and Alton Parkway an east-west roadway.

Several alternatives were considered and studied for the proposed Project improvements. From the studied alternatives, two alternatives were determined to be viable as they provide improvements in the level of service and intersection capacity utilization to maintain the intersection at acceptable City requirements for traffic circulation though the buildout conditions (2035). One of these two alternatives is considered as the "preferred alternative" (see Figure 2) which include the following:

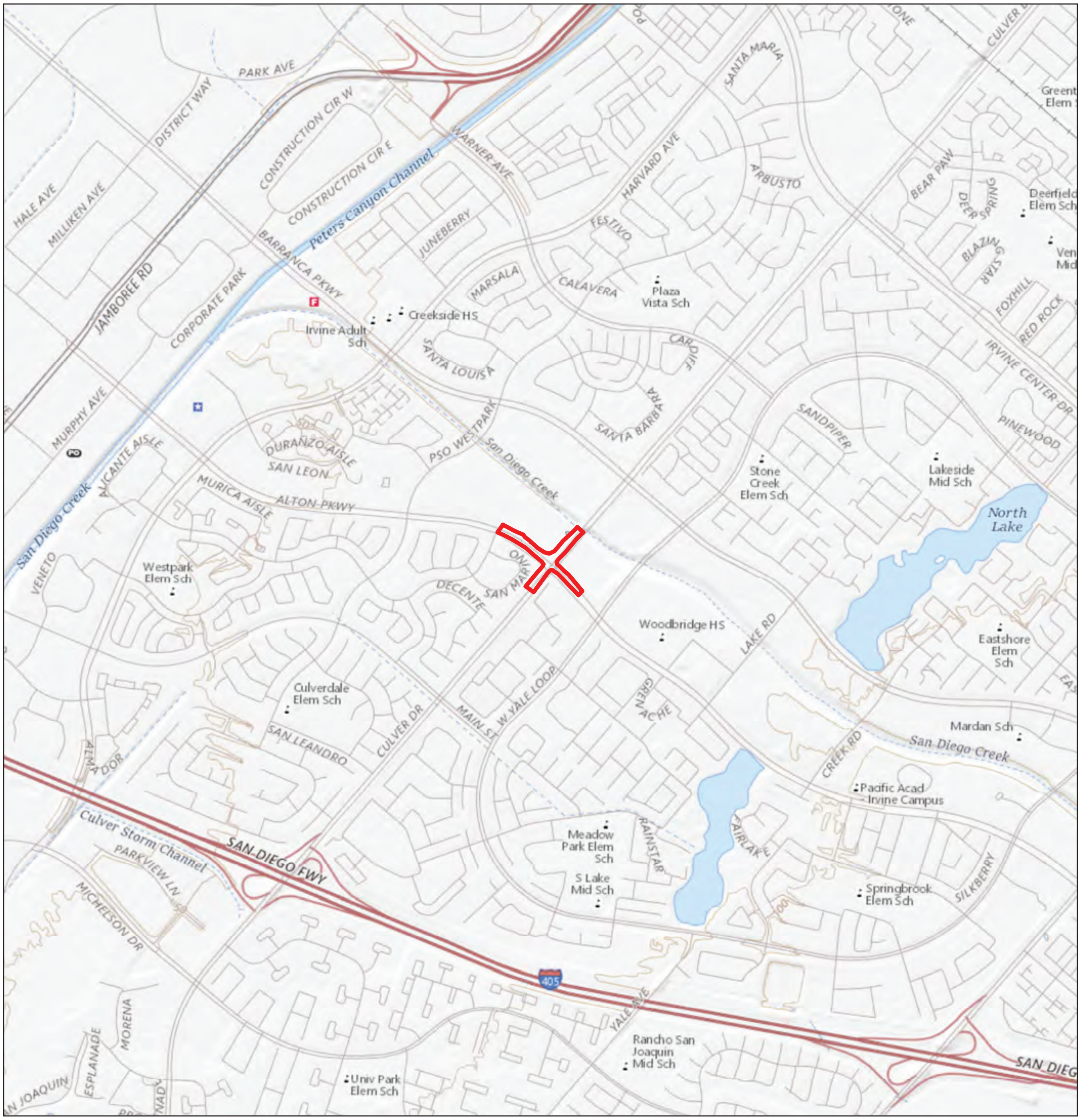
- Adding a fourth northbound through lane on Culver Drive;
- Removing the southbound free right turn lane on Culver Drive and converting it to a standard right turn lane; and removal of the existing pedestrian island;
- Adding southbound right turn overlap phasing on Culver Drive coordinated with the eastbound dual left turn phasing on Alton Parkway (prohibiting eastbound U-turn movement);
- Extending the eastbound and westbound left turn pockets in both directions on Alton Parkway approaching the intersection at Culver Drive
- Adding concrete bus pads at existing bus stops located at the northeast (Culver Drive), northwest (Alton Parkway) nearest the retail business at 3755 Alton Parkway, currently occupied by Olive Garden Italian restaurant, and southeast (Alton Parkway) corners of the intersection;
- Adding a new bus stop and bus pad on the northwest corner (Alton Parkway) of the intersection nearest to the retail business at 3995 Alton Parkway, currently occupied by Starbucks coffee shop;

- Modify / improve supporting traffic signal, medians, sidewalks, and landscaping, where applicable and;
- Providing enhanced striping to the existing on-street bike lanes on all four (4) legs of the intersection.
-

Figure 2 shows the proposed roadway layout and associated improvements, including revised geometries for the Culver Drive and Alton Parkway intersection. The design features for proposed Project are as follows:

- New pavement, curb and gutter, sidewalk and pedestrian ramps.
- Lengthen the eastbound Alton Parkway left turn pocket by approximately 60 feet.
- Lengthen the westbound Alton Parkway left turn pocket by 150 feet.
- Remove and replace existing trees and ground cover in the Alton Parkway median on both legs of the intersection.
- Protect in place the existing monument sign, stone façade wall(s), and portions of landscaping on the southeast (Woodbridge) corner of the intersection.
- Modify the existing traffic signal at the intersection.
- Adjust and/or relocate various utility features (manholes, valves, vaults, etc.).
- Install Filterra biofiltration water quality facilities; of which three (3) will retrofit existing catch basin inlets at the northwest, southwest, and southeast legs of the intersection, and 2 facilities will retrofit the existing catch basin inlet at the northeast corner of the intersection.
- Relocation of existing street lighting, as required.
- Reconstruct parkways in three of the four quadrants of the intersection, summarized as follows:
  - Northwest Quadrant – Ten-foot wide curb adjacent sidewalk with landscaping behind along Alton Parkway. Eight-foot wide curb adjacent sidewalk with landscaping behind along Culver Drive.
  - Northeast Quadrant – Variable (8-foot- 10-foot) wide curb adjacent sidewalk with retaining curb at the back of walk along Culver Drive. Five-foot wide curb adjacent planting area with 5-foot wide sidewalk behind along Alton Parkway. A retaining curb will be constructed at the back of sidewalk.
  - Southeast Quadrant – Five-foot curb adjacent sidewalk with a landscape slope (4 to1 maximum) to match existing behind the sidewalk along Culver Drive.

- Southwest Quadrant – No improvements required (existing conditions to remain)



Project Location

0 0.25 0.5 Miles

(At original document size of 8.5x11)
1:24,000

Notes

1. Coordinate System: NAD 1983 StatePlane California VI FIPS 0406 Feet
2. Data Sources: Stantec 2019.
3. Background: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National

Stantec

Project Location
Irvine, California

Prepared by DL on 2019-12-20
TR by
IR by

Client/Project
City of Irvine
Alton Parkway and Culver Drive
Intersection Improvement Project

2042557300

Figure No.
1

Title
Location Map

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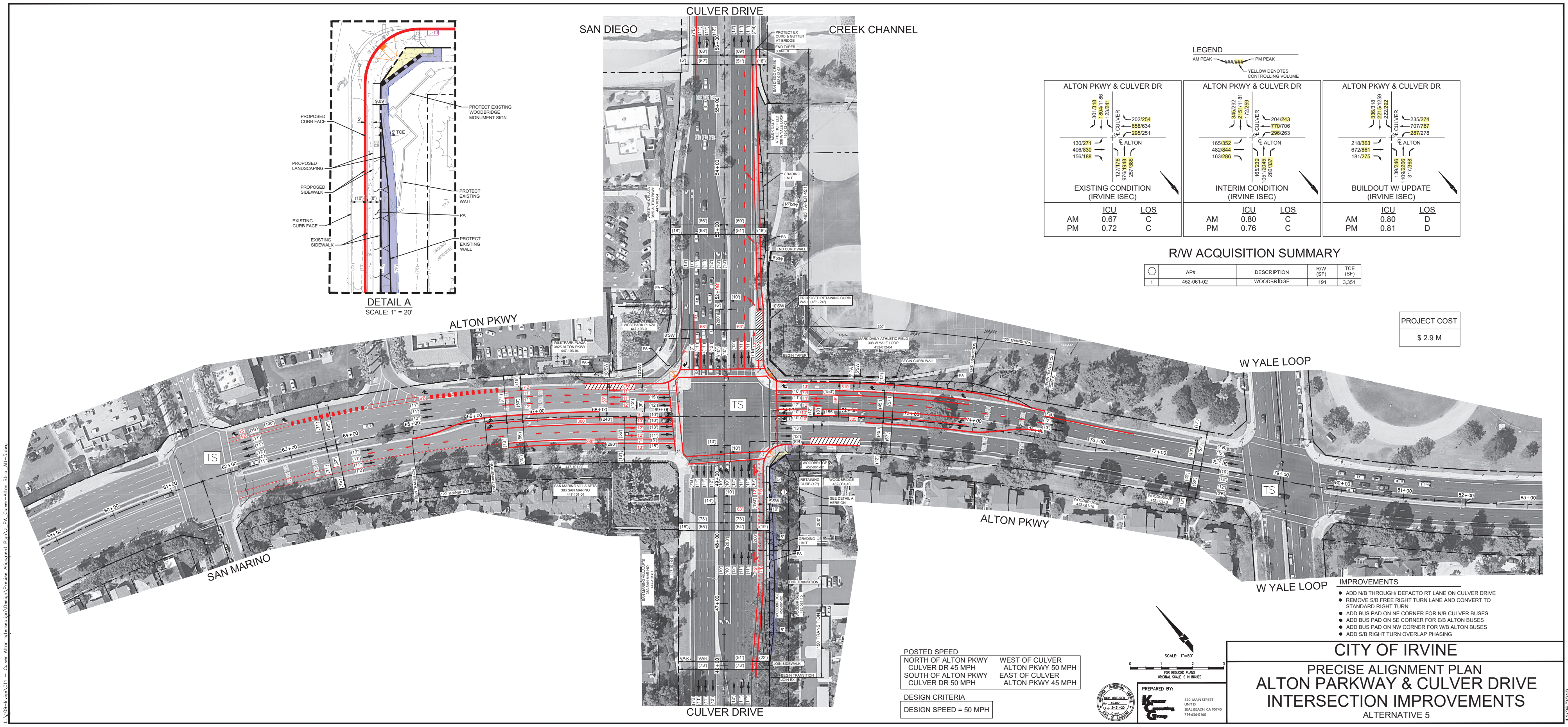

ALTON PKWY & CULVER DR

	EXISTING CONDITION (IRVINE ISEC)		INTERIM CONDITION (IRVINE ISEC)		BUILDOUT W/ UPDATE (IRVINE ISEC)	
	ICU	LOS	ICU	LOS	ICU	LOS
AM	0.67	C	0.80	C	0.80	D
PM	0.72	C	0.76	C	0.81	D

R/W ACQUISITION SUMMARY

⬡	AP#	DESCRIPTION	R/W (SF)	TCE (SF)
1	452-061-02	WOODBRIDGE	191	3,351

PROJECT COST
$ 2.9 M

IMPROVEMENTS

- ADD N/B THROUGH/ DEFACTO RT LANE ON CULVER DRIVE
- REMOVE S/B FREE RIGHT TURN LANE AND CONVERT TO STANDARD RIGHT TURN
- ADD BUS PAD ON NE CORNER FOR N/B CULVER BUSES
- ADD BUS PAD ON SE CORNER FOR E/B ALTON BUSES
- ADD BUS PAD ON NW CORNER FOR W/B ALTON BUSES
- ADD S/B RIGHT TURN OVERLAP PHASING

POSTED SPEED

NORTH OF ALTON PKWY CULVER DR 45 MPH	WEST OF CULVER ALTON PKWY 50 MPH
SOUTH OF ALTON PKWY CULVER DR 50 MPH	EAST OF CULVER ALTON PKWY 45 MPH

DESIGN CRITERIA

DESIGN SPEED = 50 MPH

CITY OF IRVINE

PRECISE ALIGNMENT PLAN
ALTON PARKWAY & CULVER DRIVE
INTERSECTION IMPROVEMENTS
ALTERNATIVE 5

LEGEND

- PROPOSED CURB
- PROPOSED SIDEWALK
- PROPOSED RETAINING CURB/WALL
- EXISTING RIGHT-OF-WAY
- EXISTING PARCEL LINE
- PROPOSED TCE
- PROPOSED STRIPING
- TS — TRAFFIC SIGNAL MODIFICATION
- 255-033-20 PA — ASSESSOR PARCEL NUMBER
- PROPOSED PLANTING AREA
- (50.00') — EXISTING DIMENSION
- 50' — PROPOSED CURB DIMENSION
- PROPOSED CATCH BASIN
- PROPOSED BUS PAD
- PROPOSED SIDEWALK
- PROPOSED TCE
- PROPOSED R/W ACQUISITION

Stantec

Project Location
Irvine, California

Prepared by DL on 2019-12-30
TR by
IR by

Client/Project
2042558200

City of Irvine
Alton Parkway and Culver Drive
Intersection Improvement Project

Figure No.
2

Title
Preliminary Engineering Plan

1.1 ENVIRONMENTAL SETTING

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An increasing body of scientific research attributes these climatological changes to GHG emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs related to human activity that include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF_6), and hydrofluorocarbons (HFCs).

GHGs vary considerably in terms of global warming potential (GWP). The GWP is the potential of a gas to trap heat in the atmosphere over a specified time period (typically 100 years). The reference gas for GWP is CO_2, which has a GWP of one. Methane has a GWP of 21, which means that it has 21-times greater global warming effect than CO_2 on a mass basis. N_2O has a GWP of 310. To assess the effect of GHG emissions, the combined emissions of various GHGs from a source are presented as a CO_2 equivalent (CO_2e). The total CO_2e is calculated by multiplying the amount of each GHG emitted from the project by its GWP and adding them up.

In the U.S., the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) are the largest contributors of GHG emissions. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

1.1.1 Regulatory Setting

Regulatory oversight authority regarding air quality rests at the federal, state, and local levels with the, U.S. Environmental Protection Agency (USEPA), California Air Resources Board (CARB), and SCAQMD, respectively. Plans, policies, and regulations that are relevant to the proposed project are discussed in the following sections.

Federal

At the federal level, currently there is no overarching law related to climate change or the reduction of GHGs. The USEPA is developing regulations under the Clean Air Act (CAA) to be adopted in the near future, pursuant to the USEPA's authority under the CAA. Foremost amongst recent developments have been the settlement agreements between the USEPA, several states, and nongovernmental organizations (NGOs) to address GHG emissions from electric generating units and refineries; the U.S. Supreme Court's decision in *Massachusetts v. EPA*; and USEPA's "Endangerment Finding," "Cause or Contribute Finding," and "Mandatory Reporting Rule." On Sept. 20, 2013, the EPA issued a proposal to limit carbon pollution from new power plants. The USEPA is proposing to set separate standards for natural gas-fired turbines and coal-fired units. Although periodically debated in Congress, no federal legislation concerning GHG limitations has yet been adopted. In *Coalition for Responsible Regulation, Inc., et al. v. EPA*, the U.S. Court of Appeals upheld the USEPA's authority to regulate GHG emissions under CAA. Furthermore, Under the authority of the CAA, the USEPA is beginning to regulate GHG emissions starting with large stationary sources. In 2010, the USEPA set GHG thresholds to define when permits under the New Source Review Prevention of Significant Deterioration (PSD) standard and Title V Operating Permit programs are required for new and existing industrial facilities. In 2012, USEPA proposed a carbon pollution standard for new power plants.

State

California has been innovative and proactive in addressing GHG emissions through passage of legislation including Senate and Assembly bills and executive orders, some of which are listed below.

Assembly Bill 1493 – Pavley Vehicular Emissions: greenhouse Gases, 2002. The bill required CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter standards were to be applied beginning with the 2009 model-year.

Executive Order S-3-05. In 2005, the governor issued Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. The goal of this EO is to reduce California's GHG emissions to year 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. This goal was further reinforced with the passage of Assembly Bill 32 (AB 32) in 2006 and Senate Bill 32 (SB 32) in 2016.

Assembly Bill 32 (AB 32). In 2006, California passed the California Global Warming Solutions Act of 2006 (*AB 32*; California Health and Safety Code Division 25.5, Sections 38500, et seq.), which codified the 2020 GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that CARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." The Legislature also intended that the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020 (Health and Safety Code Section 38551(b)). 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.

The first Scoping Plan was prepared and approved on December11, 2008 and was later updated in May 2014. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the State's longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use. The most recent update to the plan is the 2017 Climate Change Scoping Plan (CARB, 2017c) which sets the state on an aggressive course to reduce GHG emissions an additional 40% below 1990 levels by 2030 under SB 32.

Senate Bill 97 (SB 97), Chapter 185, 2007, Greenhouse Gas Emissions: This bill requires the Governor's Office of Planning and Research to develop recommended amendments to the California Environmental Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

Senate Bill 375 (SB 375), Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires CARB to set regional emissions reduction targets for passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use, and housing policies to plan how it will achieve the emissions target for its region.

Senate Bill 391 (SB 391), Chapter 585, 2009, California Transportation Plan, requires the State's long-range transportation plan to meet California's climate change goals under AB 32.

Executive Order B-30-15 (April 2015) establishes an interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050. It further orders all state agencies with jurisdiction over sources of GHG emissions to implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets. It also directs CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of millions of metric tons of CO_2e ($MTCO_2e$.) Finally, it requires the Natural Resources Agency to update the state's climate adaptation strategy, *Safeguarding California*, every 3 years, and to ensure that its provisions are fully implemented.

Senate Bill 32 (SB 32) September 2016. Chapter 249 of the bill codifies the GHG reduction targets established in EO B-30-15 to achieve a mid-range goal of 40 percent below 1990 levels by 2030. SB 32 provides another intermediate target between the 2020 and 2050 targets set in EO S-3-05.

Renewable Energy Portfolio

The Renewable Portfolio Standard promotes diversification of the state's electricity supply and decreased reliance on fossil fuel energy sources. Originally adopted in 2002 with a goal to achieve a 20 percent renewable energy mix by 2020 (referred to as the "initial Renewable Portfolio Standard"), the goals have been accelerated and increased by EOs S-14-08 and S-21-09 to a goal of 33 percent by 2020. Furthermore, on September 10, 2018, Governor Brown signed the SB 100 which aims at eliminating fossil fuel from electricity generation in California. The Bill sets a target of 100 percent carbon-free electricity by 2045.

Local

The Southern California Association of Governments (SCAG) serves as the federally designated MPO for the Southern California region. SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment and has been innovative and proactive in addressing GHG emissions through passage of legislation.

The SCAG 2016 Regional Transportation Plan/ Sustainable Community Strategy (2016 RTP/SCS) includes proposed transportation improvements to be integrated and coordinated with proposed land use changes that would lead to reduced congestion, reduced vehicle miles traveled, and increased transit, walking, and biking options. The RTP/SCS includes integrated transportation and land use strategies to promote active transportation opportunities, compact development, car sharing and ride sourcing, and technology in zero-emission vehicles and neighborhood electric vehicles. The Program Environmental Impact Report for the 2016 RTP/SCS determined that across the six counties in the SCAG region, the 2016 RTP/SCS would result in an approximately 24 percent decrease in GHG emissions by 2040. The 2016 RTP/SCS also includes land use strategies that seek to balance the region's land use choices and transportation investments.

1.1.2 Thresholds of Significance

In addition to the criteria listed in Appendix G of CEQA Guidelines, CARB and SCAQMD have developed preliminary interim GHG thresholds for two important sectors industrial and residential/commercial.

In October 2008, SCAQMD released a *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold* that suggested a tiered approach to project analysis. The proposed CARB interim significance threshold of GHG emissions in the 2008 Scoping Plan for industrial projects was set at 7,000 metric tons CO_2e per year ($MTCO_2e$/yr), and for residential/commercial projects the interim significance threshold is approximately 6,500 $MTCO_2e$/yr. SCAQMD has recommended a threshold of 10,000 $MTCO_2e$/yr for industrial sector projects and 3,000 $MTCO_2e$/yr for residential/commercial projects. These thresholds include construction emissions amortized over 30 years and added to operational GHG emissions (SCAQMD, 2008b).

The City of Irvine does not have specific significance criteria for GHG emissions, instead recommends applying all relevant measures from regional and local plans, such as CARB Scoping Plan and SCAQMD adopted plans and strategies, to reduce the project related GHG emissions.

The proposed Project is a transportation project, and although there are measures and strategies to achieve sustainability in the Scoping Plan, there are no numeric threshold for transportation projects. However, for the purpose of this analysis, we have used the most conservative threshold of 3,000 $MTCO_2e$/yr to evaluate the impact of GHG emissions related to the Project implementation.

2.0 IMPACT ANALYSIS

Impact GHG (a): Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations.

Construction GHG Emissions

Construction GHG emissions would be associated with exhaust emissions from operation of on-site heavy-duty equipment, material processing, construction worker vehicles trips to and from the site, and haul/delivery truck trips. These emissions would be produced at varying levels throughout the construction phase (anticipated to last four months). Similar to criteria pollutants, emissions of GHGs during construction of the proposed Project were quantified using the Sacramento Metro Air Quality Management District Road Construction Emissions Model, version 8.1.0. GHG emissions for the proposed Project were estimated at 126 $MTCO_2e$ for the construction period (see Roadmod model results in Appendix A). When amortized over the 30-year life of the Project, annual emissions would be 4.2 $MTCO_2e$/yr.

Operation GHG Emissions

As described in the Project's Traffic Analysis Memorandum (Stantec, 2019), operation of the Project would improve the PM (afternoon) peak hour level of service at the intersection. However, the proposed project improvements are not considered to be vehicle travel inducing. The proposed improvements are considered "spot" capacity improvements and while provide an additional through lane at the intersection, the additional "through" (auxiliary) lane would merge into existing through lanes after departing the intersection (in approximately 600 feet) without continuing to an adjacent intersection. Therefore, while the intersection operates more efficiently, no vehicle inducing capacity is added to roadway segments. Other improvements included involve only turn lane modifications and would not cause change in traffic volume or fleet mix. As such, GHG emissions from Project implementation, only comprise the amortized construction emissions

Total Proposed Project GHG Emissions

As shown in Table 1, Project-related GHG emissions would be well below the 3,000 metric tons of CO_2e threshold. Therefore, impacts would be less than significant and mitigation is not required.

Table 1. Summary of Project Greenhouse Gas Emissions

Construction Phase/ Component	Emissions (tons)			Total Emissions (metric tons)
	CO_2	CH_4	N_2O	CO_2e
Clear and Grub	7.08	0.00	0.00	6.49
Grading/ Site Preparation	54.20	0.01	0.00	49.64
Construction of subgrade and sidewalks	58.88	0.01	0.00	53.77
Paving and restriping	18.05	0.00	0.00	16.53
Total Construction (tons)	138.21	0.03	0.00	126.43
Amortized Construction Emission over 30 years (MT/year)				4.2
Project Annual Operational Emissions				0
Total Project Emissions				**4.2**
SCAQMD interim significance threshold for commercial projects				3,000
Note: CO_2= Carbon Dioxide; CH_4 = Methane, N_2O = Nitrous Oxide; CO_2e = Carbon Dioxide Equivalent; MT = metric ton				

Impact GHG (b): Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing greenhouse gases?

Less Than Significant Impact. The City does not have an adopted Climate Action Plan. The proposed Project involves minor improvements to an existing roadway intersection to improve circulation and promote pedestrian/bicycle use. As described in response to checklist item GHG (a), while the intersection would operate more efficiently, no vehicle inducing capacity is added to roadway segments and would not increase vehicle trips or miles travelled. Because the Project would result in an improvement in vehicular circulation and bicycle use opportunities, it has the potential to reduce GHG emissions compared to existing conditions. The Project involves traffic circulation improvement and would not conflict with plans, policies, and applicable regulations. As such, potential climate change impacts would be less than significant.

2.1 GREENHOUSE GAS REDUCTION STRATEGY

The City of Irvine is in the process of developing a Climate Action Plan which will include measures to reduce GHG emissions that contribute to climate change. The following section include the efforts that are currently being undertaken at the state level.

2.1.1 Statewide Efforts

In an effort to further the vision of California's GHG reduction targets outlined in AB 32 and SB 32, Governor Brown identified key climate change strategy pillars (concepts). These pillars highlight the idea that several major areas of the California economy will need to reduce emissions to meet the 2030 GHG emissions target. As shown below in Figure 3, these pillars are (1) reducing today's petroleum use in cars and trucks by up to 50 percent; (2) increasing from one-third to 50 percent our electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farm and rangelands, forests, and wetlands so they can store carbon; and (6) periodically updating the state's climate adaptation strategy, *Safeguarding California*.

Figure 3. Governor Brown's Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals

The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that we build on our past successes in reducing criteria and toxic air pollutants from transportation and goods movement activities. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of vehicle miles traveled. One of Governor Brown's key pillars sets the ambitious goal of reducing today's petroleum use in cars and trucks by up to 50 percent by 2030.

Governor Brown called for support to manage natural and working lands, including forests, rangelands, farms, wetlands, and soils, so they can store carbon. These lands have the ability to remove carbon dioxide from the atmosphere through biological processes, and to then sequester carbon in above- and below-ground matter.

Caltrans Activities

California Department of Transportation (Caltrans) continues to be involved on the Governor's Climate Action Team as the CARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. EO B-30-15, issued in April 2015, and SB 32 (2016), set a new interim target to cut GHG emissions to 40 percent below 1990 levels by 2030. The following major initiatives are underway at Caltrans to help meet these targets.

California Transportation Plan (CTP 2040)

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. The CTP defines performance-based goals, policies, and strategies to achieve our collective vision for California's future statewide, integrated, multimodal transportation system. It serves as an umbrella document for all of the other statewide transportation planning documents.

SB 391 (Liu 2009) requires the CTP to meet California's climate change goals under AB 32. Accordingly, the CTP 2040 identifies the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the state's transportation needs.

While MPOs have primary responsibility for identifying land use patterns to help reduce GHG emissions, CTP 2040 identifies additional strategies in Pricing, Transportation Alternatives, Mode Shift, and Operational Efficiency.

Caltrans Strategic Management Plan

The Strategic Management Plan, released in 2015, creates a performance-based framework to preserve the environment and reduce GHG emissions, among other goals. Specific performance targets in the plan that will help to reduce GHG emissions include:

- Increasing percentage of non-auto mode share
- Reducing vehicle miles traveled per capita
- Reducing Caltrans' internal operational (buildings, facilities, and fuel) GHG emissions

Funding and Technical Assistance Programs

In addition to developing plans and performance targets to reduce GHG emissions, Caltrans also administers several funding and technical assistance programs that have GHG reduction benefits. These include the Bicycle Transportation Program, Safe Routes to School, Transportation Enhancement Funds, and Transit Planning Grants. A more extensive description of these programs can be found in *Caltrans Activities to Address Climate Change* (2013).

Caltrans Director's Policy 30 (DP-30) Climate Change (2012) is intended to establish a policy that will ensure coordinated efforts to incorporate climate change into departmental decisions and activities.

Caltrans Activities to Address Climate Change (April 2013) provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce GHG emissions resulting from agency operations.

Project-Level GHG Reduction Strategies

The following mitigation measures will also be implemented for the Project to reduce GHG emissions and potential climate change impacts.

In addition, the proposed Project improvements components include improvements to bicycle lanes which would enhance bicycle safety and promote alternative mode of transportation, thereby reducing GHG emissions.

Provided below are the standards mitigation measures (SM) that the proposed Project would be required to implement and which would contribute to reducing GHGs:

SM GHG-1 During various phases of construction activities, the Project will comply with all applicable rules and regulations, including SCAQMD Rules 401, 402, 403 and Rule 1113.

SM-TRA.1 A traffic management plan will be prepared to optimize roadway operations during construction activities. The traffic management plan will identify temporary measures such as coordination for lane closures, lane closure signage; bicycle lane/pedestrian detours; and the potential need for a construction flag person during peak traffic hours. Minimizing delays and maintaining traffic flow will help reduce GHG emissions from idling traffic during construction.

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Appendix A AIR POLLUTANTS AND GREENHOUSE GAS EMISSIONS

Emissions Calculation Summary

Road Construction Emissions Model (RoadMod) Output

Construction Emissions Calculations Summary

Daily Emission Estimates for -> Culver Drive and Alton Parkway Intersection Improvements

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.75	5.44	8.68	2.37	0.37	2.00	0.74	0.32	0.42	0.01	1,431.11	0.37	0.02	1,445.38
Grading/Excavation	2.23	17.73	23.28	3.17	1.17	2.00	1.42	1.01	0.42	0.05	4,479.03	0.97	0.06	4,522.32
Drainage/Utilities/Sub-Grade	2.00	19.63	17.81	3.02	1.02	2.00	1.35	0.94	0.42	0.03	3,345.50	0.50	0.03	3,367.71
Paving	1.25	13.95	11.75	0.70	0.70	0.00	0.62	0.62	0.00	0.02	2,344.23	0.56	0.03	2,365.70
Maximum (pounds/day)	2.23	19.63	23.28	3.17	1.17	2.00	1.42	1.01	0.42	0.05	4,479.03	0.97	0.06	4,522.32
Total (tons/construction project)	0.08	0.69	0.73	0.11	0.04	0.07	0.05	0.04	0.01	0.00	138.21	0.03	0.00	139.36

126.4631 MT CO2e

Off-site Emissions - from Data Entry sheet

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.03	0.52	0.17		0.03			0.01		0.00	298.08	0.00	0.01	300.13
Grading/Excavation	0.15	2.16	1.01		0.14			0.06		0.01	1,536.16	0.02	0.04	1,547.74
Drainage/Utilities/Sub-Grade	0.09	1.40	0.26		0.07			0.03		0.01	587.08	0.01	0.01	590.37
Paving	0.06	1.01	0.22		0.05			0.02		0.00	458.63	0.01	0.01	461.38

Onsite emissions

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.72	4.92	8.50	2.34	0.34	2.00	0.73	0.31	0.42	0.01	1,133.03	0.37	0.01	1,145.25
Grading/Excavation	2.07	15.57	22.26	3.03	1.03	2.00	1.37	0.95	0.42	0.03	2942.88	0.95	0.03	2974.58
Drainage/Utilities/Sub-Grade	1.91	18.23	17.55	2.95	0.95	2.00	1.33	0.91	0.42	0.03	2758.42	0.49	0.02	2777.34
Paving	1.18	12.94	11.53	0.65	0.65	0.00	0.60	0.60	0.00	0.02	1885.60	0.55	0.02	1904.32
Maximum (pounds/day)	2.07	18.23	22.26	3.03	1.03		1.37	0.95		0.03	2942.88	0.95	0.03	2974.58

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Culver Drive and Alton Parkway Intersection Improvements

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.75	5.44	8.68	2.37	0.37	2.00	0.74	0.32	0.42	0.01	1,431.11	0.37	0.02	1,445.38
Grading/Excavation	2.23	17.73	23.28	3.17	1.17	2.00	1.42	1.01	0.42	0.05	4,479.03	0.97	0.06	4,522.32
Drainage/Utilities/Sub-Grade	2.00	19.63	17.81	3.02	1.02	2.00	1.35	0.94	0.42	0.03	3,345.50	0.50	0.03	3,367.71
Paving	1.25	13.95	11.75	0.70	0.70	0.00	0.62	0.62	0.00	0.02	2,344.23	0.56	0.03	2,365.70
Maximum (pounds/day)	2.23	19.63	23.28	3.17	1.17	2.00	1.42	1.01	0.42	0.05	4,479.03	0.97	0.06	4,522.32
Total (tons/construction project)	0.08	0.69	0.73	0.11	0.04	0.07	0.05	0.04	0.01	0.00	138.21	0.03	0.00	139.36

Notes: Project Start Year -> 2021
Project Length (months) -> 4
Total Project Area (acres) -> 1
Maximum Area Disturbed/Day (acres) -> 0
Water Truck Used? -> Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	200	40
Grading/Excavation	0	220	0	220	800	40
Drainage/Utilities/Sub-Grade	0	0	0	0	560	40
Paving	0	0	0	0	400	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Culver Drive and Alton Parkway Intersection Improvements

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.00	0.03	0.04	0.01	0.00	0.01	0.00	0.00	0.00	0.00	7.08	0.00	0.00	6.49
Grading/Excavation	0.03	0.21	0.28	0.04	0.01	0.02	0.02	0.01	0.01	0.00	54.20	0.01	0.00	49.64
Drainage/Utilities/Sub-Grade	0.04	0.35	0.31	0.05	0.02	0.04	0.02	0.02	0.01	0.00	58.88	0.01	0.00	53.77
Paving	0.01	0.11	0.09	0.01	0.01	0.00	0.00	0.00	0.00	0.00	18.05	0.00	0.00	16.53
Maximum (tons/phase)	0.04	0.35	0.31	0.05	0.02	0.04	0.02	0.02	0.01	0.00	58.88	0.01	0.00	53.77
Total (tons/construction project)	0.08	0.69	0.73	0.11	0.04	0.07	0.05	0.04	0.01	0.00	138.21	0.03	0.00	126.43

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model
Data Entry Worksheet

Version 8.1.0

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

Clear Data Input & User Overrides

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Culver Drive and Alton Parkway Intersection Improvements	
Construction Start Year	2021	Enter a Year between 2014 and 2025 (inclusive)
Project Type	2	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more sit 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some dif 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee constructi
Project Construction Time	4.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott R 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho
Project Length	0.45	miles
Total Project Area	0.60	acres
Maximum Area Disturbed/Day	0.20	acres
Water Trucks Used?	1	1. Yes 2. No

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing	0.45	0.40	6/1/2021	1/1/2021
Grading/Excavation	1.10	1.80	6/15/2021	1/15/2021
Drainage/Utilities/Sub-Grade	1.60	1.20	7/20/2021	2/18/2021
Paving	0.70	0.60	9/8/2021	4/8/2021
Totals (Months)	4			