INITIAL STUDY

FOR THE

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT WATER FACILITIES RELOCATION PROJECT

Prepared for:

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Planning Division
201 North E Street, 3rd Floor
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and

San Bernardino Municipal Water Department
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LIST OF ABBREVIATIONS AND ACROYNMS

AAQS	Ambient Air Quality Standards
AB	Assembly Bill
APE	Area of Potential Effect
APN	Assessor Parcel Number
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
bgs	below ground surface
BMPs	Best Management Practices
BRA	Biological Resources Assessment
BUOW	burrowing owl
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CBC	California Building Code
CCAR	California Climate Action Registry
CDFW	California Department of Fish & Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNG	Compressed Natural Gas
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
EMFAC	EMissions FACtor model
EPA	Environmental Protection Agency
FGC	Fish & Game Code
FTA	Federal Transit Administration
GCC	Global Climate Change
GHG	Greenhouse Gas
GP	General Plan
GSA	groundwater sustainability agency
GWP	Global Warming Potential
HHDT	construction vendor trips
IL	Industrial Light
IPCC	Intergovernmental Panel on Climate Change
IS/MND	Initial Study / Mitigated Negative Declaration
ITE	Institute of Transportation Engineers
JD	Jurisdictional Delineation
LDA	light-duty auto vehicles
LDT	light-duty trucks

LOS	Level of Service
LRA	Local Responsibility Area
LSTs	Localized Significance Thresholds
LUST	Leaking Underground Storage Tank
MBTA	Migratory Bird Treaty Act
MCLs	maximum contaminant levels
MHDT	construction vendor trips
MRZ	Mineral Resource Zone
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
RNG	Renewable Natural Gas
RTP/SCS	Regional Transportation Plan / Sustainable Communities Strategies
RWQCB	Regional Water Quality Control Board
SBDC	San Bernardino Development Code
SBCFD	San Bernardino County Fire District
SBCUSD	San Bernardino City Unified School District
SBKR	San Bernardino kangaroo rat
SBMBI	San Manuel Band of Mission Indians
SBMWD	San Bernardino Municipal Water Department
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCG	Southern California Gas
SOI	Sphere of Influence
SRA	Source Receptor Area
SWPPP	Storm Water Pollution Prevention Program
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish & Wildlife Services
USGS	U.S. Geological Survey
UST	Underground Storage Tanks
UWMP	Urban Water Management Plan
VdB	velocity in decibels
VHFHSZ	Very High Fire Hazard Severity Zone
VMT	Vehicle Miles Traveled
WQMP	Water Quality Management Plan
WRP	Water Reclamation Plant

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ENVIRONMENTAL CHECKLIST

1. Project Title: San Bernardino Municipal Water Department
Water Facilities Relocation Project

2. Lead Agency Name: City of San Bernardino
Address: 201 North E St, San Bernardino, CA 92401

3. Contact Person: Travis Martin, Associate Planner
Phone Number: (909) 384-5313

4. Project Location: The project is located at the following address. 397 Chandler Place, San Bernardino, CA 92408. The project is located within the USGS Topo 7.5-minute map for San Bernardino South, and is located in Section 22, Township 1 South and Range 4 West. The approximate GPS coordinates of the project site are 34.004258, -118.037515. Refer to Figures 1 and 2 for the regional and site location maps.

5. Project Sponsor Name: San Bernardino Municipal Water Department
Address: 1350 South E Street, San Bernardino, CA 92408

6. General Plan Designation: Industrial

7. Zoning: IL (Industrial Light)

8. Project Description:

Introduction

The San Bernardino Municipal Water Department (SBMWD) and Water Board were established in 1905 by the Mayor and City Council of San Bernardino in accordance with the provisions specified in the City Charter. The City of San Bernardino will serve as the Lead Agency under the California Environmental Quality Act (CEQA) for this project. SBMWD provides water, wastewater and sewer collections services to the City of San Bernardino and surrounding communities. The SBMWD water service area is approximately 45 square miles, providing water to a population of over 200,000 persons. SBMWD seeks to develop a new Administrative Building within a site containing the SBMWD existing concrete block operations building. A structure that existed previously on site was demolished in 2004, leaving a majority of the site for the proposed new administrative building vacant. This Initial Study evaluates the potential effects to the environment from implementing the project.

Project Description

The proposed SBMWD Water Facilities Relocation Project consists of development within a 7.86-acre or 342,426.48 square foot (SF) site designated for Industrial use by the City of San Bernardino General Plan on the southeast corner of E Street and Chandler Place in southwestern San Bernardino. The project consists of one parcel with the following Assessor's Parcel Number (APN): 141-291-07. Refer to the site plan, provided as Figure 3.

The project proposes a new administrative building (New Building A) with a modern look and design, that will incorporate sustainable, energy efficient building systems and features. The project proposes a 27,812 SF one-story structural administrative office building. The new administrative building will include the following amenities and features:

- Board meeting room
- Class A office space
- Common area, conference room(s) that would be large enough to accommodate up to 20 or more people for larger events, and that can be transformed into a training room with network access for laptops or work stations
- Hard-walled office spaces with doors for executive management with small conference areas
- Hard-walled office spaces with doors for managers and supervisors
- Cubicle spaces for staff with various sizes and configurations suited to the roles the spaces will serve
- Outside employee covered patio and break area
- Break room and kitchen area(s) centrally located to employee offices
- Automated building systems including climate control, security, energy efficiency management, and other features
- LED lighting
- Incorporation of natural light into building design
- Infrastructure provided to install solar panels for at least 10% of the parking area

Just east of the New Building A, administration building, the project proposes to install a 17,921 SF demonstration garden.

The proposed project would also include renovations of the existing 26,055.6 SF concrete block operations building (Building C) that is located toward the eastern boundary of the site. This building will house vehicle maintenance in the existing service bays and administrative offices in the two-story office section of the building. Additionally, the project includes the development of a 13,500 SF one-story tilt-up concrete warehouse with loading docks (Building B) along the easternmost boundary of the site, to the east of the existing building.

The New Building A will provide 26 public parking stalls along the western boundary of the site, as well as 129 employee parking stalls along the southern boundary and northern boundary of the site, both accessible from E Street and Chandler Place. The total parking stalls for the New Building A is 155 spaces, 5 of which will be accessible spaces as required by the City.

The Existing Building C will provide 4 public parking stalls along the northern boundary of the site, as well as 31 employee parking stalls along the northern boundary of the site, which will be accessible from Chandler Place. The total parking stalls for the Existing Building C is 39 spaces, 2 of which will be accessible spaces as required by the City. There will be 16 spaces designated for clean vehicles. The site plan provides infrastructure for 11 future vehicle charging stations.

In the space between the New Building A and the Existing Building C (refer to site plan, Figure 3), equipment and vehicle parking spaces are provided. Additionally, on the west side of the Existing Building C, a fueling station under an existing canopy will be installed. There are aboveground storage tanks in the parking area with fuel lines feeding four pumps under the existing canopy. At the southeastern boundary of the site, a new generator pad with conduits for future use will be installed. The project will install a 6-foot-wide metal canopy connecting the administration building to the warehouse building.

The site boundary will be fenced using tubular steel and concrete block fencing. Additionally, the project includes landscaping around the boundary of the site, within the parking lots, and around the New Building A. The landscape coverage of the site will equal about 16.75% of the total site area.

Water, sanitation, and other public utilities are available with adequate capacities for the proposed uses.

Operational Information

The new SBMWD Administrative Headquarters will employ about 200 persons, with no new positions created as a result of this project. The Administrative Headquarters will operate between the hours of 6 AM and 6 PM, except in the event of an emergency.

Construction Scenario

Construction of the proposed SBMWD Water Facilities Relocation Project is anticipated to be completed in three phases. Phase 1 would be the site improvements and constructing New Building A. Phase 2 would be construction of New Building B and Phase 3 would be the renovation of Existing Building C. Construction of the three phases would require approximately 24 months, with the anticipated start date of construction in late Fall of 2022 and the completion date by late Fall 2024. The project site is mostly vacant, and development of the site would require site preparation (i.e., clearing, grading, and excavation), paving, and construction of buildings. The project will also require demolition of the existing pavement within the site. The project is anticipated to require minimal cut and fill with any cut being reused to balance of the site through grading, which will minimize import/export of material. The proposed project will develop aboveground storage tanks to supply both gasoline and diesel fuels to support the fueling stations.

Development of the SBMWD Water Facilities Relocation Project will require installation of pavement, curbs and sidewalk throughout the site. Additionally, the project will require installation of drainage inlets at several locations within the project site and installation of catch basin filters, perforated infiltration chamber, pervious pavement, and other water quality control measures as required by the site specific Water Quality Management Plan (WQMP).

Delivery of construction supplies and removal of any excavated materials, if necessary, will be accomplished using trucks during normal working hours, with a maximum of 50 round trips per day. It is anticipated that a maximum number of 50 employees will be required to support the construction of the project each day. Grading will be by traditional mechanized grading and compaction equipment including, but not limited to the following: front end loader, excavator, loader backhoe, dump truck, forklift, skid steer, mobile crane, bulldozer, grader, roller, water wagon, asphalt compactors, telehandlers, cement trucks, etc.

Construction of the site will include but not limited to the following:

1. Clear and grub;
2. Preparation of subgrade;
3. Mass site grading and road beds;
4. Installation of the on-site storm drain systems, including water quality infrastructure;

5. Installation of sewer service lateral;
6. Installation of water service lateral;
7. Fine grade to prepare for surface improvements;
8. Installation of building foundations;
9. Install aboveground fuel tanks and associated fuel dispensing system;
10. Install internal utility infrastructure;
11. Install curb, gutters, sidewalks and asphalt base course;
12. Minor street improvements on E Street and Chandler Place to include, <u>but not limited to,</u> the following: curb & gutter, driveways, sidewalk, and asphalt patch/repair;
13. Complete building construction;
14. Install landscaping; place final lift of asphalt; and
15. Install signage and striping.

Construction materials are those typical of most commercial building projects. The materials will include: Concrete foundations, slabs and walks, asphalt concrete paving, a minor amount of concrete blocks for trash enclosures and similar site elements, structural steel construction for administration building, tilt up concrete for warehouse, cement plaster, synthetic wood, paint for exterior materials, plastic roofing, ceramic tile, carpet, sheet vinyl flooring, suspended acoustic ceilings and suspended metallic ceilings, wood doors, aluminum and glass windows, efficient forced air heating and cooling, typical wiring and conduit for data and power, access control systems, surveillance systems, and audio visual systems, and LED lights throughout.

9. Surrounding land uses and setting: (Briefly describe the project's surroundings)

The project site is located within a commercial corridor within the City of San Bernardino. The proposed project is located about 400 feet to the east of the Interstate 215 (I-215) freeway.

- To the west of the site, the land use is Commercial. The area to the west of the site contains several SBMWD facilities, including a Customer Service building, a sewer lift station, and other SBMWD office space.

- To the north of the site, the land use is Commercial. The area to the north of the site contains a shopping center.

- To the east of the site, the land use is Public Quasi Public, containing the San Bernardino Animal Control/Animal Shelter, with SBMWD's Water Reclamation Plant located just east/southeast of the Animal Shelter; and,

- To the south of the site, the land use is Commercial, currently occupied by Durham School Services, which provides reliable transportation to students across the United States.

10. Other agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

Based on an evaluation of the specific project location, because the amount of area to be disturbed by the whole project will be greater than one acre, SBMWD will be required to file a Notice of Intent (NOI) for a General Construction permit to comply with the National Pollutant Discharge Elimination System (NPDES) requirements. The NOI is filed with the State Water Resources Control Board and enforced by the Santa Ana Regional Water Quality Control Board

(RWQCB). A Stormwater Pollution Prevention Plan (SWPPP) must be implemented in conjunction with construction activities. Other required licenses include a permit from South Coast Air Quality Management District (SCAQMD) for the emergency generator, and a State fuel storage permit.

Additionally, the project must comply with the San Bernardino County Fire Department, Land Use Services-Building and Safety/Code Enforcement, Public Health-Environmental Services, Department of Public Works, City of San Bernardino Code Enforcement, and any other responsible agency that may have discretionary authority over all or a portion of the project.

Due to the height of some construction equipment, such as cranes, and the proximity of the project to the airport, there may be a need to provide a Notice of Proposed Construction or Alteration to the FAA.

No other permits or agency requirements have been identified in association with the proposed project.

11. Have California Native American tribes traditionally and cultural affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun?

The City sent letters to the Gabrieleño Band of Mission Indians – Kizh Nation, San Manuel Band of Mission Indians, and the Soboba Band of Luiseño Indians pursuant to AB-52. The tribes were contacted to initiate the AB-52 process on December 18, 2020 to notify the tribes of the proposed project through mailed letters. During the 30-day consultation period that concluded on January 16, 2021, the San Manuel Band of Mission Indians requested a copy of the Cultural Report, Geotechnical Report, and Project Plans showing the depth of disturbance. The City provided the requested documents, and since those documents were sent, with the latest document sent being the Cultural Resources Report in March of 2021, no further response or concerns have been received or raised. Therefore, consultation has concluded with the following comment from San Manuel that shall be enforced through the implementation of mitigation below: "Please note that if this information cannot be provided within the Tribe's 30-day response window, the Tribe automatically elects to be a consulting party under CEQA, as stipulated in AB52." Given that the Cultural Resources Report was provided greater than 30-days from the date of their January letter, they have automatically elected to be a consulting party under CEQA. As such, mitigation is required to ensure that communication between the Tribe and the Water Department is maintained through the construction process. No other tribes have requested consultation under AB 52.

> Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21083.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ Aesthetics
☒ Biological Resources
☒ Geology / Soils
☒ Hydrology & Water Quality
☒ Noise
☐ Recreation
☒ Utilities / Service Systems
☐ Agriculture and Forestry Resources
☒ Cultural Resources
☐ Greenhouse Gas Emissions
☐ Land Use / Planning
☐ Population / Housing
☒ Transportation
☐ Wildfire
☒ Air Quality
☐ Energy
☒ Hazards & Hazardous Materials
☐ Mineral Resources
☐ Public Services
☒ Tribal Cultural Resources
☒ Mandatory Findings of Significance

DETERMINATION (To be completed by the Lead Agency)

On the basis of this initial evaluation, the following finding is made:

☐	The proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☒	Although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	The proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	The proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	Although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Tom Dodson & Associates
Prepared by

April 22, 2022
Date

Travis Martin
Lead Agency (signature)

APRIL 26, 2022
Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.
   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

   a) the significance criteria or threshold, if any, used to evaluate each question; and
   b) the mitigation measure identified, if any, to reduce the impact to less than significance.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
I. AESTHETICS: Except as provided in Public Resources Code Section 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning or other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

SUBSTANTIATION

a. *Less Than Significant Impact* – Adverse impacts to scenic vistas can occur in one of two ways. First, an area itself may contain existing scenic vistas that would be altered by new development. A review of the project area determined that there are no scenic vistas located internally within the area proposed for the development of the SBMWD Administration Building site. The proposed project is located within an urbanized visual setting and is surrounded by development on all sides with the exception of the part of the project site that is currently vacant. Therefore, development of the SBMWD Administration Building is not expected to impact any important scenic vistas within the project area. A scenic vista impact can also occur when a scenic vista can be viewed from the project area or immediate vicinity and a proposed development may interfere with the view to a scenic vista. The proposed project site currently contains an existing concrete block operations building (Existing Building C) with associated parking, and is otherwise vacant and paved. This structure is of a similar height to the which would be developed by this project. The main views within the City are north and east to the San Bernardino Mountains, and Blue Mountain to the south. The San Bernardino Mountains can be viewed from nearest north/south and east/west roadway—in this case Chandler Place and E Street—as views are generally obscured by surrounding development. Where the mountains can be seen from within the project site, such views are obstructed by trees and structures that interrupt the potential for any unobstructed vista to be observed from the site. Based on the type of proposed development, the proposed development of an Administration Building at this site to serve SBMWD would have a less than significant potential to have a substantial adverse impact on a scenic vista.

b. *Less That Significant Impact* – The project site does not contain any scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway corridor. The project site contains an existing concrete block operations building (Existing Building C) with associated parking, and is otherwise vacant and paved. According to the City of San Bernardino General Plan, the majority of scenic highways are located in the mountain region to the north and east of the City. There are no state scenic highways located adjacent to or near the proposed project site, and therefore none will be impacted by the project. The project contains several trees that will be retained on site along the northern and eastern boundaries. Based on the site condition and immediate surroundings, the project site itself does not contain any significant scenic resources.

Therefore, no damage to a scenic resource will occur and any impacts under this issue are considered less than significant.

c. *Less Than Significant Impact* – The proposed SBMWD Water Facilities Relocation Project is located within an urbanized area. The proposed project site is located in a developed area, surrounded by existing development in all directions. The adjacent property to the west, and just to the east of the project contain similar uses, as they currently function as the SBMWD San Bernardino Water Reclamation Facility (east) and the existing SBMWD offices (west). As such, the visual character of the proposed development would be similar to surrounding uses. The project will include landscaping as required by the City for Industrial uses, which will ensure that the development does not degrade the visual character of the site or the area. Furthermore, the project would not develop structures greater than 26 feet in height, which is less than the maximum height limit imposed in the IL zone. It is therefore anticipated that public views of the site to surrounding vistas would be limited, and as previously stated, development of the site would be consistent with the character of the corridor within which the project will be developed. By developing this mostly vacant site in accordance with City design guidelines for Industrial uses and in accordance with site development plans, the visual character of this site and its surroundings will be enhanced. Thus, with the design elements incorporated in the project, implementation of the City's design standards will mitigate the potential conflicts with applicable zoning or other regulations governing scenic quality to a less than significant level.

d. *Less Than Significant With Mitigation Incorporated* – Implementation of the proposed project will create new locations of light sources during the construction and operational phases of the project. There are no residences or sensitive uses that would be impacted by any new sources of light or glare that would emanate from the proposed project as no residences or sensitive uses are located within this corridor. The proposed project will increase the overall intensity of the development within the project site as the whole of the project site will be utilized, however the type of development will remain the same, though the whole of the site will be utilized. The lighting associated with the proposed project would be comparable to and consistent with lighting from surrounding uses. Due to the types of uses surrounding the project, the new sources of light associated with the proposed project are anticipated to be consistent with that which would be anticipated in within this corridor. However, given that E Street experiences a high volume of traffic adjacent to the project site to the east, to ensure that light or glare does not result in intrusive lighting or glare to vehicles traveling along adjacent roadways in the project area, the following mitigation measure will be implemented:

AES-1 ***Prior to approval of the Final Design, an analysis of potential glare from sunlight or exterior lighting to impact vehicles traveling on adjacent roadways shall be submitted to the City for review and approval. This analysis shall demonstrate that due to building orientation or exterior treatment, no significant glare may be caused that could negatively impact drivers on the local roadways or impact adjacent land uses. If potential glare impacts are identified, the building orientation, use of non-glare reflective materials or other design solutions acceptable to the City of San Bernardino shall be implemented to eliminate glare impacts.***

With the implementation of mitigation measure (MM) **AES-1**, the proposed SBMWD Water Facilities Relocation Project would have a less than significant potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact or Does Not Apply**
II. AGRICULTURE AND FORESTRY RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

SUBSTANTIATION

a. *No Impact* – The SBMWD Water Facilities Relocation Project is in an area that is highly urbanized. Neither the project site nor the adjacent and surrounding properties are designated for agricultural use; no agricultural activities exist in the project area; and there is no potential for impact to any agricultural uses or values as a result of project implementation. According to the maps prepared pursuant to the California Department of Conservation's California Important Farmland Finder, the proposed project site is designated as urban and built-up land, with no prime farmland, unique farmland, or farmland of statewide importance exists within the vicinity of the proposed project (Figure II-1). Therefore, no adverse impact to any agricultural resources would occur from implementing the proposed project. No mitigation is required.

b. *No Impact* – There are no agricultural uses currently on the project site or on adjacent properties. The project site is zoned for Light Industrial and the General Plan land use designation is Industrial.

Given the above, no potential exists for a conflict between the proposed project and agricultural zoning or Williamson Act contracts within the project area. No mitigation is required.

c. *No Impact* – Please refer to issues II(a) and II(b) above. The project site is in an urbanized area and neither the land use designation (Industrial) nor zoning classification (Light Industrial) supports forest land or timberland uses or designations. No potential exists for a conflict between the proposed project and forest/timberland zoning. No mitigation is required.

d. *No Impact* – There are no forest lands within the project area, which is because the project is located in an area that is highly urbanized. No potential for loss of forest land would occur as a result of project implementation. No mitigation is required.

e. *No Impact* – Because the project site and surrounding area do not support either agricultural or forestry uses and, furthermore, because the project site and environs are not designated for such uses, implementation of the proposed project would not cause or result in the conversion of farmland or forest land to alternative use. No adverse impact would occur. No mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☒	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

SUBSTANTIATION: The following information utilized in this section was obtained from the technical study "Air Quality and GHG Impact Analysis San Bernardino Municipal Water Department Water Facilities Relocation Project, San Bernardino, California" prepared by Giroux & Associates dated March 3, 2021, and provided as Appendix 1 to this document.

Background

Climate

The climate of the eastern San Bernardino Valley, as with all of Southern California, is governed largely by the strength and location of the semi-permanent high pressure center over the Pacific Ocean and the moderating effects of the nearby vast oceanic heat reservoir. Local climatic conditions are characterized by very warm summers, mild winters, infrequent rainfall, moderate daytime on-shore breezes, and comfortable humidity levels. Unfortunately, the same climatic conditions that create such a desirable living environment combine to severely restrict the ability of the local atmosphere to disperse the large volumes of air pollution generated by the population and industry attracted in part by the climate.

The project will be situated in an area where the pollutants generated in coastal portions of the Los Angeles basin undergo photochemical reactions and then move inland across the project site during the daily sea breeze cycle. The resulting smog at times gives San Bernardino County some of the worst air quality in all of California. Fortunately, significant air quality improvement in the last decade suggests that healthful air quality may someday be attained despite the limited regional meteorological dispersion potential.

Air Quality Standards

Existing air quality is measured at established South Coast Air Quality Management District (SCAQMD) air quality monitoring stations. Monitored air quality is evaluated and in the context of ambient air quality standards. These standards are the levels of air quality that are considered safe, with an adequate margin of safety, to protect the public health and welfare. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) currently in effect are shown in Table III-1. Because the State of California had established Ambient Air Quality Standards (AAQS) several years before the federal action and because of unique air quality problems introduced by the restrictive dispersion meteorology, there is considerable difference between state and national clean air standards. Those standards currently in effect in California are shown in Table III-1. Sources and health effects of various pollutants are shown in Table III-2.

Table III-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards [1]		National Standards [2]		
		Concentration [3]	**Method [4]**	**Primary [3,5]**	**Secondary [3,6]**	**Method [7]**
Ozone (O3)[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		–		
Fine Particulate Matter (PM2.5)[9]	24 Hour	–	–	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15.0 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	–	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	–	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	
Nitrogen Dioxide (NO2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	–	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	–	Ultraviolet Flourescense; Spectrophotometry (Paraosaniline Method)
	3 Hour	–		–	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[11]	–	
Lead 8[12,13]	30-Day Average	1.5 µg/m^3	Atomic Absorption	–	–	–
	Calendar Quarter	–		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Avg	–		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	**No Federal Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: California Air Resources Board 5/4/16

Footnotes:

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter – PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year, with a 24-hour average concentration above 150 µg/m^3, is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national PM2.5 primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour PM2.5 standards (primarily and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM10 standards (primarily and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 j.tg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Table III-2
HEALTH EFFECTS OF MAJOR CRITERIA POLLUTANTS

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust. • Natural events, such as decomposition of organic matter.	• Reduced tolerance for exercise. • Impairment of mental function. • Impairment of fetal development. • Death at high levels of exposure. • Aggravation of some heart diseases (angina).
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust. • High temperature stationary combustion. • Atmospheric reactions.	• Aggravation of respiratory illness. • Reduced visibility. • Reduced plant growth. • Formation of acid rain.
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	• Aggravation of respiratory and cardiovascular diseases. • Irritation of eyes. • Impairment of cardiopulmonary function. • Plant leaf injury.
Lead (Pb)	• Contaminated soil.	• Impairment of blood function and nerve construction. • Behavioral and hearing problems in children.
Fine Particulate Matter (PM-10)	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.	• Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardio respiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.
Fine Particulate Matter (PM-2.5)	• Fuel combustion in motor vehicles, equipment, and industrial sources. • Residential and agricultural burning. • Industrial processes. • Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.	• Increases respiratory disease. • Lung damage. • Cancer and premature death. • Reduces visibility and results in surface soiling.
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels. • Smelting of sulfur-bearing metal ores. • Industrial processes.	• Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board, 2002.

Baseline Air Quality

Existing and probable future levels of air quality in the project area can be best inferred from ambient air quality measurements conducted by the SCAQMD at its Central San Bernardino monitoring station. This station measures both regional pollution levels such as dust (particulates) and smog, as well as levels of primary vehicular pollutants such as carbon monoxide. Table III-3 summarizes the last four years of the published data from the Central San Bernardino monitoring station.

Ozone and particulates are seen to be the two most significant air quality concerns. Ozone is the primary ingredient in photochemical smog. Slightly more than 15 percent of all days exceed the California one-hour standard. The 8-hour state ozone standard has been exceeded an average of 27 percent of all days in the past four years. The federal 8-hour standard is exceeded 21 percent of all days. For the last four years, ozone levels have neither improved nor gotten noticeably worse although 2019 shows the most promising numbers. While ozone levels are still high, they are much lower than 10 to 20 years ago. Attainment of all clean air standards in the project vicinity is not likely to occur soon, but the severity and frequency of violations is expected to continue to slowly decline during the current decade.

In addition to gaseous air pollution concerns, San Bernardino experiences frequent violations of standards for 10-micron diameter respirable particulate matter (PM-10). High dust levels occur during Santa Ana wind conditions, as well as from the trapped accumulation of soot, roadway dust and byproducts of atmospheric chemical reactions during warm season days with poor visibility. Table III-3 shows that almost 10 percent of all days in the last four years experienced a violation of the State PM-10 standard. However, the three-times less stringent federal standard has not been exceeded in the same period.

A substantial fraction of PM-10 is comprised of ultra-small diameter particulates capable of being inhaled into deep lung tissue (PM-2.5). Peak annual PM-2.5 levels are sometimes almost as high as PM-10, which includes PM-2.5 as a sub-set. However, there has only been one violation of the 24-hour standard of 35 $\mu g/m^3$ in all monitoring days for the last four years.

While many of the major ozone precursor emissions (automobiles, solvents, paints, etc.) have been substantially reduced, most major PM-10 sources (construction dust, vehicular turbulence along roadway shoulders, truck exhaust, etc.) have not been as effectively reduced. Prospects of ultimate attainment of ozone standards are better than for particulate matter.

More localized pollutants such as carbon monoxide, nitrogen oxides, etc. are very low near the project site because background levels, never approach allowable levels. There is substantial excess dispersive capacity to accommodate localized vehicular air pollutants such as NOx or CO without any threat of violating applicable AAQS.

Table III-3
AIR QUALITY MONITORING SUMMARY (2016-2019)
(ESTIMATED NUMBER OF DAYS STANDARDS WERE EXCEEDED)

Pollutant/Standard	**2016**	**2017**	**2018**	**2019**
Ozone				
1-Hour > 0.09 ppm (S)	41	81	63	41
8-Hour > 0.07 ppm (S)	106	112	102	67
8- Hour > 0.075 ppm (F)	76	88	71	73
Max. 1-Hour Conc. (ppm)	0.158	0.158	0.138	0.127
Max. 8-Hour Conc. (ppm)	0.118	0.136	0.116	0.114
Carbon Monoxide				
8- Hour > 9. ppm (S,F)	0	0	0	0
Max 8-hour Conc. (ppm)	1.7	2.3	2.5	1.1
Nitrogen Dioxide				
1-Hour > 0.18 ppm (S)	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.060	0.065	0.057	0.059
Respirable Particulates (PM-10)				
24-Hour > 50 $\mu g/m^3$ (S)	33/333	35/356	25/355	36/269
24-Hour > 150 $\mu g/m^3$ (F)	0/333	0/356	0/335	0/269
Max. 24-Hr. Conc. ($\mu g/m^3$)	91.	86.	129.	112.
Fine Particulates (PM-2.5)				
24-Hour > 35 $\mu g/m^3$ (F)	0/113	1/116	0/114	0/97
Max. 24-Hr. Conc. ($\mu g/m^3$)	32.5	38.2	30.1	34.8

S=State Standard; F=Federal Standard
Source: Central San Bernardino SCAQMD Air Monitoring Summary (5203)
data: www.arb.ca.gov/adam/

Air Quality Planning

The U.S. EPA is responsible for setting and enforcing the NAAQS for O3, CO, NOx, SO2, PM10, PM2.5, and lead. The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

The Federal Clean Air Act (CAA) was first enacted in 1955, and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes the federal air quality standards, the NAAQS, and specifies future dates for achieving compliance. The CAA also mandates that states submit and implement State Implementation Plans (SIPs) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met. Substantial reductions in emissions of ROG, NOx and CO are forecast to continue throughout the next several decades. Unless new particulate control programs are implemented, PM-10 and PM-2.5 are forecast to slightly increase.

The South Coast Air Quality Management District (SCAQMD) adopted an updated clean air “blueprint” in August 2003. The 2003 Air Quality Management Plan (AQMP) was approved by the EPA in 2004. The AQMP outlined the air pollution measures needed to meet federal health-based standards for ozone by 2010 and for particulates (PM-10) by 2006. The 2003 AQMP was based upon the federal one-hour ozone standard which was revoked late in 2005 and replaced by an 8-hour federal standard. Because of the revocation of the hourly standard, a new air quality planning cycle was initiated.

With re-designation of the air basin as non-attainment for the 8-hour ozone standard, a new attainment plan was developed. This plan shifted most of the one-hour ozone standard attainment strategies to the 8-hour standard. As previously noted, the attainment date was to "slip" from 2010 to 2021. The updated attainment plan also includes strategies for ultimately meeting the federal PM-2.5 standard.

Because projected attainment by 2021 required control technologies that did not exist yet, the SCAQMD requested a voluntary "bump-up" from a "severe non-attainment" area to an "extreme non-attainment" designation for ozone. The extreme designation was to allow a longer time period for these technologies to develop. If attainment cannot be demonstrated within the specified deadline without relying on "black-box" measures, EPA would have been required to impose sanctions on the region had the bump-up request not been approved. In April 2010, the EPA approved the change in the non-attainment designation from "severe-17" to "extreme." This reclassification set a later attainment deadline (2024), but also required the air basin to adopt even more stringent emissions controls.

Table III-4
SOUTH COAST AIR BASIN EMISSIONS FORECASTS (EMISSIONS IN TONS/DAY)

Pollutant	2015[a]	2020[b]	2025[b]	2030[b]
NOx	357	289	266	257
VOC	400	393	393	391
PM-10	161	165	170	172
PM-2.5	67	68	70	71

Source: California Air Resources Board, 2013 Almanac of Air Quality
[a] 2015 Base Year.
[b] With current emissions reduction programs and adopted growth forecasts.

AQMPs are required to be updated every three years. The 2012 AQMP was adopted in early 2013. An updated AQMP was required for completion in 2016. The 2016 AQMP was adopted by the SCAQMD Board in March, 2017, and has been submitted the California Air Resources Board for forwarding to the EPA. The 2016 AQMP acknowledges that motor vehicle emissions have been effectively controlled and that reductions in NOx, the continuing ozone problem pollutant, may need to come from major stationary sources (power plants, refineries, landfill flares, etc.). The current attainment deadlines for all federal non-attainment pollutants are now as follows:

8-hour ozone (70 ppb)	2032
Annual PM-2.5 (12 $\mu g/m^3$)	2025
8-hour ozone (75 ppb)	2024 (former standard)
1-hour ozone (120 ppb)	2023 (rescinded standard)
24-hour PM-2.5 (35 $\mu g/m^3$)	2019

The key challenge is that NOx emission levels, as a critical ozone precursor pollutant, are forecast to continue to exceed the levels that would allow the above deadlines to be met. Unless additional stringent NOx control measures are adopted and implemented, ozone attainment goals may not be met.

The proposed project does not directly relate to the AQMP in that there are no specific air quality programs or regulations governing office and warehousing projects for utility companies. Conformity with adopted plans, forecasts and programs relative to population, housing, employment and land use is the primary yardstick by which impact significance of planned growth is determined. The SCAQMD, however, while acknowledging that the AQMP is a growth-accommodating document, does not favor designating regional impacts as less-than-significant just because the proposed development is consistent with regional growth projections. Air quality impact significance for the proposed project has therefore been analyzed on a project-specific basis.

Significance Thresholds

Air quality impacts are considered “significant” if they cause clean air standards to be violated where they are currently met, or if they “substantially” contribute to an existing violation of standards. Any substantial emissions of air contaminants for which there is no safe exposure, or nuisance emissions such as dust or odors, would also be considered a significant impact.

Appendix G of the California CEQA Guidelines offers the following five tests of air quality impact significance. A project would have a potentially significant impact if it:

a. Conflicts with or obstructs implementation of the applicable air quality plan.
b. Results in a cumulatively considerable net increase of any criteria pollutants for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
c. Exposes sensitive receptors to substantial pollutant concentrations.
d. Creates objectionable odors affecting a substantial number of people.

Primary Pollutants
Air quality impacts generally occur on two scales of motion. Near an individual source of emissions or a collection of sources such as a crowded intersection or parking lot, levels of those pollutants that are emitted in their already unhealthful form will be highest. Carbon monoxide (CO) is an example of such a pollutant. Primary pollutant impacts can generally be evaluated directly in comparison to appropriate clean air standards. Violations of these standards where they are currently met, or a measurable worsening of an existing or future violation, would be considered a significant impact. Many particulates, especially fugitive dust emissions, are also primary pollutants. Because of the non-attainment status of the South Coast Air Basin (SCAB) for PM-10, an aggressive dust control program is required to control fugitive dust during project construction.

Secondary Pollutants
Many pollutants, however, require time to transform from a more benign form to a more unhealthful contaminant. Their impact occurs regionally far from the source. Their incremental regional impact is minute on an individual basis and cannot be quantified except through complex photochemical computer models. Analysis of significance of such emissions is based upon a specified amount of emissions (pounds, tons, etc.) even though there is no way to translate those emissions directly into a corresponding ambient air quality impact.

Because of the chemical complexity of primary versus secondary pollutants, the SCAQMD has designated significant emissions levels as surrogates for evaluating regional air quality impact significance independent of chemical transformation processes. Projects with daily emissions that exceed any of the following emission thresholds are recommended by the SCAQMD to be considered significant under CEQA guidelines.

Table III-5
DAILY EMISSIONS THRESHOLDS

Pollutant	Construction	Operations
ROG	75	55
NOx	100	55
CO	550	550
PM-10	150	150
PM-2.5	55	55
SOx	150	150
Lead	3	3

Source: SCAQMD CEQA Air Quality Handbook, November, 1993 Rev.

Additional Indicators
In its CEQA Handbook, the SCAQMD also states that additional indicators should be used as screening criteria to determine the need for further analysis with respect to air quality. The additional indicators are as follows:

- Project could interfere with the attainment of the federal or state ambient air quality standards by either violating or contributing to an existing or projected air quality violation
- Project could result in population increases within the regional statistical area which would be in excess of that projected in the AQMP and in other than planned locations for the project's build-out year.
- Project could generate vehicle trips that cause a CO hot spot.

Impact Analysis

a. *Less Than Significant Impact* – Projects such as the proposed SBMWD Water Facilities Relocation Project do not directly relate to the AQMP in that there are no specific air quality programs or regulations governing general development. Conformity with adopted plans, forecasts and programs relative to population, housing, employment and land use is the primary yardstick by which impact significance of planned growth is determined. The SCAQMD, however, while acknowledging that the AQMP is a growth-accommodating document, does not favor designating regional impacts as less than significant just because the proposed development is consistent with regional growth projections. Air quality impact significance for the proposed project has therefore been analyzed on a project-specific basis. The City requires compliance with the Municipal Code for a project such as this, and the Water Department is required to meet these standards. As such, the SBMWD Water Facilities Relocation Project will be consistent with the City's General Plan and Zoning Code. The proposed project is forecast to be consistent with regional planning forecasts maintained by the Southern California Association of Governments (SCAG) regional plans. Air quality impact significance for the proposed project has therefore been analyzed on a project-specific basis. As the analysis of project-related emissions provided below indicates, the proposed project will not cause or be exposed to significant air pollution, and is, therefore, consistent with the applicable air quality plan.

b. *Less Than Significant Impact With Mitigation Incorporated* – Air pollution emissions associated with the proposed project would occur over both a short and long-term time period. Short-term emissions include fugitive dust from construction activities (i.e., site prep, demolition, grading, and exhaust emission) at the proposed project site. Long-term emissions generated by future operation of the proposed project primarily include energy consumption and trips generated by the future development.

Construction Emissions

The project consists of the development of a 7.86-acre site and proposes two new structures; a new 27,812 square foot one-story structural steel administrative office building and a new 13,500 square foot one-story tilt-up concrete warehouse with loading docks. There will be 194 parking spaces. The existing building will be renovated.

The construction duration is estimated to last 14 months with a start date of Summer/early Fall 2021 and the completion date by the late Summer/early Fall 2022. It is anticipated that a maximum number of 50 employees will be required to support the construction of the project each day. Delivery of construction supplies may generate as much as 50 round trips per day.

Construction was modeled in CalEEMod2016.3.2 using specified construction equipment and schedule for this project as shown in Table III-6.

Table III-6
CONSTRUCTION ACTIVITY EQUIPMENT FLEET

Phase Name and Duration	Equipment
Demolition (20 days)	1 Concrete Saw
	1 Dozer
	3 Loader/Backhoes
Grading (6 days)	1 Grader
	1 Dozer
	2 Loader/Backhoes
Construction (220 days)	1 Crane
	1 Loader/Backhoe
	3 Welders
	1 Generator Set
	2 Forklifts
Paving (10 days)	1 Paver
	1 Mixer
	1 Paving Equipment
	1 Loader/Backhoe
	2 Rollers

Utilizing this indicated equipment fleet and durations shown in Table III-6 the following worst-case daily construction emissions are calculated by CalEEMod and are listed in Table III-7.

Table III-7
CONSTRUCTION ACTIVITY EMISSIONS MAXIMUM DAILY EMISSIONS (POUNDS/DAY)

Maximal Construction Emissions	ROG	NOx	CO	SO_2	PM-10	PM-2.5
2021[1]						
Unmitigated	2.7	21.2	19.6	0.0	8.6	4.5
Mitigated	2.7	21.2	19.6	0.0	5.0	2.7
2022[1]						
Unmitigated	40.7	19.5	19.0	0.0	2.2	1.1
Mitigated	40.7	19.5	19.0	0.0	2.2	1.1
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	No	No	No	No	No

[1] Project impacts were modeled against 2021 and 2022 construction emissions data initially. The Project will be constructed during 2022 through 2024 due to unforeseen delays in the CEQA process. This change would not result in any exceedances of SCAQMD thresholds, as the emissions generated by the project would generally be lesser due to more stringent emissions standards and due to greater efficiency in the equipment and technologies that would generate emissions during construction of the project.

Peak daily construction activity emissions are estimated be below SCAQMD CEQA thresholds without the need for added mitigation. The only model-based mitigation measure applied for this project was watering exposed dirt surfaces two times per day to minimize the generation of fugitive dust generation during grading.

Construction activities are not anticipated to cause dust emissions to exceed SCAQMD CEQA thresholds. Nevertheless, emissions minimization through enhanced dust control measures is recommended for use because of the non-attainment status of the air basin. Recommended measures include:

AIR-1 ***<u>Fugitive Dust Control</u>. The following measures shall be incorporated into Project plans and specifications for implementation:***

- ***Apply soil stabilizers or moisten inactive areas.***
- ***Water exposed surfaces as needed to avoid visible dust leaving the construction site (typically 2-3 times/day).***
- ***Cover all stock piles with tarps at the end of each day or as needed.***
- ***Provide water spray during loading and unloading of earthen materials.***
- ***Minimize in-out traffic from construction zone.***
- ***Cover all trucks hauling dirt, sand, or loose material and require all trucks to maintain at least two feet of freeboard.***
- ***Sweep streets daily if visible soil material is carried out from the construction site.***

Similarly, ozone precursor emissions (ROG and NOx) are calculated to be below SCAQMD CEQA thresholds. However, because of the regional non-attainment for photochemical smog, the use of reasonably available control measures for diesel exhaust is recommended. Combustion emissions control options include:

AIR-2 ***<u>Exhaust Emissions Control</u>. The following measures shall be incorporated into Project plans and specifications for implementation:***

- ***Utilize well-tuned off-road construction equipment.***
- ***Establish a preference for contractors using Tier 3 or better heavy equipment.***
- ***Enforce 5-minute idling limits for both on-road trucks and off-road equipment.***

With the above mitigation measures, any impacts related to construction emissions are considered less than significant. No further mitigation is required.

Operational Emissions
The project will generate 344 daily trips using trip generation numbers provided in the project traffic report. The vehicle fleet for warehousing was modified to model 49% medium duty trucks and 51% heavy duty trucks to reflect the actual vehicular mix. Operational emissions were calculated using CalEEMod2016.3.2 for an assumed completion year of 2022. The operational impacts are shown in Table III-8. As shown, operational emissions will not exceed applicable SCAQMD operational emissions CEQA thresholds of significance.

Table III-8
PROPOSED USES DAILY OPERATIONAL IMPACTS (2022)[1]

	Operational Emissions (lbs/day)					
Source	**ROG**	**NOx**	**CO**	**SO_2**	**PM-10**	**PM-2.5**
Area	1.0	0.0	0.0	0.0	0.0	0.0
Energy	0.0	0.0	0.0	0.0	0.0	0.0
Mobile	0.9	15.5	10.0	0.1	2.8	0.8
Total	**1.9**	**15.5**	**10.0**	**0.1**	**2.8**	**0.8**
SCAQMD Threshold	55	55	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

[1] Project impacts were modeled against 2022 emissions data initially. The Project will not be operational until 2024 due to unforeseen delays in the CEQA process. This change would not result in any exceedances of SCAQMD thresholds, as the emissions would generally be lesser due to more stringent emissions standards and due to greater efficiency in the equipment and technologies that would generate emissions at the project.
Source: CalEEMod Output in Appendix

As seen in Table III-8, operational emissions are predicted to be less than significant. As shown, operational emissions will not exceed applicable SCAQMD operational emissions CEQA thresholds of significance.

Based on previous discussions with SCAQMD regarding operational emissions for multi-use commercial projects, the following mitigation measures shall be implemented to minimize operational impacts to the greatest extent feasible:

AIR-3 ***The Department shall provide infrastructure to enable the future installation of solar panels to maximize the use of solar energy, when installation and reliance on solar energy is fiscally feasible.***

AIR-4 ***Require the use of electric landscaping equipment, such as lawn mowers and leaf blowers.***

AIR-5 ***Require use of electric or alternatively fueled sweepers with HEPA filters.***

AIR-6 ***Maximize the planting of trees in landscaping and parking lots consistent with water availability.***

AIR-7 ***Use light colored paving and roofing materials.***

AIR-8 ***Utilize only Energy Star heating, cooling, lighting devices, and appliances, where applicable.***

Conclusion
With the incorporation of mitigation measures **AIR-1** through **AIR-8**, the development of the SBMWD Water Facilities Relocation Project would have a less than significant potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

c. *Less Than Significant Impact* – The SCAQMD has developed analysis parameters to evaluate ambient air quality on a local level in addition to the more regional emissions-based thresholds of significance. These analysis elements are called Localized Significance Thresholds (LSTs). LSTs were developed in response to Governing Board's Environmental Justice Enhancement Initiative 1-4 and the LST methodology was provisionally adopted in October 2003 and formally approved by SCAQMD's Mobile Source Committee in February 2005.

Use of an LST analysis for a project is optional. For the proposed project, the primary source of possible LST impact would be during construction. LSTs are applicable for a sensitive receptor where it is possible that an individual could remain for 24 hours such as a residence, hospital or convalescent facility.

LSTs are only applicable to the following criteria pollutants: oxides of nitrogen (NOx), carbon monoxide (CO), and particulate matter (PM-10 and PM-2.5). LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area and distance to the nearest sensitive receptor.

LST screening tables are available for 25, 50, 100, 200- and 500-meter source-receptor distances. The nearest residence is to the northwest, across the 215 freeway, approximately 2,500 feet from the site along Scenic Drive. Therefore, a 500-meter source-receptor distance was modeled.

LST pollutant screening level concentration data is currently published for 1, 2- and 5-acre sites for varying distances. For this project, the most stringent thresholds for a 1-acre site were applied.

The following thresholds and emissions in Table III-9 are therefore determined (pounds per day):

Table III-9
LST AND PROJECT EMISSIONS (POUNDS/DAY)

LST Central San Bernardino Valley	CO	NOx	PM-10	PM-2.5
LST Threshold	21,708	651	196	98
Max On-Site Emissions				
Unmitigated	20	21	9	5
Mitigated	20	21	5	3

CalEEMod Output in Appendix

LSTs were compared to the maximum daily construction activities. As seen in Table III-9, with active dust suppression, mitigated emissions meet the LST for construction thresholds, as such, with the implementation of mitigation measure (MM) **AIR-1** above, LST impacts are less than significant.

d. *Less Than Significant Impact* – Heavy-duty equipment in the proposed project area during construction will emit odors; however, the construction activity would cease to occur after a short period of time. Land uses generally associated with odor complaints include:

- Agricultural uses (livestock and farming)
- Wastewater treatment plants
- Food processing plants
- Chemical plants
- Composting operations
- Refineries
- Landfills
- Dairies
- Fiberglass molding facilities

The proposed project does not propose any such uses or activities that would result in potentially significant operational-source odor impacts. Potential sources of operational odors generated by the project would include disposal of miscellaneous municipal refuse. Consistent with City requirements, all project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with solid waste regulations, thereby precluding substantial generation of odors due to temporary holding of refuse on-site. Moreover, SCAQMD Rule 402 acts to prevent occurrences of odor nuisances. No other sources of objectionable odors have been identified for the proposed project.

Gasoline Dispensing Emissions and Health Risk
The gasoline dispenser is subject to and required to comply with SCAQMD Rules 461 (Gasoline Transfer and Dispensing) as well as a Permit to Construct and Permit to Operate, Rules 201 and 203, respectively[1]. These required permits identify a maximum annual throughput allowed based on specific fuel storage and dispensing equipment that is proposed by the operator. Compliance with the above SCAQMD Rules, as well as the distance from any nearby sensitive receptors (approximately 2,500 feet from the site along Scenic Drive), would result in health risk associated with the proposed private gasoline dispensary at the new SBMWD offices would being less than significant.

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[1] http://www.aqmd.gov/home/rules-compliance/compliance/gasoline-dispensing2

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact or Does Not Apply**
IV. BIOLOGICAL RESOURCES: Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) 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?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

SUBSTANTIATION: The following information utilized in this Section of the Initial Study was obtained from the U.S. Fish and Wildlife Service IPaC Trust Resources Report, generated on November 24, 2020, as well as from the California Department of Fish and Wildlife California Natural Diversity Database (CNDDB), generated on November 24, 2020, pertaining to the SBMWD Water Facilities Relocation Project site project area only, which is provided as Appendix 2 to this document.

a. *No Impact* – The SBMWD Water Facilities Relocation Project area is 100% developed, as it currently contains the existing SBMWD office and a paved vacant area, other facilities, and the site itself contains no natural habitat and no potential to support any species identified as a candidate, sensitive or special status species within the IPaC or CNDDB reports. Furthermore, the proposed project is not located within an area delineated as containing possible biological resources by the City of San Bernardino General Plan Environmental Impact Report (EIR), refer to Figure IV-1. Due to past disturbance within the site, no further biological studies are necessary. With no habitat or species of concern located within the project area, the development of the SBMWD Administration Building and associated development has no potential for impact to any native biological resources. No impacts are anticipated. No mitigation is required.

b. *No Impact* – Please refer to the response under issue IV(a), above. Neither the project site or surrounding area contain any riparian habitat or other sensitive natural community resources. Therefore, no adverse impact to riparian habitat or any native biological resources would occur from implementing the proposed project. No mitigation is required.

c. *No Impact* – Please refer to the response under issue IV(a), above. According to the IPaC Trust Resources Report (Appendix 2), the project site does not contain any wetlands as defined by Section 404 of the Clean Water Act, or any other sensitive natural community resource. Therefore, with no habitat or species of concern located within the project area, the proposed project would have no potential to have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. No mitigation is required.

d. *Less Than Significant Impact With Mitigation Incorporated* – According to the IPaC Resources Report and the CNDDB (Appendix 2) several species of migratory birds could potentially be affected by construction activities in the area. With no native habitat, and no wildlife corridors that traverse within or adjacent to the project site, implementation of the proposed project is not anticipated to interfere with the movement of native animals of any kind, or to impede the use of any native wildlife nursery sites. However, there are trees within the site that could support nesting birds. Therefore, the following mitigation measure is provided as a contingency in the event that any nesting birds are found at the site location:

BIO-1 ***Nesting bird surveys shall be conducted by a qualified avian biologist no more than three (3) days prior to vegetation clearing or ground disturbance activities. Preconstruction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the preconstruction nesting bird surveys, a Nesting Bird Plan (NBP) shall be prepared and implemented by the qualified avian biologist. At a minimum, the NBP shall include guidelines for addressing active nests, establishing buffers, ongoing monitoring, establishment of avoidance and minimization measures, and reporting. The size and location of all buffer zones, if required, shall be based on the nesting species, individual/pair's behavior, nesting stage, nest location, its sensitivity to disturbance, and intensity and duration of the disturbance activity. To avoid impacts to nesting birds, any grubbing or vegetation removal should occur outside peak breeding season (typically February 1 through September 1).***

With implementation of the above mitigation measure, any impacts under this issue are considered less than significant.

e. *No Impact* – The project site is currently 100% developed, as it currently contains the existing SBMWD office and a paved vacant area, other facilities, and the site itself contains no natural habitat. The project site contains several trees that will be retained on site with no need for removal of on-site trees anticipated to be required as part of project development. Past use and human disturbance of the site have eliminated any other biological resources that might be protected As such, no other local policies or ordinances protecting biological resources would apply to the proposed project, as no native biological resources exist on site. Therefore, no impacts are anticipated under this issue and no mitigation is required.

f. *No Impact* – Implementation of the project will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. There are no applicable Habitat Conservation Plans or Natural Community Conservation Plans in effect within the City of San Bernardino. As discussed above, this site has been reviewed for biological resources, and no habitat or species of concern exist that could be adversely affected by project implementation. No further analysis is needed. No impacts are anticipated and no mitigation is required.

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact or Does Not Apply**
V. CULTURAL RESOURCES: Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

SUBSTANTIATION: A cultural resources report has been prepared to evaluate the potential for cultural resources to occur within the project area of potential effect entitled “Historical/Archaeological Resources Survey Report: San Bernardino Municipal Water Department Water Facilities Relocation Project, California” prepared by CRM TECH dated March 15, 2021 (Appendix 3). The following information is abstracted from this report. It provides an overview and findings regarding the cultural resources found within the project area.

Background

The purpose of the Cultural Resources study is to provide the City and Water Department with the necessary information and analysis to determine whether the proposed project would cause substantial adverse changes to any “historical resources” or “tribal cultural resources,” as defined by CEQA, that may exist in or around the project area.

In order to identify such resources, CRM TECH initiated a historical/archaeological resources records search and a Sacred Lands File search, pursued historical background research, and carried out a systematic field survey of the project area, including inspection of the existing SBMWD administration building and other features currently extant on the property. The results of these research procedures indicate that the SBMWD administration building was originally constructed in 1968 as a U.S. Post Office fleet maintenance facility. Since it meets the 50-year age threshold for consideration as a potential “historical resource,” the building was recorded into the California Historical Resources Inventory during this study and designated temporarily as Site 3692-1H, pending assignment of an official site number.

Because it has not been designated a heritage property on national, state, or local levels and does not appear eligible for listing in the California Register of Historical Resources, 3692-1H does not meet the definition of a “historical resource” under CEQA guidelines. No other potential “historical resources” were encountered within or adjacent to the project area. Therefore, CRM TECH recommends to the City of San Bernardino a finding of No Impact regarding “historical resources.” No further cultural resources investigation is recommended for the project unless development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are discovered during earth-moving operations associated with the project, all work in the immediate area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

Impact Analysis

a&b. *Less Than Significant With Mitigation Incorporated* – CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired."

Per the above discussion and definition, no archaeological sites or isolates were recorded within the project boundaries; thus, none of them requires further consideration during this study. In light of this information and pursuant to PRC §21084.1, the following conclusions have been reached for the project:

- No historical resources within or adjacent to the project area have any potential to be disturbed as they are not within the proposed area in which the facilities will be constructed and developed, and thus, the project as it is currently proposed will not cause a substantial adverse change to any known historical resources.
- No further cultural resources investigation is necessary for the proposed project unless construction plans undergo such changes as to include areas not covered by this study.

However, if buried cultural materials are discovered during any earth-moving operations associated with the project, the following mitigation measure shall be implemented:

CUL-1 ***Should any cultural resources be encountered during construction of these facilities, earthmoving or grading activities in the immediate area of the finds shall be halted and an onsite inspection shall be performed immediately by a qualified archaeologist. Responsibility for making this determination shall be with the City's onsite inspector. The archaeological professional shall assess the find, determine its significance, and make recommendations for appropriate mitigation measures within the guidelines of the California Environmental Quality Act.***

Additionally, as part of the AB 52 consultation process, the City received a response from the San Manuel Band of Mission Indians requesting the following mitigation measures in addition to MMs **TCR-1** and **TCR-2** identified under Section XVIII, Tribal Cultural Resources below:

CUL-2 ***In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed within TCR-1, regarding any pre-contact and/or historic-era finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.***

CUL-3 ***If significant pre-contact and/or historic-era cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to SMBMI for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.***

With the above mitigation measure, the potential for impacts to cultural resources will be reduced to a less than significant level. No additional mitigation is required.

c. *Less Than Significant With Mitigation Incorporated* – As noted in the discussion above, no available information suggests that human remains may occur within the Area of Potential Effect (APE) and the potential for such an occurrence is considered very low. Human remains discovered during the project will need to be treated in accordance with the provisions of HSC §7050.5 and PRC §5097.98, which is mandatory. State law (Section 7050.5 of the Health and Safety Code) as well as local laws requires that the Police Department, County Sheriff and Coroner's Office receive notification if human remains are encountered. Compliance with these laws is considered adequate mitigation for potential impacts, the following mitigation measure shall be implemented in relation to discovery and treatment of human remains:

CUL-4 ***If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.***

With the incorporation of the above mitigation measure, potential for impact to discovery and treatment of human remains will be reduced to a less than significant level. No additional mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
VI. ENERGY: Would the project:				
a) Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operations?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

SUBSTANTIATION: The following information utilized in this section was obtained from the technical study "San Bernardino Municipal Water Department Water Facilities Relocation Project, Energy Analysis, City of San Bernardino, California" prepared by Urban Crossroads dated July 1, 2021, and provided as Appendix 4 to this document. The following has been extracted from the analysis provided in Urban Crossroad's report.

Existing Conditions

The most recent data for California's estimated total energy consumption is from 2018, released by the U.S. Energy Information Administration's (EIA) California State Profile and Energy Estimates included:

- Approximately 7,900 trillion British Thermal Unit (BTU) of energy was consumed;
- Approximately 3,444 trillion BTU of petroleum;
- Approximately 2,210 trillion BTU of natural gas;
- Approximately 33.3 trillion BTU coal

The California Energy Commission's (CEC) Transportation Energy Demand Forecast 2018-2030 was released in order to support the 2017 Integrated Energy Policy Report. The Transportation Energy Demand Forecast 2018-2030 lays out graphs and data supporting their projections of California's future transportation energy demand. The projected inputs consider expected variable changes in fuel prices, income, population, and other variables. Predictions regarding fuel demand included:

- Gasoline demand in the transportation sector is expected to decline from approximately 15.8 billion gallons in 2017 to between 12.3 billion and 12.7 billion gallons in 2030
- Diesel demand in the transportation sector is expected to rise, increasing from approximately 3.7 billion diesel gallons in 2015 to approximately 4.7 billion in 2030
    - Data from the Department of Energy states that approximately 3.9 billion gallons of diesel fuel were consumed in 2017

The most recent data provided by the EIA for energy use in California by demand sector is from 2018 and is reported as follows:

- Approximately 39.1% transportation;
- Approximately 23.5% industrial;
- Approximately 18.3% residential; and
- Approximately 19.2% commercial

In 2020, total system electric generation for California was 277,704 gigawatt hours (GWh). California's massive electricity in-state generation system generated approximately 200,475 GWh which accounted for approximately 72.2% of the electricity it uses; the rest was imported from the Pacific Northwest (8.6%) and the U.S. Southwest (19.2%). Natural gas is the main source for electricity generation at 34.23% of the total in-state electric generation system power as shown in Table VI-1. Renewables account for 31.7% of the total electrical system power.

Table VI-1
TOTAL ELECTRICITY SYSTEM POWER (CALIFORNIA 2020)

Fuel Type	**California In-State Generation (GWh)**	**Percent of California In-State Generation**	**Northwest Imports (GWh)**	**Southwest Imports (GWh)**	**Total California Energy Mix (GWh)**	**Total California Power Mix**
Coal	248	0.12%	219	7,765	8,233	2.96%
Natural Gas	86,136	42.97%	62	8,859	95,057	34.23%
Oil	36	0.02%	0	0	36	0.01%
Other	411	0.20%	0	11	422	0.15%
Nuclear	16,163	8.06%	39	8,743	24,945	8.98%
Large Hydro	33,145	16.53%	6,387	1,071	40,603	14.62%
Unspecified	0	0.00%	6,609	13,767	20,376	7.34%
Non-Renewables and Unspecified Totals	136,139	67.91%	13,315	40,218	189,672	68.30%
Biomass	5,851	2.92%	903	33	6,787	2.44%
Geothermal	10,943	5.46%	99	2,218	13,260	4.77%
Small Hydro	5,349	2.67%	292	4	5,646	2.03%
Solar	28,513	14.22%	282	5,295	34,090	12.28%
Wind	13,680	6.82%	9,038	5,531	28,249	10.17%
Renewables Totals	64,336	32.09%	10,615	13,081	88,032	31.70%
Total	200,475	100.00%	23,930	53,299	277,704	100.00%

Source: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

An updated summary of, and context for energy consumption and energy demands within the State is presented in “U.S. Energy Information Administration, California State Profile and Energy Estimates, Quick Facts” excerpted below:

- California was the seventh-largest producer of crude oil among the 50 states in 2018, and, as of January 2019, it ranked third in oil refining capacity.
- California is the largest consumer of jet fuel among the 50 states and accounted for one-fifth of the nation’s jet fuel consumption in 2018.
- California's total energy consumption is second highest in the nation, but, in 2018, the state's per capita energy consumption was the fourth-lowest, due in part to its mild climate and its energy efficiency programs.
- In 2018, California ranked first in the nation as a producer of electricity from solar, geothermal, and biomass resources and fourth in the nation in conventional hydroelectric power generation.
- In 2018, large- and small-scale solar photovoltaic (PV) and solar thermal installations provided 19% of California’s net electricity generation.

As indicated above, California is one of the nation’s leading energy-producing states, and California’s per capita energy use is among the nation’s most efficient. Given the nature of the project, the remainder of this discussion will focus on the three sources of energy that are most relevant to the project—namely, electricity, natural gas, and transportation fuel for vehicle trips associated with the uses planned for the project.

Electricity

The usage associated with electricity use were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2. The Southern California region’s electricity reliability has been of concern for the past several years due to the planned retirement of aging facilities that depend upon once-through cooling technologies, as well as the June 2013 retirement of the San Onofre Nuclear Generating Station (SONGS). While the once-through cooling phase-out has been ongoing since the May 2010 adoption of the State Water Resources Control Board's once-through cooling policy, the retirement of San Onofre complicated the situation. California ISO studies revealed the extent to which the South California Air Basin (SCAB) and the San Diego Air Basin (SDAB) region were vulnerable to low-voltage and post-transient voltage instability concerns. A preliminary plan to address these issues was detailed in the 2013 Integrative Energy Policy Report (IEPR) after a collaborative process with other energy agencies, utilities, and air districts. Similarly, the subsequent 2018 and 2019 IEPR's identify broad strategies that are aimed at maintaining electricity system reliability.

Electricity is provided to the project by Southern California Edison (SCE). SCE provides electricity to more than 15 million persons in 15 counties and in 180 incorporated cities, within a service area encompassing approximately 50,000 square miles. Based on SCE's 2018 Power Content Label Mix, SCE derives electricity from varied energy resources including: fossil fuels, hydroelectric generators, nuclear power plants, geothermal power plants, solar power generation, and wind farms. SCE also purchases from independent power producers and utilities, including out-of-state suppliers.

California's electricity industry is an organization of traditional utilities, private generating companies, and state agencies, each with a variety of roles and responsibilities to ensure that electrical power is provided to consumers. The California Independent Service Operator (ISO) is a nonprofit public benefit corporation and is the impartial operator of the State's wholesale power grid and is charged with maintaining grid reliability, and to direct uninterrupted electrical energy supplies to California's homes and communities. While utilities [such as SCE] still own transmission assets, the ISO routes electrical power along these assets, maximizing the use of the transmission system and its power generation resources. The ISO matches buyers and sellers of electricity to ensure that enough power is available to meet demand. To these ends, every five minutes the ISO forecasts electrical demands, accounts for operating reserves, and assigns the lowest cost power plant unit to meet demands while ensuring adequate system transmission capacities and capabilities.

Part of the ISO's charge is to plan and coordinate grid enhancements to ensure that electrical power is provided to California consumers. To this end, transmission owners (investor-owned utilities such as SCE) file annual transmission expansion/modification plans to accommodate the State's growing electrical needs. The ISO reviews and either approves or denies the proposed additions. In addition, and perhaps most importantly, the ISO works with other areas in the western United States electrical grid to ensure that adequate power supplies are available to the State. In this manner, continuing reliable and affordable electrical power is assured to existing and new consumers throughout the State.

Table VI-2 identifies SCE's specific proportional shares of electricity sources in 2019. As indicated in Table VI-2, the 2019 SCE Power Mix has renewable energy at 35.1% of the overall energy resources. Geothermal resources are at 5.9%, wind power is at 11.5%, large hydroelectric sources are at 7.9%, solar energy is at 16%, and coal is at 0%.

Table VI-2
SCE 2019 POWER CONTENT MIX

Energy Resources	2019 SCE Power Mix
Eligible Renewable	**35.1%**
Biomass & waste	0.6%
Geothermal	5.9%
Small Hydroelectric	1.0%
Solar	16.0%
Wind	11.5%

Energy Resources	**2019 SCE Power Mix**
Coal	**0%**
Large Hydroelectric	**7.9%**
Natural Gas	**16.1%**
Nuclear	**8.2%**
Other	**0.1%**
Unspecified Sources of power*	32.6%
Total	**100%**
* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.	

Natural Gas

The usage associated with natural gas were calculated using the CalEEMod Version 2016.3.2. The following summary of natural gas customers & volumes, supplies, delivery of supplies, storage, service options, and operations is excerpted from information provided by the California Public Utilities Commission (CPUC).

> *"The CPUC regulates natural gas utility service for approximately 10.8 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller natural gas utilities. The CPUC also regulates independent storage operators: Lodi Gas Storage, Wild Goose Storage, Central Valley Storage and Gill Ranch Storage.*
>
> *California's natural gas utilities provide service to over 11 million gas meters. SoCalGas and PG&E provide service to about 5.9 million and 4.3 million customers, respectively, while SDG&E provides service to over 800, 000 customers. In 2018, California gas utilities forecasted that they would deliver about 4740 million cubic feet per day (MMcfd) of gas to their customers, on average, under normal weather conditions.*
>
> *The overwhelming majority of natural gas utility customers in California are residential and small commercials customers, referred to as "core" customers. Larger volume gas customers, like electric generators and industrial customers, are called "noncore" customers. Although very small in number relative to core customers, noncore customers consume about 65% of the natural gas delivered by the state's natural gas utilities, while core customers consume about 35%.*
>
> *A significant amount of gas (about 19%, or 1131 MMcfd, of the total forecasted California consumption in 2018) is also directly delivered to some California large volume consumers, without being transported over the regulated utility pipeline system. Those customers, referred to as "bypass" customers, take service directly from interstate pipelines or directly from California producers.*
>
> *SDG&E and Southwest Gas' southern division are wholesale customers of SoCalGas, i.e., they receive deliveries of gas from SoCalGas and in turn deliver that gas to their own customers. (Southwest Gas also provides natural gas distribution service in the Lake Tahoe area.) Similarly, West Coast Gas, a small gas utility, is a wholesale customer of PG&E. Some other wholesale customers are municipalities like the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC.*
>
> *Natural gas from out-of-state production basins is delivered into California via the interstate natural gas pipeline system. The major interstate pipelines that deliver out-of-state natural gas to California gas utilities are Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Mojave Pipeline, and Tuscarora. Another pipeline, the North Baja - Baja Norte Pipeline takes gas off the El Paso Pipeline at the California/Arizona border, and delivers that gas through California into Mexico. While the Federal Energy Regulatory Commission (FERC) regulates*

the transportation of natural gas on the interstate pipelines, and authorizes rates for that service, the California Public Utilities Commission may participate in FERC regulatory proceedings to represent the interests of California natural gas consumers.

The gas transported to California gas utilities via the interstate pipelines, as well as some of the California-produced gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipelines systems (commonly referred to as California's "backbone" pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered to the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large volume noncore customers take natural gas delivery directly off the high-pressure backbone and local transmission pipeline systems, while core customers and other noncore customers take delivery off the utilities' distribution pipeline systems. The state's natural gas utilities operate over 100,000 miles of transmission and distribution pipelines, and thousands more miles of service lines.

Bypass customers take most of their deliveries directly off the Kern/Mojave pipeline system, but they also take a significant amount of gas from California production.

PG&E and SoCalGas own and operate several natural gas storage fields that are located within their service territories in northern and southern California, respectively. These storage fields, and four independently owned storage utilities - Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage - help meet peak seasonal and daily natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently. PG&E is a 25% owner of the Gill Ranch Storage field. These storage fields provide a significant amount of infrastructure capacity to help meet California's natural gas requirements, and without these storage fields, California would need much more pipeline capacity in order to meet peak gas requirements.

Prior to the late 1980s, California regulated utilities provided virtually all natural gas services to all their customers. Since then, the Commission has gradually restructured the California gas industry in order to give customers more options while assuring regulatory protections for those customers that wish to, or are required to, continue receiving utility-provided services.

The option to purchase natural gas from independent suppliers is one of the results of this restructuring process. Although the regulated utilities procure natural gas supplies for most core customers, core customers have the option to purchase natural gas from independent natural gas marketers, called "core transport agents" (CTA). Contact information for core transport agents can be found on the utilities' web sites. Noncore customers, on the other hand, make natural gas supply arrangements directly with producers or with marketers.

Another option resulting from the restructuring process occurred in 1993, when the Commission removed the utilities' storage service responsibility for noncore customers, along with the cost of this service from noncore customers' transportation rates. The Commission also encouraged the development of independent storage fields, and in subsequent years, all the independent storage fields in California were established. Noncore customers and marketers may now take storage service from the utility or from an independent storage provider (if available), and pay for that service, or may opt to take no storage service at all. For core customers, the Commission assures that the utility has adequate storage capacity set aside to meet core requirements, and core customers pay for that service.

In a 1997 decision, the Commission adopted PG&E's "Gas Accord", which unbundled PG&E's backbone transmission costs from noncore transportation rates. This decision gave customers and marketers the opportunity to obtain pipeline capacity rights on PG&E's backbone transmission pipeline system, if desired, and pay for that service at rates authorized by the Commission. The Gas Accord also required PG&E to set aside a certain amount of backbone transmission capacity in order to deliver gas to its core customers. Subsequent Commission decisions modified and extended the initial terms of the Gas Accord. The "Gas Accord" framework is still in place today for PG&E's backbone and storage rates and services and is now simply referred to as PG&E Gas Transmission and Storage (GT&S).

> *In a 2006 decision, the Commission adopted a similar gas transmission framework for Southern California, called the "firm access rights" system. SoCalGas and SDG&E implemented the firm access rights system in 2008, and it is now referred to as the backbone transmission system framework. As under the PG&E backbone transmission system, SoCalGas backbone transmission costs are unbundled from noncore transportation rates. Noncore customers and marketers may obtain, and pay for, firm backbone transmission capacity at various receipt points on the SoCalGas system. A certain amount of backbone transmission capacity is obtained for core customers to assure meeting their requirements.*
>
> *Many if not most noncore customers now use a marketer to provide for several of the services formerly provided by the utility. That is, a noncore customer may simply arrange for a marketer to procure its supplies, and obtain any needed storage and backbone transmission capacity, in order to assure that it will receive its needed deliveries of natural gas supplies. Core customers still mainly rely on the utilities for procurement service, but they have the option to take procurement service from a CTA. Backbone transmission and storage capacity is either set aside or obtained for core customers in amounts to assure very high levels of service.*
>
> *In order properly operate their natural gas transmission pipeline and storage systems, PG&E and SoCalGas must balance the amount of gas received into the pipeline system and delivered to customers or to storage fields. Some of these utilities' storage capacity is dedicated to this service, and under most circumstances, customers do not need to precisely match their deliveries with their consumption. However, when too much or too little gas is expected to be delivered into the utilities' systems, relative to the amount being consumed, the utilities require customers to more precisely match up their deliveries with their consumption. And, if customers do not meet certain delivery requirements, they could face financial penalties. The utilities do not profit from these financial penalties - the amounts are then returned to customers as a whole. If the utilities find that they are unable to deliver all the gas that is expected to be consumed, they may even call for a curtailment of some gas deliveries. These curtailments are typically required for just the largest, noncore customers. It has been many years since there has been a significant curtailment of core customers in California."*

As indicated in the preceding discussions, natural gas is available from a variety of in-state and out-of-state sources and is provided throughout the state in response to market supply and demand. Complementing available natural gas resources, biogas may soon be available via existing delivery systems, thereby increasing the availability and reliability of resources in total. The CPUC oversees utility purchases and transmission of natural gas to ensure reliable and affordable natural gas deliveries to existing and new consumers throughout the State.

Transportation Energy Resources
The project would generate additional vehicle trips with resulting consumption of energy resources, predominantly gasoline and diesel fuel. In March 2019, the Department of Motor Vehicles (DMV) identified 36.4 million registered vehicles in California, and those vehicles consume an estimated 17.8 billion gallons of fuel each year[2]. Gasoline (and other vehicle fuels) are commercially provided commodities and would be available to the project patrons and employees via commercial outlets.

California's on-road transportation system includes 394,383 land miles, more than 27.5 million passenger vehicles and light trucks, and almost 8.1 million medium- and heavy-duty vehicles. While gasoline consumption has been declining since 2008 it is still by far the dominant fuel. Petroleum comprises about 91% of all transportation energy use, excluding fuel consumed for aviation and most marine vessels. Nearly 17.8 billion gallons of on-highway fuel are burned each year, including 14.6 billion gallons of gasoline (including ethanol) and 3.2 billion gallons of diesel fuel (including biodiesel and renewable diesel). In 2019, Californians also used 194 million cubic feet of natural gas as a transportation fuel, or the equivalent of 183 billion gallons of gasoline.

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[2] Fuel consumptions estimated utilizing information from EMFAC2017.

Methodology

Appendix F of the *State CEQA Guidelines,* provides some guidance for assessing these criteria, which implies that the means of achieving the goal of energy conservation includes decreasing overall per capita energy consumption; decreasing reliance on fossil fuels such as coal, natural gas, and oil; and increasing reliance on renewable energy sources. Additionally, the CEQA Guidelines state "[a] lead agency may consider the extent to which an energy source serving the project has already undergone environmental review that adequately analyzed and mitigated the effects of energy production." Therefore, this evaluation considers the effects of statewide plans such as the State's renewable portfolio standards, building code energy efficiency standards, and fuel efficiency standards.

Information from the CalEEMod Version 2016.3.2 outputs for AQIA was utilized in this analysis, detailing project related construction equipment, transportation energy demands, and facility energy demands.

CalEEMod

On October 17, 2017, the SCAQMD, in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the CalEEMod Version 2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutants and GHG emissions from direct and indirect sources as well as energy usage. Accordingly, the latest version of CalEEMod has been used to determine the proposed project's anticipated transportation and facility energy demands.

Land Uses Modeled in CalEEMod

For purposes of analysis, the following land uses were modeled based on consultation with the Applicant and information provided in the site plan. The following land uses represents a conservative estimate of emissions that would occur from potential future SBMWD staff and visitors:

- 27,810 square feet of General Office land use
- 13,500 square feet of Non-Refrigerated Warehouse land use
- 194 space parking space (77,600 square feet)

Emission Factors Model

On August 19, 2019, the EPA approved the 2017 version of the EMissions FACtor model (EMFAC) web database for use in State Implementation Plan and transportation conformity analyses. EMFAC2017 is a mathematical model that was developed to calculate emission rates, fuel consumption, VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the CARB to project changes in future emissions from on-road mobile sources. This energy study utilizes the different fuel types for each vehicle class from the annual EMFAC2017 emission inventory in order to derive the average vehicle fuel economy which is then used to determine the estimated annual fuel consumption associated with vehicle usage during project construction and operational activities. For purposes of analysis, the 2021 through 2022 analysis years were utilized to determine the average vehicle fuel economy used throughout the duration of the project. Note that the project will be constructed during 2022 through 2024 due to unforeseen delays in the CEQA process. This change would not result in worse fuel economy, as the fuel economy of vehicles utilized on behalf of the project would generally be lesser due to more stringent emissions standards and technological advances in fuel efficiency.

Construction and Operational Energy Analysis

Construction Duration

The construction schedule utilized in the analysis, shown in Table VI-3, represents a "worst-case" analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as time passes and the analysis year increases due to emission regulations becoming more stringent[3]. The duration of construction activity and associated equipment represents a reasonable approximation of the expected construction fleet as required per *CEQA Guidelines*.

Table VI-3
CONSTRUCTION DURATION

Phase Name	Start Date	End Date	Days
Demolition	9/1/2022	9/28/2022	20
Grading	10/4/2022	10/11/2022	6
Building Construction	10/12/2022	8/15/2022	220
Paving	8/16/2023	8/29/2023	10
Architectural Coating	8/30/2023	9/12/2023	10

Construction Equipment

A detailed summary of construction equipment assumptions by phase is provided at Table VI-4. Please refer to specific detailed modeling inputs/outputs contained in Appendix 4.1 of the energy study.

TableVI-4
CONSTRUCTION EQUIPMENT ASSUMPTIONS

Activity/Duration	Equipment	Quantity	Usage Hours
Demolition	Concrete Industrial Saws	1	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	3	8
Grading	Graders	1	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	2	7
Building Construction	Cranes	1	8
	Forklifts	2	7
	Generator Sets	1	8
	Tractors/Loaders/Backhoes	1	6
	Welders	3	8
Paving	Cement and Mortar Mixers	1	8
	Pavers	1	8
	Paving Equipment	1	8
	Rollers	2	8
	Tractors/Loaders/Backhoes	1	8
Architectural Coating	Air Compressors	1	6
Source: CalEEMod 2016.3.2 Appendix 4.1.			

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[3] As shown in the CalEEMod User's Guide Version 2016.3.2, Section 4.3 "OFFROAD Equipment" as the analysis year increases, emission factors for the same equipment pieces decrease due to the natural turnover of older equipment being replaced by newer less polluting equipment and new regulatory requirements.

Construction Energy Demands

Construction Equipment Electricity Usage Estimates
The focus within this section is the energy implications of the construction process, specifically the power cost from on-site electricity consumption during construction of the proposed project. Based on the *2020 National Construction Estimator*, Richard Pray (2020), the typical power cost per 1,000 square feet of construction per month is estimated to be $2.38. The proposed project includes the development of 27,180 sf of General Office use and 13,500 sf of non-refrigerated warehouse use as well as a 194- space parking lot (approximately 77,600 sf). Based on information provided in the AQIA, facility construction activities would occur over a 12-month period. Based on Table VI-5, the total power cost of the on-site electricity usage during the construction of the project is estimated to be approximately $$3,396.07.

Table VI-5
CONSTRUCTION POWER COST

Land Use	Power Cost (per 1,000 SF of building per month of construction)	Total Building Size (1,000 SF)	Construction Duration (months)	Total Project Construction Power Cost
General Office	$2.38	27.810	12	$794.25
Parking Lot	$2.38	77.600	12	$2,216.26
Unrefrigerated Warehouse No Rail	$2.38	13.500	12	$385.56
TOTAL PROJECT CONSTRUCTION COST				***$3,396.07***

The SCE's general service rate schedule were used to determine the project's electrical usage. As of January 1, 2021, SCE's general service rate is $0.11 per kilowatt hours (kWh) of electricity for industrial services. As shown on Table VI-6, the total electricity usage from on-site project construction related activities is estimated to be approximately 61,095kWh.

Table VI-6
CONSTRUCTION ELECTRICITY USAGE

Land Use	Cost per kWh	Total Project Construction Electricity Usage (kWh)
General Office	$0.11	7,220
Parking Lot	$0.11	20,148
Unrefrigerated Warehouse No Rail	$0.11	3,505
TOTAL PROJECT CONSTRUCTION ELECTRICTY USAGE (kWh)		***30,873***

Construction Equipment Fuel Estimates
Fuel consumed by construction equipment would be the primary energy resource expended over the course of project construction. Project construction activity timeline estimates, construction equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates are presented in Table VI-7. Eight-hour daily use of all equipment is assumed. The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower hour per gallon (hp-hr-gal.), obtained from CARB 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines.

For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the City and region[4].

As presented in Table VI-7, project construction activities would consume an estimated 27,637 gallons of diesel fuel. Project construction would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

Table VI-7
CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Activity / Duration	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Demolition	20	Concrete Industrial Saws	81	1	8	0.73	473	511
		Rubber Tired Dozers	247	1	8	0.40	790	854
		Tractors/Loaders/ Backhoes	97	3	8	0.37	861	931
Grading	6	Graders	187	1	8	0.41	613	199
		Rubber Tired Dozers	247	1	8	0.40	790	256
		Tractors/Loaders/ Backhoes	97	2	7	0.37	502	163
Building Construction	220	Cranes	231	1	8	0.29	536	6,373
		Forklifts	89	2	7	0.20	249	2,963
		Generator Sets	84	1	8	0.74	497	5,914
		Tractors/Loaders/ Backhoes	97	1	6	0.37	215	2,561
		Welders	46	3	8	0.45	497	5,908
Paving	10	Cement and Mortar Mixers	9	1	8	0.56	40	22
		Pavers	130	1	8	0.42	437	236
		Paving Equipment	132	1	8	0.36	380	205
		Rollers	80	2	8	0.38	486	263
		Tractors/Loaders/ Backhoes	97	1	8	0.37	287	155
Architectural Coatings	10	Air Compressors	78	1	6	0.48	225	121
CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***27,637***

Construction Trips and VMT

Based on the CalEEMod, the Trip and VMT are the number and length (in terms VMT[5]) of on-road vehicle trips for workers, vendors, and hauling for each construction phase. The trips identified in Table VI-8 are based on the CalEEMod default parameters, with the exception of trips during demolition which have been adjusted based on information provided by the Applicant.

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[4] Based on Appendix A of the CalEEMod User's Guide, Construction consists of several types of off-road equipment. Since the majority of the off-road construction equipment used for construction projects are diesel fueled, CalEEMod assumes all of the equipment operates on diesel fuel.

[5] For purposes of analysis, VMT is calculated by multiplying to number of trips by the trip length.

Table VI-8
CONSTRUCTION TRIPS AND VMT

Phase Name	Worker Trips / Day	Vendor Trips / Day	Hauling Trips / Day	Worker Trip Length	Vendor Trip Length	Hauling Trip Length
Demolition	5	0	0	14.7	6.9	20
Grading	4	0	0	14.7	6.9	20
Building Construction	8	50	0	14.7	6.9	20
Paving	6	0	0	14.7	6.9	20
Architectural Coatings	1	0	0	14.7	6.9	20
Source: CalEEMod 2016.3.2						

Construction Worker Fuel Estimates

With respect to estimated VMT for the project, the construction worker trips would generate an estimated 24,624 VMT during the 12 months days of construction. Based on the data for San Bernardino County and included in the 2017 version of the Emission Factor (EMFAC2017) model developed by CARB, it is estimated that 71% of all vendor trips are from light-duty-auto vehicles (LDA), 7% are from light-duty-trucks (LDT1[6]), and 22% are from light-duty-trucks (LDT2[7]). Data regarding project related construction worker trips were based on EMFAC2017 defaults for the San Bernardino annual emission inventory.

Vehicle fuel efficiencies for LDA, LDT1, and LDT2 were estimated using information generated within EMFAC2017. EMFAC2017 is a mathematical model that was developed to calculate emission rates, fuel consumption, and VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the CARB to project changes in future emissions from on-road mobile sources (25). EMFAC2017 was run for the LDA, LDT1, and LDT2 vehicle class within the California sub-area for the 2021 and 2022 calendar years. The year 2021 data was used for construction estimates and the year 2022 data was used for operational fuel consumption estimates.

As generated by EMFAC2017, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 31.01 miles per gallon (mpg). Table VI-9 provides an estimated annual fuel consumption resulting from LDAs related to the project construction worker trips. Based on Table VI-9, it is estimated that 515 gallons of fuel will be consumed related to construction worker trips during full construction of the project.

Table VI-9
CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDA

Construction Activity	Duration (Days)	Worker LDA Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Demolition	20	4	10.8	864	31.01	28
Grading	6	3	10.8	194	31.01	6
Building Construction	220	6	10.8	14,256	31.01	460
Paving	10	5	10.8	540	31.01	17
Architectural Coating	10	1	10.8	108	31.01	3
TOTAL CONSTRUCTION WORKER (LDA) FUEL CONSUMPTION						***515***

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[6] Vehicles under the LDT1 category have a gross vehicle weight rating (GVWR) of less than 6,000 lbs. and equivalent test weight (ETW) of less than or equal to 3,750 lbs.

[7] Vehicles under the LDT2 category have a GVWR of less than 6,000 lbs. & ETW between 3,751 lbs. and 5,750 lbs.

The EMFAC2017 aggregated fuel economy of LDT1s ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 26.03. Table VI-10 provides an estimated annual fuel consumption resulting from LDT1s related to the project construction worker trips. Based on Table VI-10, it is estimated that 119 gallons of fuel will be consumed related to construction worker trips during full construction of the project.

Table VI-10
CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDT1

Construction Activity	Duration (Days)	Worker LDA Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Demolition	20	1	10.8	432	26.03	17
Grading	6	1	10.8	65	26.03	2
Building Construction	220	1	10.8	2,376	26.03	91
Paving	10	1	10.8	108	26.03	4
Architectural Coating	10	1	10.8	108	26.03	4
TOTAL CONSTRUCTION WORKER (LDT2) FUEL CONSUMPTION						***119***

The EMFAC2017 aggregated fuel economy of LDT2s ranging from model year 1974 to model year 2021 is estimated to have a fuel efficiency of 25.15 mpg. Table VI-11 provides an estimated annual fuel consumption resulting from LDT2s related to the project construction worker trips. Based on Table VI-11, it is estimated that 222 gallons of fuel will be consumed related to construction worker trips during full construction of the project.

Table VI-11
CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDT2

Construction Activity	Duration (Days)	Worker LDA Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Demolition	20	2	10.8	432	25.15	17
Grading	6	1	10.8	65	25.15	3
Building Construction	220	2	10.8	4,752	25.15	189
Paving	10	2	10.8	216	25.15	9
Architectural Coating	10	1	10.8	108	25.15	4
TOTAL CONSTRUCTION WORKER (LDT2) FUEL CONSUMPTION						***222***

It should be noted that construction worker trips would represent a “single-event” gasoline fuel demand and would not require on-going or permanent commitment of fuel resources for this purpose.

Construction Vendor Fuel Estimates
With respect to estimated VMT, the construction vendor trips (vehicles that deliver materials to the site during construction) would generate an estimated 81,906 VMT along area roadways for the project over the duration of construction activity. It is assumed that 49.9% of all vendor trips are from medium-heavy duty trucks (MHDT) and 50.1% are from heavy-heavy duty trucks (HHDT). These assumptions are consistent with the CalEEMod defaults utilized within the within the Air Quality Impact Analysis. Vehicle fuel efficiencies for MHDTs and HHDTs were estimated using information generated within EMFAC2017.

EMFAC2017 was run for the MHDT and HHDT vehicle classes within the California sub-area for the 2021 calendar year.

As generated by EMFAC2017, an aggregated fuel economy of MHDTs ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 9.76 mpg. Based on Table VI-12, it is estimated that 4,113 gallons of fuel will be consumed related to construction vendor trips (MHDTs) during full construction of the project.

Table VI-12
CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES – MHDT

Construction Activity	Duration (Days)	Vendor Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction	220	25	7.3	40,150	9.76	4,113
TOTAL CONSTRUCTION WORKER (LDT2) FUEL CONSUMPTION						***4,113***

Tables VI-13 shows the estimated fuel economy of HHDTs accessing the project site. As generated by EMFAC2017, an aggregated fuel economy of HHDTs ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 6.16 mpg, respectively Based on Tables VI-13 and VI-14, fuel consumption from construction vendor trips (HHDTs) will total approximately 6,782 gallons.

Table VI-13
CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES – HHDT

Construction Activity	Duration (Days)	Vendor Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction	220	26	7.3	41,756	6.16	6,782
TOTAL CONSTRUCTION WORKER (LDT2) FUEL CONSUMPTION						***6,782***

It should be noted that project construction vendor trips would represent a “single-event” diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

Construction Energy Efficiency/Conservation Measures
Starting in 2014, CARB adopted the nation's first regulation aimed at cleaning up off-road construction equipment such as bulldozers, graders, and backhoes. These requirements ensure fleets gradually turnover the oldest and dirtiest equipment to newer, cleaner models and prevent fleets from adding older, dirtier equipment. As such, the equipment used for project construction would conform to CARB regulations and California emissions standards. It should also be noted that there are no unusual project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities; or equipment that would not conform to current emissions standards (and related fuel efficiencies). Equipment employed in construction of the project would therefore not result in inefficient wasteful, or unnecessary consumption of fuel.

Construction contractors would be required to comply with applicable CARB regulations regarding retrofitting, repowering, or replacement of diesel off-road construction equipment. Additionally, CARB has adopted the Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other Toxic Air Contaminants. Compliance with anti-idling and emissions regulations would result in a more efficient use of construction-related energy and the minimization or elimination of wasteful or unnecessary consumption of energy. Idling restrictions and the use of newer engines and equipment would result in less fuel combustion and energy consumption.

Additional construction-source energy efficiencies would occur due to required California regulations and best available control measures (BACM). For example, CCR Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than five minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. Section 2449(d)(3) requires that "grading plans shall reference the requirement that a sign shall be posted on-site stating that construction workers need to shut off engines at or before five minutes of idling." In this manner, construction equipment operators are required to be informed that engines are to be turned off at or prior to five minutes of idling. Enforcement of idling limitations is realized through periodic site inspections conducted by City building officials, and/or in response to citizen complaints.

In general, the construction processes promote conservation and efficient use of energy by reducing raw materials demands, with related reduction in energy demands associated with raw materials extraction, transportation, processing and refinement. Use of materials in bulk reduces energy demands associated with preparation and transport of construction materials as well as the transport and disposal of construction waste and solid waste in general, with corollary reduced demands on area landfill capacities and energy consumed by waste transport and landfill operations.

Operational Energy Demands

Energy consumption in support of or related to project operations would include transportation energy demands (energy consumed by passenger car and truck vehicles accessing the project site) and facilities energy demands (energy consumed by building operations and site maintenance activities).

Transportation Energy Demands

Energy that would be consumed by project-generated traffic is a function of total VMT and estimated vehicle fuel economies of vehicles accessing the project site. As shown in Table VI-14, the project will result in 1,265,716 annual VMT and an estimated annual fuel consumption of 57,968 gallons of fuel. These calculations are conservative and do not include any measures to reduce VMT from vehicles.

Table VI-14
TOTAL PROJECT-GENERATED TRAFFIC ANNUAL FUEL CONSUMPTION (ALL VEHICLES)

Vehicle Type	Annual Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
LDA	700,084	31.9	21,925
LDT1	46,082	26.8	1,720
LDT2	228,191	25.1	9,075
MDV	147,247	20.4	7,232
LHD1	20,460	13.7	1,488
LHD2	6,456	13.9	465
MHD	23,059	10.1	2,288
HHD	80,749	6.3	12,757
OBUS	1,718	6.4	269
UBUS	1,981	9.1	218
MCY	7,472	37.2	201
SBUS	1,023	8.1	127
MH	1,195	5.9	201
Total (All Vehicles)	**1,265,716**	**NA**	**57,968**

Facility Energy Demands
Project building operations and project site maintenance activities would result in the consumption of natural gas and electricity. Natural gas would be supplied to the project by SoCalGas; electricity would be supplied to the project by SCE. As previously stated, the analysis herein assumes compliance with the 2019 Title 24 Standards. As such, the CalEEMod defaults for Title 24 – Electricity and Lighting Energy were reduced by 30% in order to reflect consistency with the 2019 Title 24 standard. Annual natural gas and electricity demands of the project are summarized in Table VI-15 and provided in Appendices 4.1 of the EIA.

Table VI-15
PROJECT ANNUAL OPERATIONAL ENERGY DEMAND SUMMARY

Natural Gas Demand	kBTU/year
General Office	96,508
Parking Lot	0
Unrefrigerated Warehouse No Rail	27,405
TOTAL PROJECT NATURAL GAS DEMAND	***123,913***
Electricity Demand	**kWh/year**
General Office	264,771
Parking Lot	27,160
Unrefrigerated Warehouse No Rail	31,860
TOTAL PROJECT ELECTRICITY DEMAND	***323,791***
kBTU – kilo-British Thermal Units	

Operational Energy Efficiency/Conservation Measures
Energy efficiency/energy conservation attributes of the project would be complemented by increasingly stringent state and federal regulatory actions addressing vehicle fuel economies and vehicle emissions standards; and enhanced building/utilities energy efficiencies mandated under California building codes (e.g., Title24, California Green Building Standards Code).

Enhanced Vehicle Fuel Efficiencies
Project annual fuel consumption estimates presented previously in Table VI-18 represent likely potential maximums that would occur for the project. Under subsequent future conditions, average fuel economies of vehicles accessing the project site can be expected to improve as older, less fuel-efficient vehicles are removed from circulation, and in response to fuel economy and emissions standards imposed on newer vehicles entering the circulation system.

Enhanced fuel economies realized pursuant to federal and state regulatory actions, and related transition of vehicles to alternative energy sources (e.g., electricity, natural gas, biofuels, hydrogen cells) would likely decrease future gasoline fuel demands per VMT. Location of the project proximate to regional and local roadway systems tends to reduce VMT within the region, acting to reduce regional vehicle energy demands.

The SBMWD would comply with the City’s Transportation Demand Management Ordinance, which includes the provision of on-site bicycle storage facilities and sidewalks and paved pathways from the external pedestrian circulation system to each building.

Conclusion and Impact Analysis

a. *Less Than Significant Impact –*

Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. As supported by the preceding analyses, project construction and operations would not result in the inefficient, wasteful or unnecessary consumption of energy. The project would therefore not cause or result in the need for additional energy producing or transmission facilities. The project would not engage in wasteful or inefficient uses of energy and aims to achieve energy conservations goals within the State.

b. *Less Than Significant Impact –*

Conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The project's consistency with the applicable state and local plans is discussed below.

Consistency with ISTEA: Transportation and access to the project site is provided by the local and regional roadway systems. The project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be realized pursuant to the ISTEA because SCAG is not planning for intermodal facilities on or through the project site.

Consistency with TEA-21: The project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the project facilitates access, acts to reduce vehicle miles traveled, takes advantage of existing infrastructure systems, and promotes land use compatibilities through collocation of similar uses. The project supports the strong planning processes emphasized under TEA-21. The project is therefore consistent with, and would not otherwise interfere with, nor obstruct implementation of TEA-21.

Consistency with IEPR: Electricity would be provided to the project by SCE and natural gas is provided by SoCalGas. SCE's Clean Power and Electrification Pathway (CPEP) white paper and SoCalGas 2018 Corporate Sustainability Report builds on existing state programs and policies. As such, the project is consistent with, and would not otherwise interfere with, nor obstruct implementation the goals presented in the 2019 IEPR.

Consistency with State of California Energy Plan: The project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the project facilitates access, takes advantage of existing infrastructure systems, and promotes land use compatibilities through the colocation of SBMWD facilities. The project therefore supports urban design and planning processes identified under the State of California Energy Plan, is consistent with, and would not otherwise interfere with, nor obstruct implementation of the State of California Energy Plan.

Consistency with California Code Title 24, Part 6, Energy Efficiency Standards: The 2019 version of Title 24 was adopted by the CEC and became effective on January 1, 2020. It should be noted that the analysis herein assumes compliance with the 2019 Title 24 Standards. It should be noted that the CEC anticipates that nonresidential buildings will use approximately 30% less energy compared to the prior code. As such, the new buildings would be more efficient and the existing building would be retrofitted to increase energy efficiency to Title 24 standards.

Consistency with AB 1493: AB 1493 is not applicable to the project as it is a statewide measure establishing vehicle emissions standards. No feature of the project would interfere with implementation of the requirements under AB 1493.

Consistency with RPS: California's Renewable Portfolio Standard is not applicable to the project as it is a statewide measure that establishes a renewable energy mix. No feature of the project would interfere with implementation of the requirements under RPS.

Consistency with SB 350: The proposed project would use energy from SCE, which has committed to diversify its portfolio of energy sources by increasing energy from wind and solar sources. No feature of the project would interfere with implementation of SB 350. Additionally, the project would be designed and constructed to implement the energy efficiency measures and would include several measures designed to reduce energy consumption.

As shown above, the project would not conflict with any of the state or local plans. As such, a less than significant impact is expected.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
VII. GEOLOGY AND SOILS: Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
(i) 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 of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
(ii) Strong seismic ground shaking?	☐	☒	☐	☐
(iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
(iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite land-slide, lateral spreading, subsidence, liquefaction or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☒	☐	☐
e) 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?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

SUBSTANTIATION: John R. Byerly Incorporated prepared a geotechnical investigation titled "Soils Investigation New Administration and Warehouse Buildings for City of San Bernardino Municipal Water Department (SBMWD) Southeast Corner of Chandler Place and South E Street, San Bernardino, California" that is dated April 23, 2021, and is provided as Appendix 5a to this Initial Study.

a. <u>Ground Rupture</u>

Less Than Significant Impact – The project site is located in the City of San Bernardino, which is located between several active faults, including the San Andreas Fault and the San Jacinto Faults, which are both classified as Alquist-Priolo Special Study Zones under the Alquist-Priolo Earthquake Fault Zoning Act. Figure VII-1 shows where these faults are located as indicated by the City of San Bernardino General Plan. According to Figure VII-1, the site is not located within an Alquist-Priolo Special Study Zone, though the San Jacinto Fault System is located south of the project at the intersection of Interstate-215 (I-215) and I-10. Given that there is a distance of 0.8 mile separating the proposed project from the Alquist-Priolo Special Study Zone to the south, the risk for ground rupture at the site location is low; therefore, it is not likely that future visitors and employees of the project will be subject to rupture from a known earthquake fault. Therefore, any impacts under this issue are considered less than significant; no mitigation is required.

Strong Seismic Ground Shaking

Less Than Significant With Mitigation Incorporated – As stated in the discussion above, several faults run through the City, and as with much of southern California, the proposed structures will be subject to strong seismic ground shaking impacts should any major earthquakes occur in the future, as shown on Figure VII-2, which depicts the City's General Plan Map of fault zones, faults, and type of faults that traverse through the City. As a result, and like all other development projects in the City and throughout the Southern California Region, the proposed project will be required to comply with all applicable seismic design standards contained in 2020 California Building Code (CBC), including Section 1613 Earthquake Loads. Compliance with the CBC will ensure that structural integrity will be maintained in the event of an earthquake. Additionally, adherence to the seismic design parameters identified in the Soils Investigation provided as Appendix 5a would further ensure that that structural integrity will be maintained in the event of an earthquake. As such the following mitigation measure shall be implemented to ensure these parameters are adopted as part of the project:

GEO-1 Based upon the geotechnical investigation (Appendix 5a of this document), all of the recommended seismic design measures identified in Appendix 5a (listed on pages 7-8) shall be implemented by the City. Implementation of these specific measures will address all of the identified geotechnical constraints identified at project site, including seismic related hazards on the proposed structures.

Therefore, impacts associated with strong ground shaking will be less than significant without mitigation.

Seismic-Related Ground Failure Including Liquefaction

Less Than Significant Impact – According to the map prepared for the San Bernardino County Land Use Plan General Plan Geologic Hazard Overlays (Figure VII-3), the project site is located in an area that is considered potentially highly susceptible to seismic-related ground failure, including liquefaction. The City's General Plan requires site-specific geotechnical reports to determine the site-specific liquefaction potential and possible seismic design mitigation, and a Soils Investigation prepared by John R. Byerly Inc. is provided as Appendix 5a to meet this requirement. While Free groundwater was not encountered during at the boring locations investigated. The Soils Investigation concluded that neither liquefaction nor seismically induced dry settlement need to be considered as part of the project design. As such, though the County identifies this location as potentially highly susceptible to seismic-related ground failure, including liquefaction, the data contained in Appendix 5a suggests that liquefaction potential is less than significant at this site. Therefore, any potential liquefaction hazard impacts are less than significant. No mitigation is required,

Landslides

No Impact – The project site is essentially flat and has been previously developed containing an existing structure that will be retained and renovated, as well as pavement throughout. Therefore, based on the existing site conditions, the project is not located in an area in which landslides are anticipated to occur. According to the map prepared for the San Bernardino County Land Use Plan General Plan Geologic Hazard Overlays (Figure VII-3), the project site is not located in an area that is considered susceptible to landslides. Therefore, the project will not expose people or structures to potential substantial adverse landslide effects, including the risk of loss, injury, or death involving landslides. No impacts under this issue are anticipated and no mitigation is required.

b. *Less Than Significant Impact With Mitigation Incorporated* – Due to the existing development that encompasses the whole of the project site and the type of project being proposed, the potential for soil erosion, loss of topsoil, and/or placing structures on unstable soils is generally considered less than significant. The project site contains minimal landscaping, and coverage of the site consists mainly of developed structures, concrete, or asphalt. City grading standards, best management practices and the Storm Water Pollution Prevention Plan (SWPPP) and Water Quality Management Plan (WQMP) are required to control the potential significant erosion hazards. The proposed project is anticipated to balance soils on site, as the proposed project will not require a significant amount of excavation except in support of the underground storage tank (UST) for fuel. During project construction when soils are exposed, temporary soil erosion may occur, which could be exacerbated by rainfall. Project grading would be managed through the preparation and implementation of a SWPPP, and will be required to implement best management practices to achieve concurrent water quality controls after construction is completed and the SBMWD Water Facilities Relocation Project is in operation. The following mitigation measures or equivalent BMPs shall be implemented to address these issues:

GEO-2 Stored backfill material shall be covered with water resistant material during periods of heavy precipitation to reduce the potential for rainfall erosion of stored backfill material. Where covering is not possible, measures such as the use of straw bales or sand bags shall be used to capture and hold eroded material on the project site for future cleanup such that erosion does not occur.

GEO-3 All exposed, disturbed soil (trenches, stored backfill, etc.) shall be sprayed with water or soil binders twice a day, or more frequently if fugitive dust is observed migrating from the site within which the project is being constructed.

With implementation of the above mitigation measures, implementation of the SWPPP and associated BMPS, any impacts under this issue are considered less than significant.

c. *Less Than Significant With Mitigation Incorporated* – According to the San Bernardino County Land Use Plan General Plan Geologic Hazard Overlays (Figure VII-3), the project is located within an area of high liquefaction susceptibility. The proposed development will involve the demolition and removal of pavement on site, as well as excavation related to the proposed UST that will be developed in support of the SBMWD site operations. As discussed under issue VII(a) above, liquefaction is a concern at the site, and is a concern throughout the southern portion of the City of San Bernardino. However, the Soils Investigation concluded that liquefaction is not a concern within the project site. According to the San Bernardino General Plan EIR, the proposed project is located in an area that is potentially susceptible to subsidence (Figure VII-4); potential impacts to structures related to subsidence can be mitigated through design measures intended to stabilize soils on site, which will be enforced through the following mitigation measure:

GEO-4 Based upon the geotechnical investigation (Appendix 5a of this document), all of the recommended design measures identified in Appendix 5a (listed on pages 7-15) shall be implemented by the City. Implementation of these specific measures will address all of the identified geotechnical constraints identified at project site.

Therefore, implementation of MMs **GEO-1** and **GEO-4** above will ensure that implementation of the proposed project will not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse. No further mitigation is required.

d. *Less Than Significant With Mitigation Incorporated* – According to the United States Department of Agriculture Web Soil Survey, the project's Area of Potential Effect (APE) is underlain mostly by Grangeville fine sandy loam, warm MAAT, MLRA 19, as well as by Tujunga gravelly loamy sand, 0 to 9 percent slopes (Appendix 5b). According to the USDA Soil Series website, the Grangeville series consists of very deep, somewhat poorly drained soils that formed in moderate coarse textured alluvium dominantly from granitic rock sources.[8] Tujunga series soils are somewhat excessively drained soils, have negligible to low runoff, and flooding is none to frequent.[9] With the implementation of MMs **GEO-1** and **GEO-4** above, any impacts from implementing the proposed project on this site will be mitigated through the implementation of design measures intended to protect human safety.. Furthermore, expansive soils are typically clay type soils, and sometimes may result within fine sands, as such, MM **GEO-4** would be require to minimize impacts related to expansive soils should any be located within the project site. With implementation of MM **GEO-1** above, impacts under this issue are considered less than significant. No further mitigation is required.

e. *No Impact* – The project does not propose any septic tanks or alternative wastewater disposal systems. Therefore, determining if the project site soils are capable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater does not apply. No impacts are anticipated. No mitigation is required.

f. *Less Than Significant With Mitigation Incorporated* – The potential for discovering paleontological resources during development of the project is considered unlikely, primarily because the site has been previously disturbed at depth, and based on the data gathered within the Cultural Resources Report provided as Appendix 3. No unique geologic features are known or suspected to occur on or beneath the sites. However, because these resources are located beneath the surface and can only be discovered as a result of ground disturbance activities, the following measure shall be implemented:

GEO-5 ***Should any paleontological resources be encountered during construction of these facilities, earthmoving or grading activities in the immediate area of the finds shall be halted and an onsite inspection should be performed immediately by a qualified paleontologist. Responsibility for making this determination shall be with the City's onsite inspector. The paleontological professional shall assess the find, determine its significance, and determine appropriate mitigation measures within the guidelines of the California Environmental Quality Act that shall be implemented to minimize any impacts to a paleontological resource.***

With incorporation of this contingency mitigation, the potential for adverse impact to paleontological resources will be reduces to a less than significant level. No additional mitigation is required.

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[8] https://soilseries.sc.egov.usda.gov/OSD_Docs/G/GRANGEVILLE.html
[9] https://soilseries.sc.egov.usda.gov/OSD_Docs/T/TUJUNGA.html

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
VIII. GREENHOUSE GAS EMISSIONS: Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

SUBSTANTIATION: The following information utilized in this section was obtained from the technical study “Air Quality and GHG Impact Analysis San Bernardino Municipal Water Department Water Facilities Relocation Project, San Bernardino, California” prepared by Giroux & Associates dated March 3, 2021, and provided as Appendix 1 to this document.

a&b. *Less Than Significant Impact –*

Global Climate Change (GCC) is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. Many scientists believe that the climate shift taking place since the industrial revolution (1900) is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of greenhouse gases in the earth’s atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases. Many scientists believe that this increased rate of climate change is the result of greenhouse gases resulting from human activity and industrialization over the past 200 years.

An individual project like the proposed SBMWD Water Facilities Relocation Project evaluated in this greenhouse gas impact analysis cannot generate enough greenhouse gas emissions to effect a discernible change in global climate. However, the project may participate in the potential for GCC by its incremental contribution of greenhouse gasses combined with the cumulative increase of all other sources of greenhouse gases, which when taken together constitute potential influences on GCC.

AB 32 is one of the most significant pieces of environmental legislation that California has adopted. Among other things, it is designed to maintain California’s reputation as a “national and international leader on energy conservation and environmental stewardship.” It will have wide-ranging effects on California businesses and lifestyles as well as far reaching effects on other states and countries. A unique aspect of AB 32, beyond its broad and wide-ranging mandatory provisions and dramatic GHG reductions are the short time frames within which it must be implemented. Major components of the AB 32 include:

- Require the monitoring and reporting of GHG emissions beginning with sources or categories of sources that contribute the most to statewide emissions.
- Requires immediate “early action” control programs on the most readily controlled GHG sources.
- Mandates that by 2020, California’s GHG emissions be reduced to 1990 levels.
- Forces an overall reduction of GHG gases in California by 25-40%, from business as usual, to be achieved by 2020.
- Must complement efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminants.

Statewide, the framework for developing the implementing regulations for AB 32 is under way. Maximum GHG reductions are expected to derive from increased vehicle fuel efficiency, from greater use of renewable energy and from increased structural energy efficiency. Additionally, through the California Climate Action Registry (CCAR now called the Climate Action Reserve), general and industry-specific protocols for assessing and reporting GHG emissions have been developed. GHG sources are categorized into direct sources (i.e. company owned) and indirect sources (i.e. not company owned). Direct sources include combustion emissions from on-and off-road mobile sources, and fugitive emissions. Indirect sources include off-site electricity generation and non-company owned mobile sources.

Thresholds of Significance

In response to the requirements of SB97, the State Resources Agency developed guidelines for the treatment of GHG emissions under CEQA. These new guidelines became state laws as part of Title 14 of the California Code of Regulations in March, 2010. The CEQA Appendix G guidelines were modified to include GHG as a required analysis element. A project would have a potentially significant impact if it:

- Generates GHG emissions, directly or indirectly, that may have a significant impact on the environment, or,
- Conflicts with an applicable plan, policy or regulation adopted to reduce GHG emissions.

Section 15064.4 of the Code specifies how significance of GHG emissions is to be evaluated. The process is broken down into quantification of project-related GHG emissions, making a determination of significance, and specification of any appropriate mitigation if impacts are found to be potentially significant. At each of these steps, the new GHG guidelines afford the lead agency with substantial flexibility.

In September 2010, the SCAQMD CEQA Significance Thresholds GHG Working Group released revisions which recommended a threshold of 3,000 MT CO_2e for all land use projects. This 3,000 MT/year recommendation has been used as a guideline for this analysis. In the absence of an adopted numerical threshold of significance, project related GHG emissions in excess of the guideline level are presumed to trigger a requirement for enhanced GHG reduction at the project level.

Construction Activity GHG Emissions

The project is assumed to require approximately 14 months for construction. During project construction, the CalEEMod2016.3.2 computer model predicts that the construction activities will generate the annual CO_2e emissions identified in Table VIII-1.

Table VIII-1
CONSTRUCTION EMISSIONS (METRIC TONS CO2e)

	CO_2e
Year 2021[1]	397.1
Year 2022[2]	121.6
Total	518.7
Amortized	**17.3**

[1] Project impacts were modeled against 2021 and 2022 construction emissions data initially. The Project will be constructed during 2022 through 2024 due to unforeseen delays in the CEQA process. This change would not result in any exceedances of SCAQMD thresholds, as the emissions generated by the project would generally be lesser due to more stringent emissions standards and due to greater efficiency in the equipment and technologies that would generate emissions during construction of the project.
CalEEMod Output provided in appendix

SCAQMD GHG emissions policy from construction activities is to amortize emissions over a 30-year lifetime. The amortized level is also provided. GHG impacts from construction are considered individually less than significant.

Operational GHG Emissions

The input assumptions for operational GHG emissions calculations, and the GHG conversion from consumption to annual regional CO_2e emissions are summarized in the CalEEMod2016.3.2 output files found in the appendix of the Air Quality and Greenhouse Gas Impact Analysis (Appendix 1).

The total operational and annualized construction emissions for the proposed project are identified in Table VIII-2. The project GHG emissions are considered less than significant.

Table VIII-2
OPERATIONAL EMISSIONS (METRIC TONS CO_2e)

Consumption Source	
Area Sources	<0.1
Energy Utilization	110.2
Mobile Source	1,113.3
Solid Waste Generation	19.4
Water Consumption	55.3
Construction	17.3
Total	**1,315.5**
Guideline Threshold	3,000

[1] Project impacts were modeled against 2022 emissions data initially. The Project will not be operational until 2024 due to unforeseen delays in the CEQA process. This change would not result in any exceedances of SCAQMD thresholds, as the emissions would generally be lesser due to more stringent emissions standards and due to greater efficiency in the equipment and technologies that would generate emissions at the project.

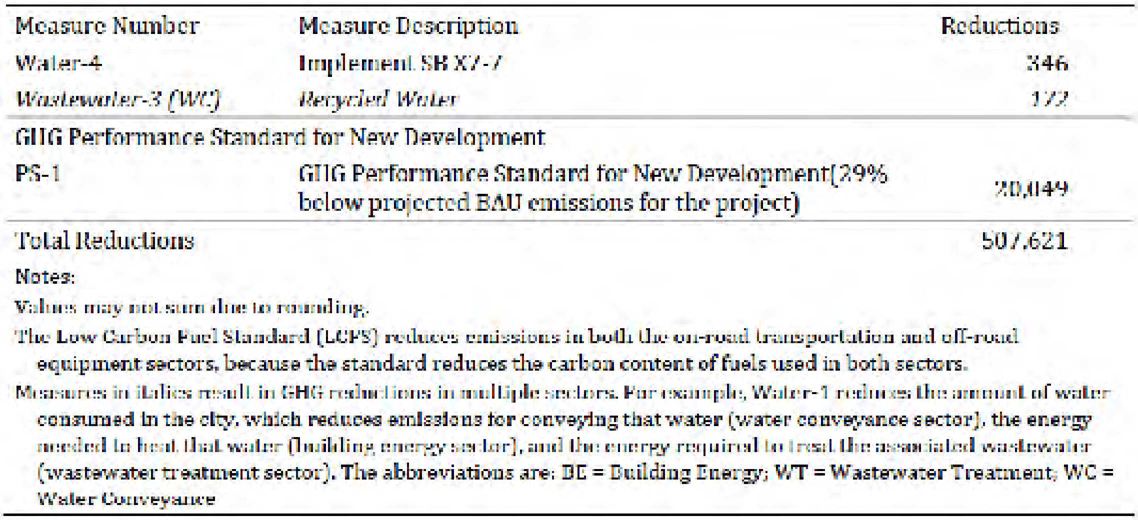
Consistency with GHG Plans, Programs and Policies

In March 2014, the San Bernardino Associated Governments and Participating San Bernardino County Cities Partnership (Partnership) created a final draft of the San Bernardino County Regional Greenhouse Gas Reduction Plan (Reduction Plan). This Reduction Plan was created in accordance to AB 32, which established a greenhouse gas limit for the state of California. The Reduction Plan seeks to create an inventory of GHG gases and develop jurisdiction-specific GHG reduction measures and baseline information that could be used by the 21 Partnership Cities of San Bernardino County, which include the City of San Bernardino.

Projects that demonstrate consistency with the strategies, actions, and emission reduction targets contained in the Reduction Plan would have a less than significant impact on climate change. In the Reduction Plan, the City of San Bernardino selected a goal to reduce community GHG emissions to a level that is 15% below its 2008 GHG emissions levels by 2020. The project will be compliant with the goal and objectives set forth in the Partnership's Reduction Plan as shown on Table VIII-3. Therefore, consistency with the Reduction Plan would result in a less than significant impact with respect to GHG emissions.

Table VIII-3
GHG REDUCTION MEASURES AND ESTIMATED 2020 REDUCTIONS FOR SAN BERNARDINO

Measure Number	Measure Description	Reductions
State/County Measures		
State-1	Renewable Portfolio Standard	91,336
State-2	Title 24 (Energy Efficiency Standards)	17,395
State-3	AB 1109	25,615
State-4	Solar Water Heating	555
State-5	Industrial Boiler Efficiency	2,229
State-6	Pavley plus LCFS	222,577
State-7	AB 32 Transportation Reduction Strategies	19,752
State-8	LCFS: Off-Road	8,964
State-9	AB 32 Methane Capture	1
County-1	San Bernardino County GHG Plan Landfill Controls	47,059
Local Measures		
Building Energy		
Energy-1	Energy Efficiency for Existing Buildings	10,324
Energy-4	Solar Installation for New Housing	310
Energy-5	Solar Installation for New Commercial	980
Energy-6	Solar Energy for Warehouse Space	1,836
Energy-7	Solar Installation for Existing Housing	3,176
Energy-8	Solar Installation for Existing Commercial / Industrial	1,183
LandUse-1 (BE)	*Tree Planting Programs*	*149*
Wastewater-2 (BE)	*Equipment Upgrades*	*2,447*
Water-2 (BE)	*Renovate Existing Buildings to Achieve Higher Levels of Water Efficiency*	*6,868*
Water-4 (BE)	*Implement SB X7-7*	*2,501*
On-Road Transportation		
Transportation-1	Sustainable Communities Strategy	7,813
Transportation-2	Smart Bus Technologies	436
Off-Road Equipment		
OffRoad-1	Electric-Powered Construction Equipment	5,781
OffRoad-2	Idling Ordinance	739
OffRoad-3	Electric Landscaping Equipment	2,970
Solid Waste Management		
Waste-2	Waste Diversion	1,459
Wastewater Treatment		
Water-2 (WT)	*Renovate Existing Buildings to Achieve Higher Levels of Water Efficiency*	*100*
Water-4 (WT)	*Implement SB X7-7*	*76*
Water Conveyance		
Water-2	Renovate Existing Buildings to Achieve Higher Levels of Water Efficiency	1,461
Water-3	Water-Efficient Landscaping Practices	961



Measure Number	Measure Description	Reductions
Water-4	Implement SB X7-7	346
Wastewater-3 (WC)	*Recycled Water*	*172*
GHG Performance Standard for New Development		
PS-1	GHG Performance Standard for New Development(29% below projected BAU emissions for the project)	20,049
Total Reductions		507.621

Notes:

Values may not sum due to rounding.

The Low Carbon Fuel Standard (LCFS) reduces emissions in both the on-road transportation and off-road equipment sectors, because the standard reduces the carbon content of fuels used in both sectors.

Measures in italics result in GHG reductions in multiple sectors. For example, Water-1 reduces the amount of water consumed in the city, which reduces emissions for conveying that water (water conveyance sector), the energy needed to heat that water (building energy sector), and the energy required to treat the associated wastewater (wastewater treatment sector). The abbreviations are: BE = Building Energy; WT = Wastewater Treatment; WC = Water Conveyance

The proposed project would consist of renovating an existing building to achieve higher levels of water efficiency, would install water efficient landscaping, and would meet the GHG performance standards for new development amongst other performance standards listed in Table VIII-3. No conflicts exist between the project and the above performance standards; therefore, consistency with the Reduction Plan would result in a less than significant impact with respect to GHG emissions.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
IX. HAZARDS AND HAZARDOUS MATERIALS: Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) 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, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☒	☐
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

SUBSTANTIATION

a&b. *Less Than Significant Impact With Mitigation Incorporated* – The project may create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; or may create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. During construction there is a potential for accidental release of petroleum products in sufficient quantity to pose a significant hazard to people and the environment. The following mitigation measure will be incorporated into the Storm Water Pollution Prevent Plan (SWPPP) prepared for the project and implementation of this measure can reduce this potential hazard to a less than significant level.

HAZ-1 ***All accidental spills or discharge of hazardous material during construction activities shall be reported to the Certified Unified Program Agency and shall be remediated in compliance with applicable state and local regulations regarding cleanup and disposal of the contaminant released. The contaminated waste will be collected and disposed of at an appropriately a licensed disposal or treatment facility. This measure shall be incorporated into***

the SWPPP prepared for the proposed SBMWD Water Facilities Project. Prior to accepting the site as remediated, the area contaminated shall be tested to verify that any residual concentrations meet the standard for future residential or public use of the site.

The proposed project would require demolition of the existing pavement throughout the project site, though it would retain the Existing Building C shown on Figure 3, the site plan. At present, Existing Building C serves as an operations building for the SBMWD, and will house vehicle maintenance in the existing service bays and administrative offices in the two-story office section of the building. Materials such as household cleaning supplies may be used on site in small quantities for the operational use. These materials would be used and disposed of in small quantities and therefore would not pose a significant hazard to the public. The proposed vehicle maintenance includes the use of a variety of vehicle repair and maintenance products that that will be stored at the site. At present, SBMWD does not store any hazardous substances or materials at the project site. Among other hazardous wastes, used oil from vehicles will require onsite management and ultimate disposal. Because the project will include a gas station, underground storage tanks (USTs) will store gas and diesel on the project site, as shown in Figure 3 (site plan). The UST will consist of double-walled, fiberglass fuel storage tank with leak detection sensors. Because of the nature of the proposed project, and in particular the fueling station, the project will be subject to routine inspection by federal, State, and local regulatory agencies with jurisdiction over fuel dispensing facilities. These regulations and regulatory agencies include: provisions established by Section 2540.7, Gasoline Dispensing and Service Stations, of the California Occupational Safety and Health Regulations; Chapter 38, Liquefied Petroleum Gases, of the California Fire Code; Resource Conservation and Recovery Act (RCRA); and the SBCFD. The storage, use and disposal of these materials are a common activity within all communities of the United States due to the universal presence of vehicles. A stringent regulatory system has evolved around the supply of gasoline and vehicle maintenance and repair facilities. An updated standard Business Plan (including a Spill Prevention Control and Countermeasures Plan) must be filed with the City Fire Department and routine inspections of facilities to ensure compliance with the Plan is conducted by the City to verify compliance. This must include proper storage of both hazardous materials and used hazardous waste (for example, used motor oil). As such, following mitigation measure shall be implemented.

HAZ-2 SBMWD shall prepare an updated Business Plan, with a Spill Prevention Control Countermeasures Plan, and submit this document to the City Fire Department for review and approval. All hazardous materials that could potentially be used at the project site shall be identified (including quantities); methods of storage shall be defined; measures to prevent release of the hazardous materials to the environment shall be defined; and management procedures for disposal of hazardous waste, including proper manifesting, shall be identified. The City Fire Department shall review and approve this plan prior to movement of any hazardous materials onto the site.

With implementation of the above mitigation measures, the project would not create a significant hazard to the public or the environment either through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Impacts are considered less than significant and no further mitigation is required.

c. *No Impact* – A review of Google Maps (2/1/18) indicates that the project site is located greater than one-quarter mile from any public school. Based on this information, implementation of the project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No adverse impacts are anticipated. No additional mitigation is required.

d. *Less Than Significant Impact* – The proposed project site is completely developed with pavement and the Existing Building C, which supports SBMWD operations. The project will not be located on a site that is included on a list of hazardous materials sites that are currently under remediation. According to the California State Water Board's GeoTracker website (consistent with Government Code Section 65962.5), which provides information regarding Leaking Underground Storage Tanks (LUST), and Department of Toxic Substance Control (DTSC) cleanup sites, there is one open LUST clean-up site, and there are seven open DTSC cleanup sites within 2,500 feet of the project site (Figures IX-1 through IX-17). The open site has undergone remediation and is eligible for closure as of March of 2019 (Figure IX-5). Because these open and remediated sites are not located within or adjacent to the project site, there is no potential for the project to be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 thereby creating a significant hazard to the public or the environment. Therefore, the proposed construction and operation of the site as the SBMWD Water Facilities Project will have a less than significant potential to create a significant hazard to the population or to the environment from their implementation. No mitigation is required.

e. *Less Than Significant Impact* – The nearest public airport is the San Bernardino International Airport, the boundary for which is just less than two miles to the east/northeast of the project site. No private airports are located within the vicinity of the project. According to the City of San Bernardino General Plan San Bernardino International Airport Planning Boundaries map—provided as Figure IX-18—the project site is not located within the designated planning boundary and is not located within the City's designated Airport Overlay Districts. However, due to the proximity of the proposed project to the airport, and due to the height of future construction equipment, such as cranes, the Department may be required to provide a Notice of Proposed Construction or Alteration to the FAA. This is a mandatory requirement, and provision of the Notice would meet safety requirements such that no significant airport hazards would occur from project implementation. Therefore, with no potential for this project to conflict with the Airport, the proposed project will have a less than significant potential to cause or experience any adverse impact related to public or private airport operations. Impacts under this issue are considered less than significant. No mitigation is required.

f. *No Impact* – The proposed project will occur entirely within the boundaries of the project site, which is located at the southeast corner of E Street and Chandler Place. Traffic along either street will have access to the site. It is not anticipated that development of the project site would impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan because the site activities will be confined within the proposed project site, and furthermore, the proposed project site currently is in operation serving SBMWD as their operations building, and is therefore within existing emergency service areas. The proposed modified onsite parking and circulation plans will be reviewed by the local Fire Department and Police Department to ensure that the project's ingress/egress are adequate for accommodating emergency vehicles. Finally, a construction traffic plan will be required to be submitted to the Fire Department prior to development in order to ensure the continued provision of adequate emergency access during construction of the proposed project. Therefore, there is no potential for the development of the project to physically interfere with any adopted emergency response plans, or evacuation plans. No impacts are anticipated and no mitigation is required.

g. *No Impact* – According to the Fire Hazard Areas map gathered from the Safety Element of the City's General Plan (Figure IX-19), the proposed project site is not located in an area of concern for fire hazards. The proposed project is located in an urban area removed from the high fire hazard areas that are located adjacent to the San Bernardino Mountains. Therefore, project implementation would not result and a potential to expose people or structures to fire hazards. Potential project-related impacts are less than significant; no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
X. HYDROLOGY AND WATER QUALITY: Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or 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) result in substantial erosion or siltation onsite or offsite?	☐	☐	☒	☐
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?	☐	☐	☒	☐
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?; or,	☐	☒	☐	☐
(iv) impede or redirect flood flows?	☐	☐	☒	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

SUBSTANTIATION

a. *Less Than Significant With Mitigation Incorporated* – The proposed project is located within the planning area of the Santa Ana Regional Water Quality Control Board (RWQCB). The project would be supplied with water by San Bernardino Municipal Water District that uses local and imported water to meet customer demand.

For a developed area, the only three sources of potential violation of water quality standards or waste discharge requirements are from generation of municipal wastewater, stormwater runoff, and potential discharges of pollutants, such as accidental spills. Municipal wastewater is delivered to San Bernardino Municipal Water Department's Water Reclamation Plant (WRP), which meets the waste discharge requirements imposed by the RWQCB.

The City of San Bernardino implements National Pollutant Discharge Elimination System (NPDES) requirements for surface discharge for all qualified projects. The project site is greater than one acre in size, therefore, it is required to obtain coverage under an NPDES permit. To address stormwater and accidental spills within this environment, any new project must ensure that site development implements a Storm Water Pollution Prevention Plan (SWPPP) to control potential sources of water pollution that could violate any standards or discharge requirements during construction. Also, a Water Quality Management Plan (WQMP) must be prepared and implemented to ensure that project-related surface runoff meets discharge requirements over the long term. The SWPPP would specify the Best Management Practices (BMPs) that the project would be required to implement during construction activities to ensure that all potential pollutants of concern are controlled, minimized, and/or otherwise appropriately treated prior to being discharged from the subject property as stormwater runoff. Compliance with the terms and conditions of the NPDES and the SWPPP is mandatory and is judged adequate mitigation by the regulatory agencies for potential impacts to stormwater during construction activities. Implementation of the following mitigation measure is also considered adequate to reduce potential impacts to stormwater runoff to a less than significant level.

HYD-1 ***The City shall require that the construction contractor prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving offsite into receiving waters. The SWPPP shall include a Spill Prevention and Cleanup Plan that identifies the methods of containing, cleanup, transport and proper disposal of hazardous chemicals or materials released during construction activities that are compatible with applicable laws and regulations. BMPs to be implemented in the SWPPP may include but not be limited to:***

- ***The use of silt fences;***
- ***The use of temporary stormwater desilting or retention basins;***
- ***The use of water bars to reduce the velocity of stormwater runoff;***
- ***The use of wheel washers on construction equipment leaving the site;***
- ***The washing of silt from public roads at the access point to the site to prevent the tracking of silt and other pollutants from the site onto public roads;***
- ***The storage of excavated material shall be kept to the minimum necessary to efficiently perform the construction activities required. Excavated or stockpiled material shall not be stored in water courses or other areas subject to the flow of surface water; and***
- ***Where feasible, stockpiled material shall be covered with waterproof material during rain events to control erosion of soil from the stockpiles.***

With implementation of these mandatory Plans and their BMPs, as well as MMs **HAZ-1** and **HYD-1** above, the development of the proposed project will not cause a violation of any water quality standards or waste discharge.

b. *Less Than Significant Impact* –The project does not propose the installation of any water wells that would directly extract groundwater and the change in pervious surfaces to impervious surfaces will be minimal because the site itself is already paved and is not large at only 7.86-acres. The project site is located in the Bunker Hill Basin. According to the City General Plan, the San Bernardino Municipal Water Department (SBMWD) produces over 497 gallons per capita, per day with the average consumption reaching 330 gallons per capita per day. According to the City of San Bernardino General Plan, 9,198.9 acres are designated for “business use” (total of commercial and industrial use acreage) within the City. The 2015 San Bernardino Valley Regional Urban Water Management Plan (UWMP)[10] indicates that, within SBMWD, Industrial uses (in conjunction with commercial uses) demanded 6,083 acre feet per year (AFY) of raw and potable water in 2015 in the SBMWD service area; a number which is anticipated to increase to 7,091 by 2020, and 8,076 AFY by 2040. The proposed project will encompass 7.86 acres, which represents 0.085% of the land

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[10] http://www.sbcity.org/civicax/filebank/blobdload.aspx?BlobID=20386

designated for "business use" (7.86 ÷ 9,198.9 acres of land designated for industrial use x 100 = 0.085%). The project is therefore estimated to require approximately 6.06 AFY (based on the 2020 projected demand) or approximately 5,410 gallons per day (GPD) in order to support the needs of the project which is well within the projected demand for water by the proposed site use. It is anticipated that some of the anticipated supply required to operate the project site is currently within SBMWD's existing demand because the Existing Build C is served by SBMWD, and some of their operations will be transferred from other existing facilities. This projected increase in demand is well below the amount of water SBMWD produces per capita per day. Thus, the construction of the new Administration Building and associated facilities in support of SBMWD's Water Facilities Relocation Project is not forecast to cause a significant demand for new groundwater supplies. The potential impact under this proposed project is considered less than significant; no mitigation measures other than the installation of standard water conservation fixtures and use of drought resistant landscaping are required; these measures have been incorporated into the design for the project.

c. i. Result in substantial erosion or siltation onsite or offsite?

Less Than Significant Impact – The proposed project is not anticipated to significantly change the volume of flows downstream of the project site, and would not be anticipated to change the amount of surface water in any water body in an amount that could initiate a new cycle of erosion or sedimentation downstream of the project site. The project will require installation of drainage inlets at several locations within the project site and installation of catch basin filters, perforated infiltration chamber, pervious pavement, and other water quality control measures as required by the site specific WQMP. This drainage system will capture any incremental increase in runoff from the project site associated with project development. Impervious coverage of the site as proposed is anticipated to be about 83.25% (landscaped area will be about 16.75% of the site), and onsite surface flows will be collected and conveyed in a controlled manner as described above. This system will be designed to capture the peak flows from the project site or otherwise be detained on site and discharged in conformance with City and County requirements. The downstream drainage system will not be altered and given the control of future surface runoff from the project site, thus, the potential for downstream erosion or sedimentation will be controlled to a less than significant impact level.

c. ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?

Less Than Significant Impact – The proposed project will very minorly alter the existing drainage courses or patterns onsite but will maintain the existing offsite downstream drainage system through control of future discharges from the site, which would prevent flooding onsite or offsite from occurring. Impervious coverage of the site as proposed is anticipated to be about 83.25% (landscaped area will be about 16.75% of the site), and onsite surface flows will be collected and conveyed in a controlled manner through the project site through drainage inlets at several locations within the project site and installation of catch basin filters, perforated infiltration chamber, pervious pavement, and other water quality control measures as required by the site specific WQMP. This system will be designed to capture the peak flows from the project site or otherwise be detained on site and discharged in conformance with City and County requirements. Thus, the implementation of onsite drainage improvements and applicable requirements will ensure that stormwater runoff will not substantially increase the rate or volume of runoff in a manner that would result in flooding on- or off-site. Impacts under this issue are considered less than significant with no mitigation required.

c. iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant With Mitigation Incorporated – As indicated above, the project will not substantially create or contribute runoff water that would exceed the capacity of existing or planned stormwater capacity, or provide substantial additional sources of polluted water, particularly because the site plan includes a drainage inlets at several locations within the project site and installation of catch basin filters, perforated infiltration chamber, pervious pavement, and other water quality control measures as required by the site specific WQMP that will collect on-site runoff. The project will require the implementation of a SWPPP and WQMP, and implementation of MM **HAZ-1**, which will ensure that discharge of polluted material does not occur or is remediated in the event of an accidental spill, as well as MM **HYD-1**, which would result in a reduction in potential impacts to stormwater runoff. However, in most cases onsite surface flows will be collected and conveyed in a controlled manner through the project site through drainage inlets at several locations within the project site and installation of catch basin filters, perforated infiltration chamber, pervious pavement, and other water quality control measures as required by the site specific WQMP. At present, the site is mostly impervious and runoff is either retained on site or is directed into adjacent public rights-of-way; thus, with the development of the site as proposed and through development of the planned drainage systems, runoff from the site would be managed more efficiently than that which exists at present. Thus, the implementation of onsite drainage improvements and applicable requirements will ensure that that drainage and stormwater will not create or contribute runoff that would exceed the capacity of existing or planned offsite stormwater drainage systems or provide substantial additional sources of polluted runoff. Impacts under this issue are considered less than significant with implementation of mitigation.

c. iv. Impede or redirect flood flows?

Less Than Significant Impact – According to the City of San Bernardino General Plan 100-Year Floodplain Map (Figure X-1), the proposed project is not located in a 100-year or 500-year flood hazard area. Furthermore, development of this site is not anticipated to redirect or impede flood flow at the project site, particularly given that surface flows on site will be directed to the onsite drainage features which will be capable of intercepting flows within the project site or otherwise be detained on site and discharged in conformance with San Bernardino County requirements. Therefore, impacts under this issue are considered less than significant and no mitigation is required.

d. *Less Than Significant Impact* – Implementation of the project will not expose people or structures to a significant risk of inundation by seiche, tsunami, or other flood hazards. According to the City of San Bernardino General Plan Seven Oaks Dam Inundation map (Figure X-2), the project is within the limit of flooded area if the dam was to fail. The Seven Oaks Dam stores an average of about 10,000 acre-feet of water per year, and was designed to resist an earthquake measuring 8.0 on the Richter scale, with any point able to sustain a displacement of four feet without causing any overall structural damage (City GP pg. 10-10). An earthquake event of this magnitude is extremely unlikely. The Pacific Ocean is located more than 50 miles from the Pacific Ocean, which eliminates the potential for a tsunami to impact the project area. Additionally, a seiche would not occur within the vicinity of the project because no lakes or enclosed bodies of water exist near the site that could be impacted by such an event. It is anticipated that through compliance with the City's Municipal Code and implementation of the onsite drainage system, inundation hazards within the City would be reduced to a level of less than significant. Therefore, the potential to expose people or structures to a significant risk of pollutants due to inundation would be minimal. No mitigation is required.

e. *Less Than Significant Impact* – "In 2014, Governor Brown signed into law the Sustainable Groundwater Management Act, also known as SGMA. The Act took effect in 2015. It requires for the first time in state history that groundwater resources be sustainably managed by local agencies through the formation of Groundwater Sustainability Agencies (GSAs) in each basin that are deemed high-priority or medium-priority by the Department of Water Resources. In such basins, GSAs are required to develop and implement Groundwater Sustainability Plans."[11] According to the California Department of Water Resources Groundwater Sustainability Agency Formation Notification System[12], the groundwater basin underlying the project is not considered to be a basin that requires management under the Sustainable Groundwater Management Act. As such, the project would not

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[11] https://www.wmwd.com/461/Sustainable-Groundwater-Management-Act
[12] https://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&rz=true

conflict with a sustainable groundwater management plan. Water consumption and effects in this basins indicates that the proposed project's water demand is considered to be minimal. By controlling water quality during construction and operations through implementation of both short (SWPPP) and long (WQMP) term best management practices at the site, no potential for conflict or obstruction of the Regional Board's water quality control plan has been identified.

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact or Does Not Apply**
XI. LAND USE AND PLANNING: Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) 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?	☐	☐	☒	☐

SUBSTANTIATION

a. *No Impact* – The project site is zoned for Light Industrial use and designated by the City's General Plan as Industrial use. The surrounding uses include commercial uses to the north, west, and south, as well as Public Quasi Public uses to the east of the project site. The adjacent property to the west, and just to the east of the project contain similar uses, as they currently function as the SBMWD San Bernardino Water Reclamation Facility (east) and the existing SBMWD offices (west). As such, the addition of the SBMWD Water Facilities Relocation Project at this location would be consistent with both the uses surrounding the project and the surrounding land use designations and zoning classifications. Furthermore, the proposed project would develop a site currently containing an existing SBMWD office building, and as such further development in support of SBMWD would be consistent with both the uses surrounding the project and the surrounding land use designations and zoning classifications. Consequently, the development of the project site with the proposed use will not divide any established community in any manner. Therefore, no impacts under this issue are anticipated and no mitigation is necessary.

b. *Less Than Significant Impact* – As stated under issue XI(a) above, the project site is zoned for Light Industrial use and designated by the City's General Plan as Industrial use. The City requires compliance with setbacks and parking requirements, and the site plan intends to and currently meets these standards. Therefore, the implementation of this project at this site will be consistent with surrounding land uses, and current use of the site. Based on this information, implementation of the SBMWD Water Facilities Relocation Project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. Impacts under this issue are considered less than significant and no mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XII. MINERAL RESOURCES: Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

SUBSTANTIATION

a&b. *No Impact* – The proposed SBMWD Water Facilities Relocation Project site is in an urbanized area surrounded by development within the City of San Bernardino. The site does not contain known mineral deposits, and according to the City's General Plan Mineral Resource Zones map (Figure XII-1), the project site is located within an area designated as "MRZ-2: Areas where the available geologic information indicates that there are significant mineral deposits or that there is a likelihood of significant mineral deposits."[13] Given the past use of the site as the SBMWD offices, and that the site currently serves this purpose, no mining operations are known to have occurred at or in the vicinity of the project site. Furthermore, a large portion of the City of San Bernardino is designated as MRZ-2, most of which is not currently used for any mining activities. The City has not included this site within its Industrial Extractive classification, and as such, is not planned to be used for mining activities by the City. Therefore, the development of the project will not cause any loss of mineral resource values to the region or residents of the state, nor would it result in the loss of any locally important mineral resources identified in the City of San Bernardino General Plan. No impacts would occur under this issue. No mitigation is required.

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[13] San Bernardino General Plan

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XIII. NOISE: Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of a project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐
c) 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, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

SUBSTANTIATION:
"Noise Impact Analysis for San Bernardino Municipal Water Department Water Facilities Relocation Project, City of San Bernardino, California" prepared by Giroux & Associates dated March 3, 2021 and provided as Appendix 6 to this document.

Background

Noise is generally described as unwanted sound. The proposed SBMWD Water Facilities Relocation Project will be developed within a 7.86-acre site that will include the renovation of the existing structure on site, development of a new Administration Building, a new Warehouse Building, and a fueling station canopy. The project is located adjacent to the San Bernardino Animal Shelter, and is located adjacent to E Street, which experiences a relatively high volume of traffic resulting in a moderate background noise from both vehicles and animals adjacent to the site.

The unit of sound pressure ratio to the faintest sound detectable to a person with normal hearing is called a decibel (dB). Sound or noise can vary in intensity by over one million times within the range of human hearing. A logarithmic loudness scale, similar to the Richter scale for earthquake magnitude, is therefore used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all sound frequencies within the entire spectrum. Noise levels at maximum human sensitivity from around 500 to 2,000 cycles per second are factored more heavily into sound descriptions in a process called "A-weighting," written as "dBA."

Leq is a time-averaged sound level; a single-number value that expresses the time-varying sound level for the specified period as though it were a constant sound level with the same total sound energy as the time-varying level. Its unit is the decibel (dB). The most common averaging period for Leq is hourly.

Because community receptors are more sensitive to unwanted noise intrusion during more sensitive evening and nighttime hours, state law requires that an artificial dBA increment be added to quiet time noise levels. The State of California has established guidelines for acceptable community noise levels that are based on the Community Noise Equivalent Level (CNEL) rating scale (a 24-hour integrated noise measurement scale). The guidelines rank noise land use compatibility in terms of "normally acceptable," "conditionally acceptable," and "clearly unacceptable" noise levels for various land use types. The State Guidelines, Land Use Compatibility for Community Noise Exposure, single-family homes are "normally acceptable" in exterior noise environments up to 60 dB CNEL and "conditionally acceptable" up to 70 dB CNEL based on this scale. Multiple family residential uses are "normally acceptable" up to 65 dB CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries and churches are "normally acceptable" up to 70 dB CNEL, as are office buildings and business, commercial and professional uses with some structural noise attenuation.

Noise Thresholds
The City of San Bernardino General Plan Noise Element provides noise compatibility guidelines for a variety of uses. CNEL-based standards apply to noise sources whose noise generation is preempted from local control (such as from on-road vehicles, trains, airplanes, etc.) and are used to make land use decisions as to the suitability of a given site for its intended use. The City of San Bernardino considers office use “normally acceptable” up to 70 dBA CNEL and “conditionally acceptable” up to noise levels of up to 77 dBA CNEL. Industrial uses are not considered noise sensitive and are normally acceptable to levels of 75 dBA CNEL and conditionally acceptable up to 80 dBA CNEL.

The City of San Bernardino Municipal Code limits the time of construction to hours of lesser noise sensitivity. Per Section 8.54.070, Disturbances from Construction Activity, of the Municipal Code:

- No person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m. (Ord. MC-1246, 5-23-07)

Construction activities are exempt from numerical noise standards if there is adherence to these time-of-day restrictions.

The City of San Bernardino has no numerical noise thresholds for operational noise impacts. The Code does allow that noise is exempt when it is resulting from a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose (Municipal Code Section 8.54.060).

Baseline Noise Levels
Short term on-site noise measurements were made in order to document existing baseline levels in the project area. These help to serve as a basis for projecting future noise exposure from the project upon the surrounding community as well as determining project compatibility with the existing noise environment. Noise monitoring was conducted on Tuesday, February 9, 2021, in the early afternoon at two locations. Measurement locations are shown in Exhibit VIII-1 and are summarized below in Table XIII-1, and summarized below.

Exhibit VIII-1
NOISE METER LOCATIONS

Table XII-1
MEASURED NOISE LEVELS (dBA)

Site No.	Leq	Lmax	Lmin	L10	L50	L90
1	64	76	59	69	67	61
2	66	76	56	66	65	60

Sources of Impact
Two characteristic noise sources are typically identified with general development such as the proposed water facilities relocation project. Construction activities, especially heavy equipment, will create short-term noise increases near the project site. Upon completion, vehicular traffic on streets around the proposed project area may create a higher noise exposure. Traffic noise impacts are analyzed to ensure that the project does not adversely impact the acoustic environment of the surrounding community. In already-developed areas, the added land use intensity associated with a single project only increases traffic incrementally on existing roadways. These noise impacts are often masked by the baseline, and often preclude perception of any substantial noise level increase.

Impact Analysis

a. *Less Than Significant With Mitigation Incorporated* – The proposed project is located in a developed area and is adjacent to a major roadway which experiences heavy traffic due to its proximity to the I-215. According to the General Plan, traffic noise along E Street adjacent to the project generates noise at a level of about 73 dB CNEL at a 50 foot distance from the roadway centerline. Additionally, the proposed project is located within the 65-70+ dB CNEL contour from the centerline of the I-215 freeway within the vicinity of the project site. With no sensitive receptors located within close proximity to the project, and due to the moderate-to-high background noise levels at the project site, short-term noise levels associate with project construction activities will not impact any sensitive receptors, as the noise generated from adjacent traffic would dominate the noise environment at the nearest sensitive receptor.

Compatibility with the Existing Noise Environment
Meter 1 was located on the shared property line with the animal shelter. The observed noise level at Meter 1 was 64 dBA Leq. Monitoring experience shows that 24-hour weighted CNEL's can be reasonably well estimated from mid-afternoon noise readings by adding +2 or 3 decibels. This would equate to a CNEL of 66-69 dBA. This is the approximate exterior noise level that would be expected at Building B.

Meter 2 was located to the north of the site, approximately120 feet from the E Street centerline along Chandler Place. This location is closer to traffic on E Street and more representative of noise levels at future Building A which will contain offices. The observed Leq was 66 dBA which would translate to a CNEL of 68-69 dBA. As discussed, the City of San Bernardino considers office use "normally acceptable" to 70 dBA CNEL and "conditionally acceptable" to noise levels of up to 77 dBA CNEL. Therefore, the proposed office use is compatible with the existing noise environment.

Short-Term Noise
The City's Noise Ordinance (Municipal Code Chapter 8.54, Noise Control) controls hours of operation for multiple sources of excessive noise. Excessive noise is not permitted between the hours of 8:00 PM and 8:00 AM in residential zones, and between 8:00 PM and 7:00 AM in all other zones. However, the City does not have a significance threshold for CEQA to assess noise impacts during construction, and construction noise is a short-term temporary event that occurs mostly during daytime hours (such as 8:00 AM to 5:00 PM). Construction noise is considered a common necessity for new/modified development.

Construction noise exposure can be worsened when several pieces of equipment operate in close proximity. Because of the logarithmic nature of decibel addition, two equally loud pieces of equipment will be +3 dB louder than either one would be individually. Three simultaneous sources are +5 dB louder than any single source. Thus, while average operational equipment noise levels are perhaps 5 dB less than at peak power, simultaneous equipment operation can still yield an apparent noise strength equal to any individual source at peak noise output. The average heavy equipment reference noise level is 85 dB(A). Construction equipment generates noise that ranges between approximately 75 and 90 dBA at a distance of 50 feet. Refer to Table XIII-2 below, which shows construction equipment noise levels at 25, 50 and 100 feet from the noise source.

There are no sensitive uses surrounding the project site that would be impacted by construction noise. The nearest residence is to the northwest, across the 215 freeway, approximately 2,500 feet from the project site, along Scenic Drive. At 2,500 feet, in an urban environment and with an intervening freeway, construction noise will not be perceptible.

As discussed, the City of San Bernardino Municipal Code does not establish quantitative construction noise standards. Instead, the City, in Section 8.54.070 the City of San Bernardino Municipal Code, has established the allowable hours of construction to be between the hours of 7:00 AM and 8:00 PM. As such, through compliance with the City's noise standards, short-term construction impacts would not expose persons to or generate noise in excess of standards established by the City or by any other applicable agencies. However, to minimize the noise generated on the site to the extent feasible, the following mitigation measures shall be implemented:

NOI-1 ***Stationary construction equipment shall be located away from the adjacent animal shelter to the greatest extent feasible throughout the duration of construction.***

NOI-2 ***All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided adequate hearing protection devices to ensure no hearing damage will result from construction activities.***

NOI-3 ***No exterior construction activities shall occur during the hours of 6 PM through 7 AM, Monday through Saturday; at no time shall construction activities occur on Sundays or holidays, unless a declared emergency exists.***

NOI-4 ***Equipment not in use for five minutes shall be shut off.***

NOI-5 ***Equipment shall be maintained and operated such that loads are secured from rattling or banging.***

NOI-6 ***Construction employees shall be trained in the proper operation and use of equipment consistent with these mitigation measures, including no unnecessary revving of equipment.***

NOI-7 ***The City will require that all construction equipment be operated with mandated noise control equipment (mufflers or silencers). Enforcement will be accomplished by random field inspections by applicant personnel during construction activities.***

NOI-8 ***All construction vehicles and fixed or mobile equipment shall be equipped with operating and maintained mufflers.***

Thus, based on the existing noise circumstances within the vicinity of the project (i.e. from the I-215 and from existing traffic along E Street), short-term noise impacts are considered less than significant with the implementation of the mitigation measures above.

Table XIII-2
NOISE LEVELS OF CONSTRUCTION EQUIPMENT AT 25, 50 AND 100 FEET (in dBA LEQ) FROM THE SOURCE

Equipment	Noise Levels at 25 feet	Noise Levels at 50 feet	Noise Levels at 100 feet
Earthmoving			
Front Loader	85	79	73
Backhoes	86	80	74
Dozers	86	80	74
Tractors	86	80	74
Scrapers	91	85	79
Trucks	91	85	79
Material Handling			
Concrete Mixer	91	85	79
Concrete Pump	88	82	76
Crane	89	83	77
Derrick	94	88	82
Stationary Sources			
Pumps	82	79	70
Generator	84	78	72
Compressors	87	81	75
Other			
Saws	84	78	72
Vibrators	82	76	70

Source: U.S. Environmental Protection Agency "Noise"

Long-Term Noise

Project Related Traffic Noise Impacts
According to the project traffic analysis, the project will generate 344 daily trips from both the office and warehousing uses. Of the 344 daily trips 196 are office related and 148 are warehouse related. Of the warehousing trips, 72 will be passenger vehicles (SUV's, pick-up trucks, and vans), and 66 will be 4-axle trucks (flatbed trucks and dump/water trucks). These were assumed to be all heavy-duty diesel trucks.

The daily CNEL calculated with this vehicle mix would be 54.6 dBA. Because of the logarithmic nature of sound, the addition of 54.6 dBA CNEL to existing noise levels of 65-70 dBA CNEL as determined through noise monitoring would yield less than a +0.4 dBA project related noise increase. Project traffic would not create a perceptible noise increase on area roadways.

Project Operational Noise
There are no adjacent sensitive uses to the project site. Nevertheless, the primary noise associated with the project will be vehicular travel. According to the project traffic analysis, a peak hour would contain 133 vehicular movements (ins and outs). Of these 133 vehicles, 17 might be a heavy duty truck and the remaining 98 vehicles would be light duty vehicles such as passenger cars, SUV's or pick-up trucks. The associated hourly noise level would be 62 dBA at 50 feet. However, most parking is along the E Street frontage with a much greater setback than 50 feet. Nevertheless, this would be less than the 64 dBA Leq observed at the property line with the animal shelter. The net noise increase

resulting from adding 62 dBA to 64 dBA is +2.0 dBA. Therefore, project operational noise will not create a substantial impact at any adjacent uses.

Conclusion
As stated above, with the background noise from the I-215 and adjacent roadway, and the short-term, single event nature of the aforementioned activities, operational noise is not expected to violate the City Municipal Code noise standards (such as standards 8.54.050[B] and [G]), but will cause temporary increases in noise levels below significance thresholds. The project will be required to comply with the Noise Control standards outlined in the City Municipal Code which prohibits the timing of noisy events in the evening, thus with no long-term increases in ambient noise levels, impacts under this issue are considered less than significant. No mitigation is required.

b. *Less Than Significant With Mitigation Incorporated* – Vibration is the periodic oscillation of a medium or object. The rumbling sound caused by vibration of room surfaces is called structure borne noises. Sources of groundborne vibrations include natural phenomena (e.g. earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g. explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous or transient. Vibration is often described in units of velocity (inches per second), and discussed in decibel (dB) units in order to compress the range of numbers required to describe vibration. Vibration impacts related to human development are generally associated with activities such as train operations, construction, and heavy truck movements.

The FTA Assessment states that in contrast to airborne noise, ground-borne vibration is not a common environmental problem. Although the motion of the ground may be noticeable to people outside structures, without the effects associated with the shaking of a structure, the motion does not provoke the same adverse human reaction to people outside. Within structures, the effects of ground-borne vibration include noticeable movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. FTA Assessment further states that it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. However, some common sources of vibration are trains, trucks on rough roads, and construction activities, such as blasting, pile driving, and heavy earth-moving equipment. The Federal Transit Association (FTA) guidelines identify a level of 80 VdB for sensitive land uses. Groundborne vibrations from construction activities rarely reach levels that can damage structures. Because vibration is typically not an issue, very few jurisdictions have adopted vibration significance thresholds. Vibration thresholds have been adopted for major public works construction projects, but these relate mostly to structural protection (cracking foundations or stucco) rather than to human annoyance. The City of San Bernardino Development Code, Section 19.20.030[28] indicates: *No vibration associated with any use shall be permitted which is discernible beyond the boundary line of the property.* However, the City does not identify specific construction vibration level limits.

A vibration descriptor commonly used to determine structural damage is the peak particle velocity (ppv) which is defined as the maximum instantaneous positive or negative peak of the vibration signal, usually measured in in/sec. The range of such vibration is as follows in Table XIII-3:

Table XIII-3
HUMAN RESPONSE TO TRANSIENT VIBRATION

Average Human Response	PPV (in/sec)
Severe	2.000
Strongly perceptible	0.900
Distinctly perceptible	0.240
Barely perceptible	0.035

Source: Caltrans Transportation and Construction Vibration Guidance Manual, 2013.

Over the years, numerous vibration criteria and standards have been suggested by researchers, organizations, and governmental agencies. As shown in Table XIII-4, according to Caltrans and the FTA, the threshold for structural vibration damage for modern structures is 0.5 in/sec for intermittent sources, which include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Older structures have a 0.3 in/sec threshold. Below this level there is virtually no risk of building damage.

Table XIII-4
FTA AND CALTRANS GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

Building Type	PPV (in/sec)
FTA Criteria	
Reinforced concrete, steel or timber (no plaster)	0.5
Engineered concrete and masonry (no plaster)	0.3
Non-engineered timber and masonry buildings	0.2
Buildings extremely susceptible to vibration damage	0.12
Caltrans Criteria	
Modern industrial/commercial buildings	0.5
New residential structures	0.5
Older residential structures	0.3
Historic old buildings	0.25
Fragile Buildings	0.1
Extremely fragile ruins, ancient monuments	0.08

To be conservative, the damage threshold of 0.3 in/sec for older fragile structures was used in this analysis. The predicted vibration levels generated by construction equipment anticipated for use are shown below in Table XIII-5.

Table XIII-5
ESTIMATED VIBRATION LEVELS DURING PROJECT CONSTRUCTION

Equipment	PPV at 18 feet (in/sec)	PPV at 25 ft (in/sec)	PPV at 50 ft (in/sec)	PPV at 100 ft (in/sec)
Large Bulldozer	0.146	0.089	0.031	0.013
Jackhammer	0.057	0.035	0.012	0.005
Small Bulldozer	0.005	0.003	<0.001	<0.001

Source: FHWA Transit Noise and Vibration Impact Assessment

Building “C” is setback 18 feet from the shared animal services property line. As seen in Table XIII-5, if a large bulldozer operated 18 feet from the property line the predicted vibration level would be far below the structural damage threshold of older structures (i.e., 0.3 in/sec). However, the City of San Bernardino code states that vibration levels should not be discernible.

A small dozer has a much lower vibration signature that a large dozer. To ensure no discernible vibration is observed at the adjacent animal shelter property line, a large dozer should not be used within 50 feet of the shared property line. Although all project vibration will be well below any damage threshold, a separation distance of 50 feet for a large dozer would ensure that vibration be within the barely perceptible range. Therefore, the following mitigation measure shall be implemented to ensure no discernible vibration occur at any shared property line:

NOI-9 Only small dozers shall be used within 50 feet of any property line.

Thus, with the implementation of MM **NOI-9**, the proposed project would have a less than significant potential to result in generation of excessive groundborne vibration or groundborne noise levels.

c. *Less Than Significant Impact* – The nearest public airport is the San Bernardino International Airport, the boundary for which is just less than two miles to the east/northeast of the project site. According to the City of San Bernardino General Plan San Bernardino International Airport Planning Boundaries map—provided as Figure IX-18—the project site is not located within the designated planning boundary. The project site is located well outside of the Airport's current CNEL 65 noise contour (Figure XIII-1).[14] Based on the recent approval of the San Bernardino International Airport's Eastgate Building 1 Project, the noise contours will change significantly as Airport traffic increases related to the operation of the Eastgate Building 1 Project. As such, once constructed, the project site will be located near, but not within the 65 CNEL noise contour, which extends to Orange Show Road just east of Arrowhead Avenue, by around 2024 (Figure XIII-2). As such, the noise environment at the project site is anticipated to increase by the time that the proposed project is constructed and in operation. The project's is designated for Industrial use, and it is considered normally acceptable with exterior noise levels between 65 to 70 dBA. Furthermore, standard building construction typically provides up to 25 dBA CNEL of attenuation, which would reduce the interior noise levels within the building to satisfy the 65 dBA CNEL interior noise level standard of the City of San Bernardino General Plan Noise Element. As such, though the project is located within a high background noise environment from the I-215, Airport, and adjacent traffic noise, the noise levels at the project site would not exceed acceptable noise levels enforced by the City of San Bernardino; therefore, the project would have a less than significant potential to expose people residing or working in the project area to excessive noise levels.

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[14] San Bernardino County, 2018; AEDT 2d; Adapted by ESA, 2018

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XIV. POPULATION AND HOUSING: Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

SUBSTANTIATION

a. *Less Than Significant Impact* – According to the SCAG's profile for the City of San Bernardino (May 2019), the City had a population of 221,130 in 2018.[15] The type of use planned for the project site is not of a type that would induce substantial population growth in the area. No housing is proposed as part of the project. Relative to the total number residents of San Bernardino—approximately 221,130 persons—a temporary increase of about 50 construction employees as possible new residents represents a minor, temporary increase in the area population. The proposed project will not result in any new employees of SBMWD, as such with no permanent change in the work force, the proposed project is not anticipated to contribute to substantial growth in the area beyond that which has been planned by the City. Thus, based on the type of project, and the small increment of potential temporary indirect population growth the project may generate, the population generation associated with project implementation will not induce substantial population growth that exceeds either local or regional projections.

b. *No Impact* – The proposed project will occur on a site that currently contains an existing SBMWD offices, and is otherwise vacant. Implementation of the project will include the renovation of the existing structure on site, development of a new Administration Building, a new Warehouse Building, and a fueling station canopy. No housing is proposed as part of the project and no persons reside within the project site. Therefore, implementation of the project as a whole will not displace any existing housing or displace a substantial number of people that would necessitate the construction of replacement housing elsewhere. No impacts will occur as a result of project implementation. No mitigation is required.

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[15] https://scag.ca.gov/sites/main/files/file-attachments/sanbernardino_localprofile.pdf?1606014826

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XV. PUBLIC SERVICES: Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☒	☐
b) Police protection?	☐	☐	☒	☐
c) Schools?	☐	☐	☒	☐
d) Parks?	☐	☐	☒	☐
e) Other public facilities?	☐	☐	☒	☐

SUBSTANTIATION

a. *Less Than Significant Impact* – The existing SBMWD office site is currently served by the San Bernardino County Fire District (SBCFD), which responds to a wide variety of service call types. The nearest Fire Station is the SBCFD Station 231 located to the east of the project site at 450 E. Vanderbilt Way, San Bernardino, CA 92408. According to the San Bernardino County Fire Annual Report July 2017-June 2018, SBCFD will increase availability of fire protection services in the City by ensuring quicker response times during times with high call volumes from nearby county fire stations.[16] The proposed project would include the installation of fire hydrants to assist in combating potential fire hazards should they arise. As previously stated, due to the potential on-site use and storage of hazardous and flammable materials, the project would also require an Emergency/Contingency Plan that would establish procedures to follow in the event of an emergency situation (such as a fire or hazardous spill). Oversight for this Plan is provided by the County of San Bernardino Fire Department, Hazardous Materials Division, and would be reviewed annually and renewed every three years. Implementation of necessary maintenance, training and emergency preparation provided by the Emergency/Contingency Plan, would ensure that the proposed project would have a less than significant impact on fire protection services. Therefore, impacts under this issue are considered less than significant. No mitigation is necessary.

b. *Less Than Significant Impact* – The existing SBMWD office site is currently served by the San Bernardino Police Department, which is a municipal law enforcement agency responsible for the delivery of a full range of law enforcement services. The San Bernardino Police Department would provide police protection services to the project via their headquarters at 710 North “D” Street. The project site is located within existing patrol routes and future calls can be responded to within the identified priority call target response times. The proposed project will incrementally add to the existing demand for police protection services. The City’s General Fund covers operational expenses. The project is not expected to result in any unique or more extensive crime problems that cannot be handled with the existing level of police resources. No new or expanded police facilities would need to be constructed as a result of the project. Therefore, impacts to police protection resources from implementation of the proposed project are considered less than significant; no mitigation measures are required.

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[16] https://www.sbcfire.org/Portals/58/Documents/About/2017-18AnnualReport.pdf

c. *Less Than Significant Impact* – The proposed project will develop new facilities in support of and renovate an existing, in use SBMWD office site with a greater intensity of development. The project is not anticipated to generate any new direct demand for the area schools. The proposed project may place additional demand on school facilities, but such demand would be indirect and speculative. The City of San Bernardino is served by the San Bernardino City Unified School District (SBCUSD). The State of California requires a portion of the cost of construction of public schools to be paid through a fee collected on residential, commercial, and industrial developments. Given that the development proposed is for a public facility, the proposed project will not be subject to the development impact fee mitigation program of the San Bernardino City Unified School District (SBCUSD), which adequately provides for mitigating the impacts of from cumulative development in accordance with current state law. No additional mitigation measures are required to reduce school impacts of the proposed project to a less than significant level.

d. *Less Than Significant Impact* – The proposed project will not directly add to the existing demand on local recreational facilities. The proposed project will develop new facilities in support of and renovate an existing, in use SBMWD office site with a greater intensity of development. The project is not anticipated to generate any new direct demand for parks within the City, as project would have a minimal potential to induce substantial population growth within the City as discussed under Issue XIV, Population and Housing, above. According to the City of San Bernardino Department Fee Schedule,[17] the City does not impose their Park Development Impact Fees (DIF) on Commercial/Industrial/Public-Quasi Public land uses, therefore the project is not required to contribute DIF designated for park development. Thus, the proposed project will have a less than significant impact to parks and recreation facilities.

e. *Less Than Significant Impact* – Other public facilities include library and general municipal services. Since the project will not directly induce substantial population growth, it is not forecast that the use of such facilities will substantially increase as a result of the proposed project. Construction of new or rehabilitated facilities contributes to the City's ability to provide needed public services and enhance public access to those same service and systems. According to the City of San Bernardino Department Fee Schedule,[18] the City does not impose their Library DIF on Commercial/Industrial/Public-Quasi Public land uses, therefore the project is not required to contribute DIF designated for library or other public services development. Thus, any impacts under this issue are considered less than significant, and no mitigation is required.

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[17] http://www.sbcity.org/civicax/filebank/blobdload.aspx?blobid=26328
[18] http://www.sbcity.org/civicax/filebank/blobdload.aspx?blobid=26328

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XVI. RECREATION:				
a) Would the project 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?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

SUBSTANTIATION

a. *Less Than Significant Impact* – As addressed in the discussion under XIII and XVI(d) above, the proposed project does not include a use that would substantially induce population growth; as stated in the discussion under Population and Housing, no new permanent positions would be created as a result of the proposed SBMWD Water Facilities Relocation Project, with only 50 temporary construction positions that would be created as a result of the proposed project. Thus, the proposed project will not generate a substantial increase in residents of the City who would increase the use of or demand for existing recreational facilities. Additionally, the proposed project will be developed on land that is designated by the City's General Plan for Industrial use, and is not listed in any planning documents as desirable land for future park development. Given that the proposed project consists of the renovation of an existing use and development of greater intensity within this existing site use, and will not induce substantial population, the proposed SBMWD Water Facilities Relocation Project is not anticipated to result in a substantial increase in the use of existing park and recreation facilities. Therefore, any impacts under this issue are considered less than significant. No mitigation is required.

b. *Less Than Significant Impact* – The proposed project will renovate and expand an existing SBMWD office site with updated facilities. The project is currently in use as an SBMWD office site, and does not contain any recreational facilities. The renovation of the site will not include any recreational facilities, nor will it require the construction of new recreational facilities or expansion of new recreational facilities because the proposed project is not anticipated to substantially induce any population growth. As a result, no recreational facilities—existing or new—are required to serve the project, thus any impacts under this issue are considered less than significant. No mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XVII. TRANSPORTATION: Would the project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☒	☐	☐
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐
d) Result in inadequate emergency access?	☐	☒	☐	☐

SUBSTANTIATION: The following information utilized in this section of the Initial Study was obtained from the *San Bernardino Municipal Water Department Water Facilities Relocation Traffic Analysis* (TA) prepared by Urban Crossroads dated September 20, 2021. This TA is provided as Appendix 7a to this Initial Study. Additionally, Urban Crossroads prepared the VMT analysis for this project, it is titled “San Bernardino Municipal Water Department Water Facilities Relocation Vehicle Miles Traveled (VMT) Screening Analysis,” and is dated February 24, 2021 and provided as Appendix 7b.

a. *Less Than Significant With Mitigation Incorporated* – The proposed SBMWD Water Facilities Relocation Project will require relocation of existing staff from the Water Utility Division (which is comprised of an Administration Section, a Distribution Section, and an Operations Section) along with the Water Quality Section from another division to the 397 Chandler Place campus. The total number of employees to be relocated is 98 of the anticipated 200 persons that will be employed at the relocated SBMWD facilities. According to the Trip Generation Assessment (TGA) prepared by Urban Crossroads (Appendix 7a), the proposed project is anticipated to generate 344 two-way trips per day, with 84 AM peak hour trips and 133 PM peak hour trips. The City’s Guidelines require that truck intensive uses translate heavy truck trips to passenger car equivalents (PCE). The project is anticipated to generate 388 two-way PCE trips per day, with 92 PCE AM peak hour trips and 141 PCE PM peak hour trips. The project is anticipated to generate more than 50 peak hour trips (both actual and PCE based).

TA Analysis Scenarios

Existing Traffic Conditions (2021)

Information for Existing (2021) conditions is disclosed to represent the baseline traffic conditions. Traffic counts were collected at the existing study area intersections, however, due to the currently ongoing COVID-19 pandemic, new traffic counts were compared to historic counts (2015) and adjusted accordingly.

Existing Plus Project Conditions

The E+P conditions analysis determine the potential circulation system deficiencies based on a comparison of the E+P to Existing traffic conditions. The roadway network is similar to Existing conditions except for new connections to be constructed by the project. Project traffic has been added to the adjusted Existing (2021) traffic volumes.

Opening Year Cumulative Conditions (2022)

The Opening Year Cumulative (2022) Without and With Project traffic conditions analysis determines the potential cumulative near-term circulation system deficiencies. The roadway network is similar to Existing conditions except for new connections to be constructed by the project. To account for background traffic growth, an ambient growth factor of 3.0% from Existing conditions are included for Opening Year Cumulative (2022) Without and With Project traffic conditions.

Conservatively, the TA estimates the area ambient traffic growth and then adds traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed 3.0% of ambient growth; and some of these related projects may not be implemented and operational within the 2022 Opening Year time frame assumed for the project. The resulting traffic growth utilized in the TA (3.0% ambient growth factor plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2022 conditions.

Study Area

The 8 study area intersections listed in Table XVII-1 were selected for evaluation in this TA based on consultation with City of San Bernardino staff. Exhibit XVII-1 shows the study area intersections. The study area includes intersections where the project is anticipated to contribute 50 or more peak hour trips per the City of San Bernardino's TA Guidelines. The "50 peak hour trip" criterion represents a minimum number of trips at which a typical intersection would have the potential to be substantively affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and widely used within San Bernardino County for estimating a potential area of influence (i.e., study area).

The intent of the San Bernardino County Congestion Management Plan (CMP) is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. Study area intersections that are identified as CMP facilities in the County of San Bernardino per the San Bernardino County Transportation Authority (SBCTA) CMP are indicated in the table below.

Exhibit XVII-1: Study Area

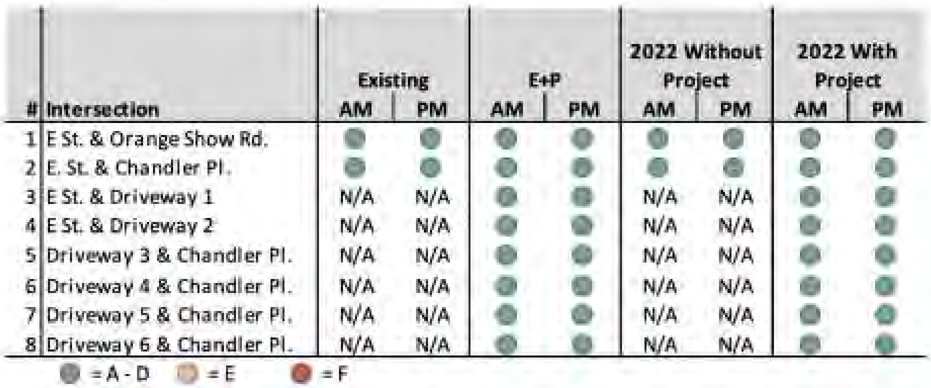
Table XVII-1
INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	E St. & Orange Show Rd.	San Bernardino	Yes
2	E. St. & Chandler Pl.	San Bernardino	No
3	E St. & Driveway 1	San Bernardino	No
4	E St. & Driveway 2	San Bernardino	No
5	Driveway 3 & Chandler Pl.	San Bernardino	No
6	Driveway 4 & Chandler Pl.	San Bernardino	No
7	Driveway 5 & Chandler Pl.	San Bernardino	No
8	Driveway 6 & Chandler Pl.	San Bernardino	No

Summary of Analysis Results

A summary of LOS results for all analysis scenarios is presented on Table XVII-2, below.

Table XVII-2
SUMMARY OF DEFICIENT INTERSECTIONS BY ANAYSIS SCENARIO



		Existing		E+P		2022 Without Project		2022 With Project	
#	Intersection	AM	PM	AM	PM	AM	PM	AM	PM
1	E St. & Orange Show Rd.	●	●	●	●	●	●	●	●
2	E. St. & Chandler Pl.	●	●	●	●	●	●	●	●
3	E St. & Driveway 1	N/A	N/A	●	●	N/A	N/A	●	●
4	E St. & Driveway 2	N/A	N/A	●	●	N/A	N/A	●	●
5	Driveway 3 & Chandler Pl.	N/A	N/A	●	●	N/A	N/A	●	●
6	Driveway 4 & Chandler Pl.	N/A	N/A	●	●	N/A	N/A	●	●
7	Driveway 5 & Chandler Pl.	N/A	N/A	●	●	N/A	N/A	●	●
8	Driveway 6 & Chandler Pl.	N/A	N/A	●	●	N/A	N/A	●	●

● = A - D ● = E ● = F

Notes: E+P = Existing and Project

Existing and Project Conditions

The study area intersections are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for E+P traffic conditions, consistent with Existing traffic conditions. In addition, the addition of project traffic is not anticipated to increase the volume to capacity (v/c) at the intersection of E Street at Orange Show Road by more than 0.02. As such, improvements have not been recommended for this location to reduce the change in v/c from the pre-project conditions.

Opening Year Cumulative Without and With Project Conditions (2022)

The study area intersections are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Opening Year Cumulative (2022) Without Project traffic conditions. The addition of Project traffic is not anticipated to increase the volume to capacity (v/c) at the intersection of E Street at Orange Show Road by more than 0.02. As such, improvements have not been recommended for this location to reduce the change in v/c from the pre-project conditions.

Recommendations

Site Adjacent and Site Access Recommendations

The following recommendations are based on the improvements needed to accommodate site access. Minimum turn pocket storage and intersection spacing have been evaluated in a queuing evaluation of the site adjacent intersections and project driveways and has been utilized for the recommendations below. As such, the following mitigation measure shall be implemented to enforce site access and site adjacent impacts from project implementation (illustrated on Figure XVII-1):

TRAN-1 The Applicant shall complete the following site and site adjacent improvements:

E Street & Chandler Place (#2) – The following improvements are necessary to accommodate site access:

- *Project shall restripe and extend the southbend left turn pocket to accommodate a minimum of 150-feet of storage.*

E Street & Driveway 1 (#3) – The following improvements are necessary to accommodate site access:

- *Project shall install a stop control on the westbound approach with a right turn lane.*

E Street & Driveway 2 (#4) – The following improvements are necessary to accommodate site access:

- *Project shall install a stop control on the westbound approach with a right turn lane.*

Driveway 3 & Chandler Place (#5) – The following improvements are necessary to accommodate site access:

- *Project shall install a stop control on the northbound approach with a shared left-right turn lane*

Driveway 4 & Chandler Place (#6) – The following improvements are necessary to accommodate site access:

- *Project shall install a stop control on the northbound approach with a shared left-right turn lane.*

Driveway 5 & Chandler Place (#7) – The following improvements are necessary to accommodate site access:

- *Project shall install a stop control on the northbound approach with a shared left-right turn lane.*

Driveway 6 & Chandler Place (#8) – The following improvements are necessary to accommodate site access:

- *Project shall install a stop control on the northbound approach with a shared left-right turn lane.*

TRAN-2 The project shall implement sidewalk improvements along the project frontages on E Street and Chandler Place and provide curb cuts to accommodate proposed driveway locations for site access.

No improvements are necessary to the intersection of E Street and Chandler Place from those that are currently in place.

TRAN-3 On-site traffic signing and striping shall be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the project site.

TRAN-4 Sight distance at each project access point shall be reviewed with respect to standard Caltrans and City of San Bernardino sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

Off-Site Recommendations
There are no recommended off-site improvements. However, the Applicant would be required to pay requisite DIF and/or fair share fees consistent with the City's requirements.

Truck Access and Circulation
Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid at the intersection of E Street and Chandler Place in order to determine verify the existing curb radii could accommodate turning trucks. It should be noted that there are existing 4+-axle trucks making the westbound right turn maneuver (albeit limited as there were only 2 in the AM peak hour observed and 1 in the PM peak hour). A WB-50 truck turn template has been utilized to determine the turning radius and the improvements needed to the intersection to accommodate westbound right turns for heavy trucks. As shown on Figure XVII-2, it is recommended the Bus Only lane be restriped (60-feet north of its current location) in order to accommodate the turning radius. As such, the following enforcing mitigation measure shall be implemented:

TRAN-5 The Bus Only lane shall be restriped (60-feet north of its current location) in order to accommodate the turning radius for trucks.

With implementation of the above mitigation measures which ensure that the Applicant shall contribute to on- and off-site roadway and intersection improvements impacted by project generated traffic, the project would have a less than significant impact on the roadway circulation system.

Construction Roadway Traffic
The project will also generate construction traffic, which is temporary; during construction, the project is anticipated to generate about 50 roundtrips per day, which will be spread throughout the day during construction. As such, construction traffic generated by the proposed project would contribute less than 50 peak hour trips to any driveway and off-site study area intersection, thus resulting in a less than significant construction impact.

Alternative Modes of Transportation Analysis
The project site is located in an area served by existing sidewalk and transit service. The project site is located within the service area of Omnitrans, specifically Omnitrans Routes sbX and 2, which run from Cal State San Bernardino area, in San Bernardino to the VA Hospital area in Loma Linda, with the major north-south route being located along E Street, which is the roadway along which the proposed project is located.[19] Transit routes are shown on Figures XVII-3 and XVII-4. These routes enable transit service throughout San Bernardino County, and through access to the San Bernardino Transit Center at E Street and Rialto Avenue, access to Los Angeles (LA), including Downtown LA, is provided by Metrolink. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget and community demand needs. It is not anticipated the project will result in a significant increase in demand for transit service. The bikeways within the vicinity of the project are shown on Figure XVII-5. These figures indicate that the project site is not located in an area served by bikeways, as the nearest bike paths are located along Arrowhead Avenue to the east and along Mill Street to the North of the project site. Therefore, bike paths are not anticipated to be interrupted by the construction of any off-site improvements (discussed under issue XVII[c] below). As such, it is not anticipated the project will result in a significant increase in demand for alternative transportation systems, and will be adequately served by existing systems in the vicinity of the project site. Finally, the project will involve site improvements and improvements to the adjacent sidewalk and roadway; the project will be required to improve the adjacent sidewalk/curb/gutter to City Standards, which will ensure that development of the project will not adversely impact pedestrian

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[19] https://w9x4b2e3.rocketcdn.me/wp-content/uploads/2020/12/January_Bus-Book-2021_rev1.pdf

facilities. No other impacts under this issue are anticipated. Impacts are therefore considered less than significant with mitigation incorporated.

b. *Less Than Significant Impact* – Senate Bill 743 mandates that California Environmental Quality Act (CEQA) guidelines be amended to provide an alternative to Level of Service for evaluating transportation impacts. The amended CEQA guidelines, specifically Section 15064.3, recommend the use of Vehicle Miles Traveled (VMT) for transportation impact evaluation. For the purposes of this analysis the recommended VMT analysis methodology and thresholds identified within the Technical Advisory and the City's new analysis methodology have been used.

It is our understanding that the City of San Bernardino utilizes the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool (Screening Tool). The Screening Tool allows users to input an assessor's parcel number (APN) to determine if a project's location meets one or more of the screening thresholds for land use projects as identified in San Bernardino County Transportation Authority (SBCTA) Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (SBCTA Guidelines) that addresses both traditional automobile delay-based level of service (LOS) and new VMT analysis requirements. (2) The City of San Bernardino then used the SBCTA Guidelines to develop its City of San Bernardino Traffic Impact Analysis Guidelines (August 2020) (City Guidelines). (3) These guidelines have been used to conduct this screening analysis.

<u>Project Screening</u>
The City Guidelines provides details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed project level analysis. Screening thresholds are broken into the following three steps:

- Transit Priority Area (TPA) Screening
  As described in the City Guidelines, projects located within a Transit Priority Area (TPA) (i.e., within 1/2 mile of an existing "major transit stop"1 or an existing stop along a "high-quality transit corridor"2) may be presumed to have a less than significant impact absent substantial evidence to the contrary. However, the presumption may not be appropriate if a project:
  - Has a Floor Area Ratio (FAR) of less than 0.75;
  - Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
  - Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
  - Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the Screening Tool results presented in Attachment B, the project site is not located within 1/2 mile of an existing major transit stop, or along a high-quality transit corridor. *The TPA screening threshold is not met.*

- Low VMT Area Screening
  The City Guidelines states that "residential and office projects located within a low VMT-generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related and mixed-use land use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per resident, per worker or per service population that is similar to the existing land uses in the low VMT area." The Screening Tool uses the sub-regional San Bernardino Transportation Analysis Model (SBTAM) to measure VMT performance within individual traffic analysis zones (TAZ's) within the SBCTA region. The project's physical location based on the APN is input into the Screening Tool to determine VMT generated by the existing TAZ as compared to the City's impact threshold of "better than General Plan Buildout VMT per service population". The parcel containing the proposed project was selected and the Screening Tool was run for the

Origin/Destination VMT per service population measure of VMT. Based on the Screening Tool results (see Attachment B), the project is not located within a low VMT generating zone. *The Low VMT Area screening threshold is not met.*

- Project Type Screening
  The City Guidelines identifies that local serving retail projects less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition to local serving retail, other types of local serving uses such as community institutions (public libraries, fire stations, local government, etc.) may also be presumed to have a less than significant impact as their uses are local serving in nature and would tend to shorten vehicle trips. The proposed SBMWD Project will relocate local serving municipal services within the same geographic region and would not result in an increase in employees due to the new location. *The Project Type screening threshold is met.*

Based on our review of applicable VMT screening thresholds, the proposed project meets the project Type screening and would therefore result in a less than significant VMT impact; no additional VMT analysis is required and no mitigation is necessary.

c. *Less Than Significant With Mitigation Incorporated* – The proposed project will occur entirely within the project site boundaries. However, construction activities will include curb improvements as well as installation of new access driveways to provide access to the site. Large trucks delivering equipment or removing demolition materials or excavated materials and debris can enter the site without major conflicts with the flow of traffic on the roadways used to access the site. Access to the site will be located at two points on E Street (western property boundary), and four points along Chandler Place (northern property boundary). These access points are similar to the access points provided at the site at present for SBMWD's current operations at this site, with one additional access point at both the northern and western boundaries. Access to the site must comply with all City design standards, and would be reviewed by the City to ensure that inadequate design features or incompatible uses do not occur. Additionally, the proposed project would be required to comply with all applicable fire code and ordinance requirements for construction and access to the site. Emergency response and evacuation procedures would be coordinated with the City, as well as the police and fire departments, resulting in less than significant impacts.

The proposed project will temporarily alter the adjacent sidewalk, possibly encroaching on adjacent roadway(s). Construction within and adjacent to these roadways may require partial lane closure; however, the project will ensure that each roadway can still operate during construction. In order to accomplish this, the project will require implementation of a traffic management plan in order to comply with the City of San Bernardino and the County of San Bernardino Master Plan of Roads and Circulation Plans, which will ensure adequate circulation within the City. As such, to mitigate the potential impacts to traffic flow, the following mitigation measure shall be implemented:

TRAN-6 ***The construction contractor will provide adequate traffic management resources, as determined by the City of San Bernardino. The City shall require a construction traffic management plan for work in public roads that complies with the Work Area Traffic Control Handbook, or other applicable standard, to provide adequate traffic control and safety during excavation activities. At a minimum this plan shall include the following:***

a) Methods to minimize the amount of time spent on construction activities;
b) Methods to minimize disruption of vehicle and alternative modes of transport traffic at all times, but particularly during periods of high traffic volumes;
c) Methods to maintain safe traffic flow on local streets affected by construction at all times, including through the use of adequate signage,

protective devices, flag persons or police assistance to ensure adequate traffic flow;

d) Identification of alternative routes, if necessary, that can meet the traffic flow requirements of a specific area, including communication (signs, webpages, etc.) with drivers and neighborhoods where construction activities will occur; and

e) Identification of methods or procedures to ensure that at the end of each construction day roadways shall be prepared for continued utilization without any significant roadway hazards remaining.

Upon implementation of a construction traffic management plan, any potential increase in hazards due to design features or incompatible use will be considered less than significant in the short term. Operation of the proposed SBMWD Administrative Building and associated facilities would be similar to both the existing and the surrounding uses, and the design of the project would not create any hazards to surrounding roadways. Thus, any impacts are considered less than significant with implementation of mitigation. No additional mitigation is required.

d. *Less Than Significant With Mitigation Incorporated* – Please refer to the discussion of site access provided under issue XVII(c) above. Site access will be provided along E Street, and along Chandler Place. The proposed project may involve a small amount of construction within adjacent roadways to the project site; emergency access will be ensured through implementation of mitigation measure **TRAN-6** above. Access to the site must comply with the mitigation measures identified above, and additionally, access to the site must comply with all City design standards, and would be reviewed by the City to ensure that inadequate design features or incompatible uses do not occur. Additionally, the proposed project would be required to comply with all applicable fire code and ordinance requirements for construction and access to the site. Emergency response and evacuation procedures would be coordinated with the City, as well as the police and fire departments. Thus, because of the lack of adverse impact on local circulation there is a less than significant potential to impact emergency access during construction or operation. No further mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XVIII. TRIBAL CULTURAL RESOURCES: Would the project cause a substantial change in the significance of tribal cultural resources, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to the California Native American tribe, and that is:				
a) 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	☐	☒	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in sub-division (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

SUBSTANTIATION

The Definition of a Tribal Cultural Resource includes:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that are either of the following: included or determined to be eligible for inclusion in the California Register of Historical Resources or included in a local register of historical resources as defined in subdivision (k) of Section 5020.1;
- A resource 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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purpose of this paragraph, the lead agency shall consider the significance of the resources to a California American tribe;
- A cultural landscape that meets the criteria of subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape;
- A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "non-unique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal resource if it conforms with the criteria of subdivision (a).

a. *Less Than Significant With Mitigation Incorporated* – The project site is located within the area of cultural significance for the Gabrieleño Band of Mission Indians – Kizh Nation, San Manuel Band of Mission Indians, and the Soboba Band of Luiseño Indians. As stated in the Project Description, the City sent letters to the Gabrieleño Band of Mission Indians – Kizh Nation, San Manuel Band of Mission Indians, and the Soboba Band of Luiseño Indians pursuant to AB-52. The tribes were contacted to initiate the AB-52 process on December 18, 2020 to notify the tribes of the proposed project through mailed letters. During the 30-day consultation period that concluded on January 16, 2021, the San Manuel Band of Mission Indians requested a copy of the Cultural Report, Geotechnical Report, and Project Plans showing the depth of disturbance. The City provided the requested documents, and since those documents were sent, the Tribe has requested the following mitigation measures in addition to MMs **CUL-2** through **CUL-4** identified under Section VI, Cultural Resources above:

TRC-1 ***The San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed in CR-1, of any pre-contact and/or historic-era cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a cultural resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with SMBMI, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents SMBMI for the remainder of the project, should SMBMI elect to place a monitor on-site.***

TRC-2 ***Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to SMBMI. The Lead Agency and/or applicant shall, in good faith, consult with SMBMI throughout the life of the project.***

AB 52 concluded with no further responses from any of the three tribes. As such, with implementation of MMs **CUL-1** through **CUL-4**, and the mitigation measures identified above, the project is not anticipated to cause a change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape, or object with cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe. No further mitigation is required.

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact or Does Not Apply**
XIX. UTILITIES AND SERVICE SYSTEMS: Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☒	☐	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☒	☐	☐

SUBSTANTIATION

a. Water

Less Than Significant Impact – Water will be provided by SBMWD (the Applicant). The project site is currently served by existing water transmission lines, and as such, the proposed project will be served by the existing water transmission line that currently serves the site. It is not anticipated that the relocation or construction of new or expanded water transmission would be required to serve the proposed project. The project would be supplied with water by SBMWD that mostly uses groundwater from the Bunker Hill Basin to meet customer demand. As previously stated under issue X, Hydrology and Water Quality, the District's Urban Water Management Plan (2015) identifies sufficient water resources to meet demand in its surface area. The project will operate under the guidelines outlined in the UWMP and within SBMWD's capacity, and the estimated water demand will represent only a nominal percentage of the surplus that currently exists in the water supply. The anticipated demand of water supply within SBMWD's retail service area is anticipated to be greater than the demand for water in the future, which indicates that the District has available capacity to serve the proposed project. Therefore, development of the SBMWD Water Facilities Relocation Project would not result in a significant environmental effect related to the relocation or construction of new or expanded water facilities. Impacts are less than significant.

Wastewater

Less Than Significant Impact – The Wastewater collection will be provided by SBMWD's Water Reclamation Plant (WRP). The project site is currently connected to and served by an existing sewer transmission line. It is not anticipated that the relocation or construction of new or expanded wastewater transmission would be required to serve the proposed project. The WRP is a 33 million gallon per day (MGD) regional secondary treatment facility that provides services to a number of cities, including the City of San Bernardino. The WRP receives approximately 28 MGD of wastewater per day, and therefore has available capacity to accommodate the project's wastewater generation. It is not anticipated that SBMWD would need to expand their existing facilities to accommodate the wastewater generated by the proposed project. This is discussed further under issue XIX(c) below. Therefore, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded wastewater facilities. Impacts are less than significant.

Stormwater

Less Than Significant Impact – The stormwater runoff, will be managed in accordance with the WQMP as discussed in the Hydrology and Water Quality Section (Section X) of this Initial Study. The project will require installation of drainage inlets at several locations within the project site and installation of catch basin filters, perforated infiltration chamber, pervious pavement, and other water quality control measures as required by the site specific WQMP. This drainage system will capture the incremental increase in runoff from the project site associated with project development. Impervious coverage of the site as proposed is anticipated to be about 83.25% (landscaped area will be about 16.75% of the site), and onsite surface flows will be collected and conveyed in a controlled manner as described above. This system will be designed to capture the peak 100-year flow runoff from the project site or otherwise be detained on site and discharged in conformance with San Bernardino County requirements. Therefore, surface water will be adequately managed on site and as such, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded stormwater facilities. Impacts are less than significant.

Electric Power

Less Than Significant Impact – Southern California Edison (SCE) currently provides electricity to the site and will continue to serve the project site with the greater intensity of development with sufficient electricity. No construction or relocation of electric facilities will be required to serve the project. Therefore, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded electric power facilities. Impacts are less than significant.

Natural Gas

Less Than Significant Impact – Natural gas will be supplied by Southern California Gas. The site will connect to the existing natural gas line that traverses the property, in which the project will be connected. No construction or relocation of natural gas facilities will be required to serve the project. Therefore, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded natural gas facilities. Impacts are less than significant.

Telecommunications

Less Than Significant Impact – Development of the SBMWD Water Facilities Relocation Project would require extension of telecommunication services through the existing connection to telecommunication services at the project site serving the existing SBMWD offices, including wireless internet service and phone service. No construction or relocation of telecommunication facilities will be required to serve the project. Therefore, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded telecommunications facilities. Impacts are less than significant.

b. *Less Than Significant Impact* - Please refer to the discussion under Hydrology, Section X(b) above. The anticipated available water supply within SBVMD's retail service area is anticipated to be greater than the demand for water in the future, which indicates that the SBVMD has available capacity to serve the proposed project. As such, given that the 2015 San Bernardino Valley Regional UWMP[20]

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[20] http://www.sbcity.org/civicax/filebank/blobdload.aspx?BlobID=20386

indicates that the District anticipates ample water supply will be available to serve the project's minimal daily demand it is anticipated that the project will have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. Impacts under this issue are considered less than significant.

c. *Less Than Significant Impact* – The proposed project would install additional wastewater infrastructure within the SBWMD office site including the renovation of the existing structure on site, development of a new Administration Building, a new Warehouse Building, and a fueling station canopy. All wastewater generated by the interior plumbing system of the new structures proposed by the project would be discharged into the local sewer main and conveyed for treatment through SBMWD's WRP. The WRP is a 33 MGD regional secondary treatment facility that provides services to a number of cities, including the City of San Bernardino. According to the SBMWD website, the WRP receives approximately 28 MGD of wastewater per day. The project will generate only a modest amount of wastewater, through the use of the onsite restroom facilities. This wastewater will represent a miniscule percentage of the available 5 MGDcapacity of the permitted wastewater treatment capacity available through SBMWD. As such, it is anticipated that there will be available capacity to accommodate the demand generated by the proposed project. Impacts under this issue are less than significant.

d&e. *Less Than Significant With Mitigation Incorporated* – The proposed project will generate demand for solid waste service system capacity and has a potential to contribute to potentially significant cumulative demand impacts on the solid waste system. Solid waste generation rates outlined on the CalRecycle[21] website indicate the following solid waste generation rates for specific uses, also below are the solid waste generation rates calculated for the proposed project.

- Public Institutional (new structures): 0.007 lb / 27,812 SF / day = **194.7 lbs / day**
- Industrial (new structures): 0.006 lb / 13,500 SF / day = **81 lbs / day**
- TOTAL: = **275.7 lbs / day**
  or 100,630.5 lbs /year

The total solid waste generated per year would equal about 50.32 tons, or after an assumed 50% diversion to be recycled per the state's solid waste diversion requirements under AB 939, the project solid waste generation will be about 25.16 tons per year. With the City's mandatory source reduction and recycling program, the proposed project is not forecast to cause a significant adverse impact to the waste disposal system.

The City of San Bernardino General Plan identifies landfills that serve the planning area. The San Timoteo Sanitary Landfill and Mid-Valley Sanitary Landfill serve the project area. The San Timoteo Sanitary Landfill has a maximum permitted daily capacity of 2,000 tons per day, with a permitted capacity of 20,400,000 cubic yards (CY), with 11,402,000 CY of capacity remaining. The Mid-Valley Sanitary Landfill has a maximum permitted daily capacity of 7,500 tons per day, with a permitted capacity of 101,300,000 CY, with 67,520,000 CY of capacity remaining. According to Jurisdiction Landfill Tonnage Reports from the City of San Bernardino, 192,667 total tons of solid waste was hauled to area landfills in 2018.[22] Therefore, the proposed project would consist of about 0.026% of solid waste generation within the City of San Bernardino. The City of San Bernardino contracts with Burrtec Waste and Recycling Services to provide regular trash, recycling, and green waste pickup. It is not anticipated that the project will generate a significant amount of construction waste, as the project aims to use any excavated material on site, with a neutral amount of cut and fill. However, should the proposed project need to remove any excess soils, the soil removal will be accomplished using trucks during normal working hours, with a maximum of 50 round trips per day. Additionally, any hazardous materials collected on the project site during either construction or operation of the project will be transported and disposed of by a permitted and licensed hazardous materials service

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[21] https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates

[22] https://www2.calrecycle.ca.gov/LGCentral/AnnualReporting/ReviewReports/DisposalTonnageTrend

provider, as stated under issue IX, Hazards and Hazardous Materials above. The construction contract for this project will require that concrete, asphalt and base material be recycled by grinding, which allows reuse of these materials. All metals, woods and equipment that are reusable shall be salvaged and recycled.

Thus, due to the small size of this project and the limited amount of wastes that will be generated, potential impacts to the waste disposal systems are considered less than significant. To further reduce potential less than significant impacts, the following mitigation measure shall be implemented:

UTIL-1 The contract with demolition and construction contractors shall include the requirement that all materials that can feasibly be recycled shall be salvaged and recycled. This includes but is not limited to wood, metals, concrete, road base and asphalt. The contractors shall submit a recycling plan to SBMWD for review and approval prior to the construction of demolition/construction activities.

Therefore, with the above mitigation measure, the project is expected to comply with all regulations related to solid waste under federal, state, and local statutes, and be served by a landfill(s) with sufficient permitted capacity to accommodate the project's solid waste disposal needs. No further mitigation is necessary.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XX. WILDFIRE: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire?	☐	☐	☐	☒
c) 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?	☐	☐	☐	☒
d) 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?	☐	☐	☐	☒

SUBSTANTIATION

a-d. *No Impact* – The proposed project is not located in or near state responsibility areas or lands classified as very high fire hazard severity zone, therefore the proposed project can have no impacts to any wildfire issues. As stated in previous sections, according to the City of San Bernardino Hazard Map for the project area, the proposed project is not located within the fire safety severity zone (Figure IX-19). Furthermore, according to CAL FIRE, the proposed project is not located within a Very High Fire Hazard Severity Zone in a Local Responsibility Area (LRA) or in a State Responsibility Area (SRA), which is illustrated on Figures XX-1 and XX-2. The proposed project area is located in an urban area removed from the high fire hazard areas that are located adjacent to the San Bernardino Mountains to the north. As such, no impacts under these issues are anticipated.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XXI. MANDATORY FINDINGS OF SIGNIFICANCE:				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

SUBSTANTIATION

The analysis in this Initial Study and the findings reached indicate that the proposed project can be implemented without causing any new project specific or cumulatively considerable unavoidable significant adverse environmental impacts. Mitigation is required to control potential environmental impacts of the proposed project to a less than significant impact level. The following findings are based on the detailed analysis of the Initial Study of all environmental topics and the implementation of the mitigation measures identified in the previous text and summarized following this section.

a. *Less Than Significant With Mitigation Incorporated* – The project has no potential to cause a significant impact any biological or cultural resources. The project has been identified as having no potential to degrade the quality of the natural environment, substantially reduce habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal. The project requires mitigation to prevent significant impacts from occurring as a result of implementation of the project. Based on the historic disturbance of the site, and its current condition, the potential for impacting cultural resources is low. The Cultural Resources Report determined that no cultural resources of importance were found at the project site, so it is not anticipated that any resources could be affected by the project because no cultural resources exist. However, because it is not known what could be unearthed upon any excavation activities, contingency mitigation measures are provided to ensure that, in the unlikely event that any resources are found, they are protected from any potential impacts. Please see biological and cultural sections of this Initial Study.

b. *Less Than Significant With Mitigation Incorporated* – The project has 11 potential impact categories that are individually limited, but may be cumulatively considerable. These are: Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology & Soils, Hazards & Hazardous Materials, Hydrology & Water Quality, Noise, Transportation, Tribal Cultural Resources, and Utilities & Service Systems. The project is not considered growth-inducing, as defined by *State CEQA Guidelines* (http://ceres.ca.gov/ceqa/guidelines/). These issues require the implementation of mitigation measures to reduce impacts to a less than significant level and ensure that cumulative effects are not cumulatively considerable. All other environmental issues were found to have no significant impacts without implementation of mitigation. The potential cumulative environmental effects of implementing the proposed project have been determined to be less than considerable and thus, less than significant impacts.

c. *Less Than Significant With Mitigation Incorporated* – The proposed project includes activities that have a potential to cause direct substantial adverse effects on humans. The issues of Air Quality, Geology and Soils, Hazards & Hazardous Materials, and Noise require the implementation of mitigation measures to reduce human impacts to a less than significant level. All other environmental issues were found to have no significant impacts on humans without implementation of mitigation. The potential for direct human effects from implementing the proposed project have been determined to be less than significant.

Conclusion

This document evaluated all CEQA issues contained in the latest Initial Study Checklist form. The evaluation determined that either no impact or less than significant impacts would be associated with the issues of Agriculture and Forestry Resources, Energy, Greenhouse Gases, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, Recreation, and Wildfire. The issues of Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology & Soils, Hazards & Hazardous Materials, Hydrology & Water Quality, Noise, Transportation, Tribal Cultural Resources, and Utilities & Service Systems, require the implementation of mitigation measures to reduce project specific and cumulative impacts to a less than significant level. The required mitigation has been proposed in this Initial Study to reduce impacts for these issues to a less than significant impact level.

Based on the evidence and findings in this Initial Study, the City of San Bernardino proposes to adopt a Mitigated Negative Declaration for the SBMWD Water Facilities Relocation Project. A Notice of Intent to Adopt a Mitigation Negative Declaration (NOI) will be issued for this project by the City. The Initial Study and NOI will be circulated for 20-days of public comment. At the end of the 20-day review period, a final MND package will be prepared and it will be reviewed by the City for possible adoption at a future Development / Environmental Review Committee (D/ERC) meeting, the date for which has yet to be determined. If you or your agency comments on the MND/NOI for this project, you will be notified about the meeting date in accordance with the requirements in Section 21092.5 of CEQA (statute).

Note: Authority cited: Sections 21083 and 21083.05, Public Resources Code. Reference: Section 65088.4, Gov. Code; Sections 21080(c), 21080.1, 21080.3, 21083, 21083.05, 21083.3, 21093, 21094, 21095, and 21151, Public Resources Code; *Sundstrom v. County of Mendocino*,(1988) 202 Cal.App.3d 296; *Leonoff v. Monterey Board of Supervisors*, (1990) 222 Cal.App.3d 1337; *Eureka Citizens for Responsible Govt. v. City of Eureka* (2007) 147 Cal.App.4th 357; *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th at 1109; San *Franciscans Upholding the Downtown Plan v. City and County of San Francisco* (2002) 102 Cal.App.4th 656.

Revised 2019
Authority: Public Resources Code sections 21083 and 21083.09
Reference: Public Resources Code sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3/ 21084.2 and 21084.3

SUMMARY OF MITIGATION MEASURES

Aesthetics

AES-1 Prior to approval of the Final Design, an analysis of potential glare from sunlight or exterior lighting to impact vehicles traveling on adjacent roadways shall be submitted to the City for review and approval. This analysis shall demonstrate that due to building orientation or exterior treatment, no significant glare may be caused that could negatively impact drivers on the local roadways or impact adjacent land uses. If potential glare impacts are identified, the building orientation, use of non-glare reflective materials or other design solutions acceptable to the City of San Bernardino shall be implemented to eliminate glare impacts.

Air Quality

AIR-1 Fugitive Dust Control. The following measures shall be incorporated into Project plans and specifications for implementation:

- Apply soil stabilizers or moisten inactive areas.
- Water exposed surfaces as needed to avoid visible dust leaving the construction site (typically 2-3 times/day).
- Cover all stock piles with tarps at the end of each day or as needed.
- Provide water spray during loading and unloading of earthen materials.
- Minimize in-out traffic from construction zone.
- Cover all trucks hauling dirt, sand, or loose material and require all trucks to maintain at least two feet of freeboard.
- Sweep streets daily if visible soil material is carried out from the construction site.

AIR-2 Exhaust Emissions Control. The following measures shall be incorporated into Project plans and specifications for implementation:

- Utilize well-tuned off-road construction equipment.
- Establish a preference for contractors using Tier 3 or better heavy equipment.
- Enforce 5-minute idling limits for both on-road trucks and off-road equipment.

AIR-3 The Department shall provide infrastructure to enable the future installation of solar panels to maximize the use of solar energy, when installation and reliance on solar energy is fiscally feasible.

AIR-4 Require the use of electric landscaping equipment, such as lawn mowers and leaf blowers.

AIR-5 Require use of electric or alternatively fueled sweepers with HEPA filters.

AIR-6 Maximize the planting of trees in landscaping and parking lots consistent with water availability.

AIR-7 Use light colored paving and roofing materials.

AIR-8 Utilize only Energy Star heating, cooling, lighting devices, and appliances, where applicable.

Biological Resources

BIO-1 Nesting bird surveys shall be conducted by a qualified avian biologist no more than three (3) days prior to vegetation clearing or ground disturbance activities. Preconstruction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the preconstruction nesting bird surveys, a Nesting Bird Plan (NBP) shall be prepared and implemented by the qualified avian biologist. At a minimum, the NBP shall include guidelines for addressing active nests, establishing buffers, ongoing monitoring, establishment of avoidance and minimization measures, and reporting. The size and location of all buffer zones, if required, shall be based on the nesting species, individual/pair's behavior, nesting stage, nest location, its sensitivity to disturbance, and intensity and duration of the disturbance activity. To avoid impacts to nesting birds, any grubbing or vegetation removal should occur outside peak breeding season (typically February 1 through September 1).

Cultural Resources

CUL-1 Should any cultural resources be encountered during construction of these facilities, earthmoving or grading activities in the immediate area of the finds shall be halted and an onsite inspection shall be performed immediately by a qualified archaeologist. Responsibility for making this determination shall be with the City's onsite inspector. The archaeological professional shall assess the find, determine its significance, and make recommendations for appropriate mitigation measures within the guidelines of the California Environmental Quality Act.

CUL-2 In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed within TCR-1, regarding any pre-contact and/or historic-era finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

CUL-3 If significant pre-contact and/or historic-era cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to SMBMI for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

CUL-4 If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.

Geology and Soils

GEO-1 Based upon the geotechnical investigation (Appendix 5a of this document), all of the recommended seismic design measures identified in Appendix 5a (listed on pages 7-8) shall be implemented by the City. Implementation of these specific measures will address all of the identified geotechnical constraints identified at project site, including seismic related hazards on the proposed structures.

GEO-2 Stored backfill material shall be covered with water resistant material during periods of heavy precipitation to reduce the potential for rainfall erosion of stored backfill material. Where covering is not possible, measures such as the use of straw bales or sand bags shall be used to capture and hold eroded material on the project site for future cleanup such that erosion does not occur.

GEO-3 All exposed, disturbed soil (trenches, stored backfill, etc.) shall be sprayed with water or soil binders twice a day, or more frequently if fugitive dust is observed migrating from the site within which the project is being constructed.

GEO-4 Based upon the geotechnical investigation (Appendix 5a of this document), all of the recommended design measures identified in Appendix 5a (listed on pages 7-15) shall be implemented by the City. Implementation of these specific measures will address all of the identified geotechnical constraints identified at project site.

GEO-5 Should any paleontological resources be encountered during construction of these facilities, earthmoving or grading activities in the immediate area of the finds shall be halted and an onsite inspection should be performed immediately by a qualified paleontologist. Responsibility for making this determination shall be with the City's onsite inspector. The paleontological professional shall assess the find, determine its significance, and determine appropriate mitigation measures within the guidelines of the California Environmental Quality Act that shall be implemented to minimize any impacts to a paleontological resource.

Hazards and Hazardous Materials

HAZ-1 All accidental spills or discharge of hazardous material during construction activities shall be reported to the Certified Unified Program Agency and shall be remediated in compliance with applicable state and local regulations regarding cleanup and disposal of the contaminant released. The contaminated waste will be collected and disposed of at an appropriately a licensed disposal or treatment facility. This measure shall be incorporated into the SWPPP prepared for the proposed SBMWD Water Facilities Project. Prior to accepting the site as remediated, the area contaminated shall be tested to verify that any residual concentrations meet the standard for future residential or public use of the site.

HAZ-2 SBMWD shall prepare an updated Business Plan, with a Spill Prevention Control Counter-measures Plan, and submit this document to the City Fire Department for review and approval. All hazardous materials that could potentially be used at the project site shall be identified (including quantities); methods of storage shall be defined; measures to prevent release of the hazardous materials to the environment shall be defined; and management procedures for disposal of hazardous waste, including proper manifesting, shall be identified. The City Fire Department shall review and approve this plan prior to movement of any hazardous materials onto the site.

Hydrology and Water Quality

HYD-1 The City shall require that the construction contractor prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving offsite into receiving waters. The SWPPP shall include a Spill Prevention and Cleanup Plan that identifies the methods of containing, cleanup, transport and proper disposal of hazardous chemicals or materials released during construction activities that are compatible with applicable laws and regulations. BMPs to be implemented in the SWPPP may include but not be limited to:

- The use of silt fences;
- The use of temporary stormwater desilting or retention basins;
- The use of water bars to reduce the velocity of stormwater runoff;
- The use of wheel washers on construction equipment leaving the site;
- The washing of silt from public roads at the access point to the site to prevent the tracking of silt and other pollutants from the site onto public roads;
- The storage of excavated material shall be kept to the minimum necessary to efficiently perform the construction activities required. Excavated or stockpiled material shall not be stored in water courses or other areas subject to the flow of surface water; and
- Where feasible, stockpiled material shall be covered with waterproof material during rain events to control erosion of soil from the stockpiles.

Noise

NOI-1 Stationary construction equipment shall be located away from the adjacent animal shelter to the greatest extent feasible throughout the duration of construction.

NOI-2 All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided adequate hearing protection devices to ensure no hearing damage will result from construction activities.

NOI-3 No construction activities shall occur during the hours of 5 PM through 7 AM, Monday through Saturday; at no time shall construction activities occur on Sundays or holidays, unless a declared emergency exists.

NOI-4 Equipment not in use for five minutes shall be shut off.

NOI-5 Equipment shall be maintained and operated such that loads are secured from rattling or banging.

NOI-6 Construction employees shall be trained in the proper operation and use of equipment consistent with these mitigation measures, including no unnecessary revving of equipment.

NOI-7 The City will require that all construction equipment be operated with mandated noise control equipment (mufflers or silencers). Enforcement will be accomplished by random field inspections by applicant personnel during construction activities.

NOI-8 All construction vehicles and fixed or mobile equipment shall be equipped with operating and maintained mufflers.

NOI-9 Only small dozers shall be used within 50 feet of any property line.

Transportation

TRAN-1 The Applicant shall complete the following site and site adjacent improvements:

E Street & Chandler Place (#2) – The following improvements are necessary to accommodate site access:

- Project shall restripe and extend the southbend left turn pocket to accommodate a minimum of 150-feet of storage.

E Street & Driveway 1 (#3) – The following improvements are necessary to accommodate site access:

- Project shall install a stop control on the westbound approach with a right turn lane.

E Street & Driveway 2 (#4) – The following improvements are necessary to accommodate site access:

- Project shall install a stop control on the westbound approach with a right turn lane.

Driveway 3 & Chandler Place (#5) – The following improvements are necessary to accommodate site access:

- Project shall install a stop control on the northbound approach with a shared left-right turn lane

Driveway 4 & Chandler Place (#6) – The following improvements are necessary to accommodate site access:

- Project shall install a stop control on the northbound approach with a shared left-right turn lane.

Driveway 5 & Chandler Place (#7) – The following improvements are necessary to accommodate site access:

- Project shall install a stop control on the northbound approach with a shared left-right turn lane.

Driveway 6 & Chandler Place (#8) – The following improvements are necessary to accommodate site access:

- Project shall install a stop control on the northbound approach with a shared left-right turn lane.

TRAN-2 The project shall implement sidewalk improvements along the project frontages on E Street and Chandler Place and provide curb cuts to accommodate proposed driveway locations for site access.

TRAN-3 On-site traffic signing and striping shall be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the project site.

TRAN-4 Sight distance at each project access point shall be reviewed with respect to standard Caltrans and City of San Bernardino sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

TRAN-5 The Bus Only lane shall be restriped (60-feet north of its current location) in order to accommodate the turning radius for trucks.

TRAN-6 The construction contractor will provide adequate traffic management resources, as determined by the City of San Bernardino. The City shall require a construction traffic management plan for work in public roads that complies with the Work Area Traffic Control Handbook, or other applicable standard, to provide adequate traffic control and safety during excavation activities. At a minimum this plan shall include the following:

a) Methods to minimize the amount of time spent on construction activities;
b) Methods to minimize disruption of vehicle and alternative modes of transport traffic at all times, but particularly during periods of high traffic volumes;
c) Methods to maintain safe traffic flow on local streets affected by construction at all times, including through the use of adequate signage, protective devices, flag persons or police assistance to ensure adequate traffic flow;
d) Identification of alternative routes, if necessary, that can meet the traffic flow requirements of a specific area, including communication (signs, webpages, etc.) with drivers and neighborhoods where construction activities will occur; and
e) Identification of methods or procedures to ensure that at the end of each construction day roadways shall be prepared for continued utilization without any significant roadway hazards remaining.

Tribal Cultural Resources

TRC-1 The San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed in CR-1, of any pre-contact and/or historic-era cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a cultural resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with SMBMI, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents SMBMI for the remainder of the project, should SMBMI elect to place a monitor on-site.

TRC-2 Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to SMBMI. The Lead Agency and/or applicant shall, in good faith, consult with SMBMI throughout the life of the project.

Utilities and Service Systems

UTIL-1 The contract with demolition and construction contractors shall include the requirement that all materials that can feasibly be recycled shall be salvaged and recycled. This includes but not limited to wood, metals, concrete, road base and asphalt. The contractors shall submit a recycling plan to SBMWD for review and approval prior to the construction of demolition/construction activities.

REFERENCES

California Department of Fish and Wildlife California Natural Diversity Database (CNDDB) generated on November 24, 2020, pertaining to the SBMWD Water Facilities Relocation Project site project area only

CRM TECH, *"Historical/Archaeological Resources Survey Report, San Bernardino Municipal Water Department Water Facilities Relocation Project, California"* dated March 15, 2021

Giroux & Associates, *"Air Quality and GHG Impact Analysis, San Bernardino Municipal Water Department Water Facilities Relocation Project, San Bernardino, California"* dated March 3, 2021

Giroux & Associates, *"Noise Impact Analysis, San Bernardino Municipal Water Department Water Facilities Relocation Project, San Bernardino, California"* dated March 3, 2021

John R. Byerly Incorporated, *"Soils Investigation New Administration and Warehouse Buildings for City of San Bernardino Municipal Water Department (SBMWD) Southeast Corner of Chandler Place and South E Street, San Bernardino, California"* dated April 23, 2021

City of San Bernardino General Plan, November 1, 2005

San Bernardino County, 2018; AEDT 2d; Adapted by ESA, 2018

Urban Crossroads, *"San Bernardino Municipal Water Department Water Facilities Relocation Project, Energy Analysis, City of San Bernardino, California"* dated July 1, 2021

Urban Crossroads, *"San Bernardino Municipal Water Department Water Facilities Relocation Traffic Analysis* (Revised)" dated September 20, 2021

Urban Crossroads, *"San Bernardino Municipal Water Department Water Facilities Relocation Vehicle Miles Traveled (VMT) Screening Analysis"* dated February 24, 2021

U.S. Department of Agriculture Web Soil Survey

U.S. Fish and Wildlife Service *IPaC Trust Resources Report* generated on November 24, 2020

Websites

http://www.aqmd.gov/home/rules-compliance/compliance/gasoline-dispensing2
https://soilseries.sc.egov.usda.gov/OSD_Docs/G/GRANGEVILLE.html
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https://w9x4b2e3.rocketcdn.me/wp-content/uploads/2020/12/January_Bus-Book-2021_rev1.pdf
http://www.sbcity.org/civicax/filebank/blobdload.aspx?BlobID=20386
https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates
https://www2.calrecycle.ca.gov/LGCentral/AnnualReporting/ReviewReports/DisposalTonnageTrend

FIGURES

FIGURE 1

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Regional Location

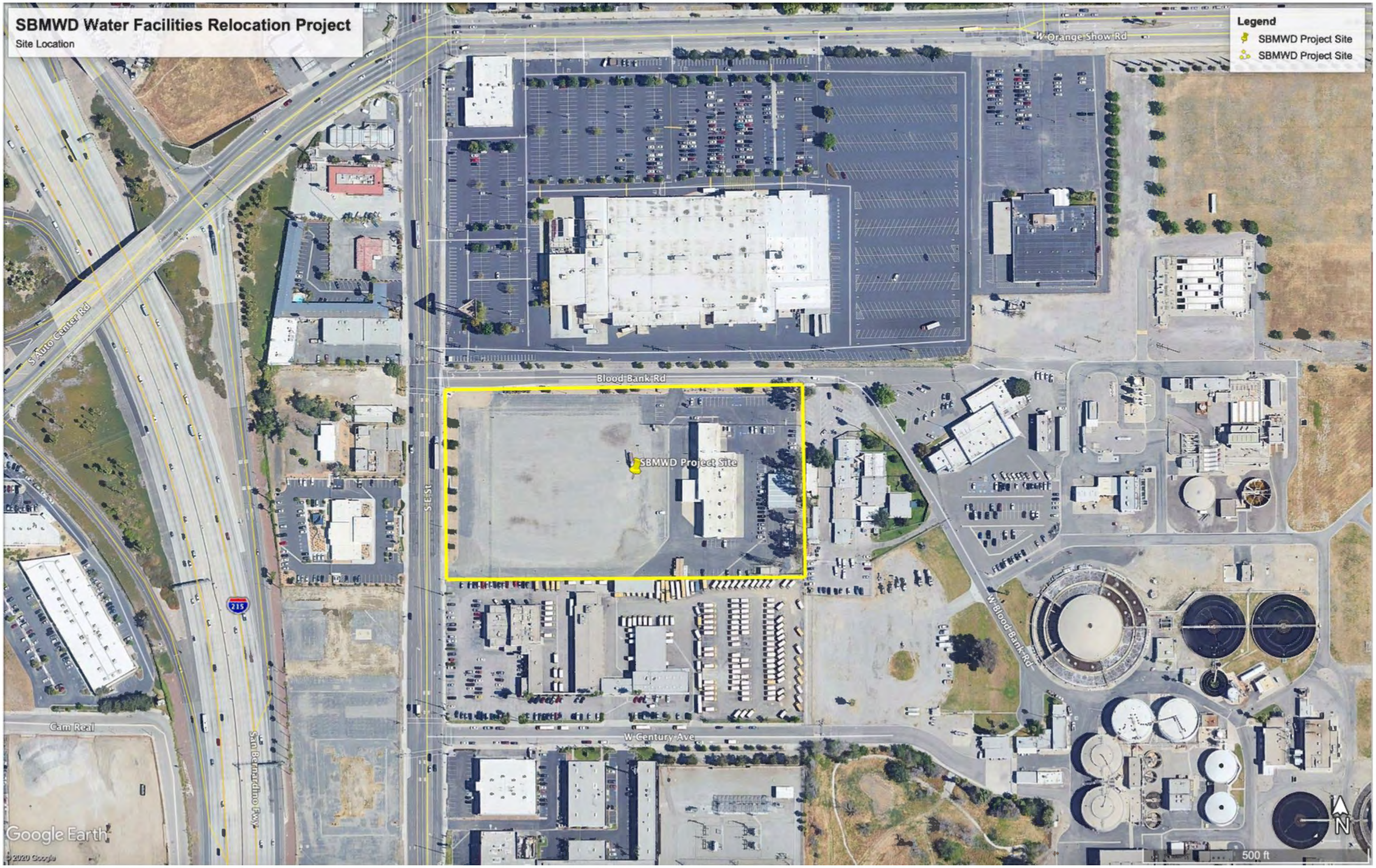

FIGURE 2

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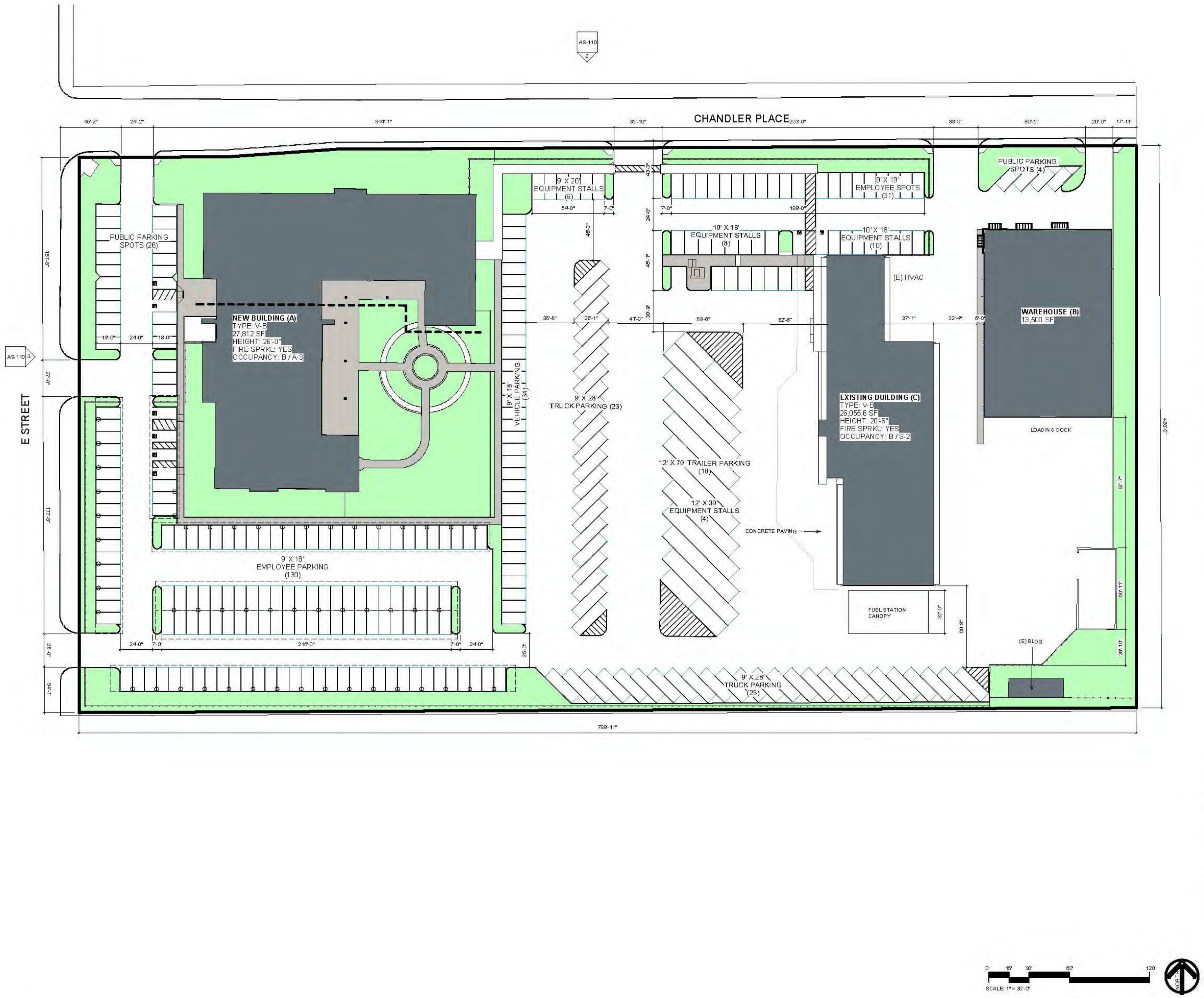
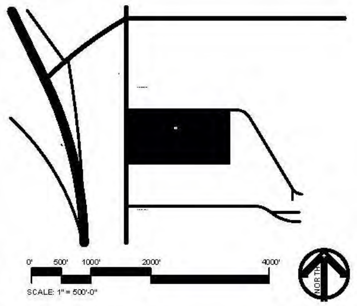
Environmental Consultants

Site Location



SITE PLAN | SCALE 1" = 30'-0" | 1



VICINITY MAP | SCALE 1" = 500'-0" | 2

PROJECT SITE INFORMATION:

CURRENT ZONING: IL (INDUSTRIAL LIGHT)
CURRENT LAND USE: INDUSTRIAL
CURRENT SPECIFIC PLAN:
EXISTING % BUILDING COVERAGE:
16,420.67 / 342,426.48 SQ FT = 4.8%
PROPOSED % BUILDING COVERAGE:
43,073.67 / 342,426.48 SQ FT = 12.6%

TABLE 11B-208.2
PARKING SPACES

TOTAL NUMBER OF PARKING SPACES PROVIDED IN PARKING FACILITY	MINIMUM NUMBER OF REQUIRED ACCESSIBLE PARKING SPACES
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total
1001 and over	20, pus 1 for each 100, or fraction thereof, over 1000

NEWBUILDING (A)
PUBLIC PARKING SPOTS: 26
EMPLOYEE PARKING: 25 + 73 + 31 = 129
TOTAL AVAILABLE PARKING: 155

REQUIRED ACCESSIBLE PARKING: 5
PROVIDED ACCESSIBLE PARKING: 5

EXISTING BUILDING (C)
PUBLIC PARKING SPOTS: 4
EMPLOYEE PARKING: 31
TOTAL AVAILABLE PARKING: 39

REQUIRED ACCESSIBLE PARKING: 2
PROVIDED ACCESSIBLE PARKING: 2

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interiors
planning

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Phone: 909-335-7400
Fax: 909-335-7299
info@miller-aip.com

LICENSED ARCHITECT
GARY W. MILLER
No. C 14635
REN. 9-30-19
STATE OF CALIFORNIA

owner approval

initials	date	phase

revisions/addenda

Date Comment

SAN BERNARDINO MUNICIPAL WATER
DEPARTMENT PROJECT

San Bernardino Water Department

1331 "E" STREET
SAN BERNARDINO, CA 92408

project information

Project Number:	Project Number
Drawn By:	Author
Checked By:	GWM
Issue Date:	4/6/2020
APN:	0141-291-07-0000

sheet name

SITE PLAN

sheet number

AS-102

Sheet Of Sheets

SOURCE:

FIGURE 3

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Environmental Consultants

Site Plan

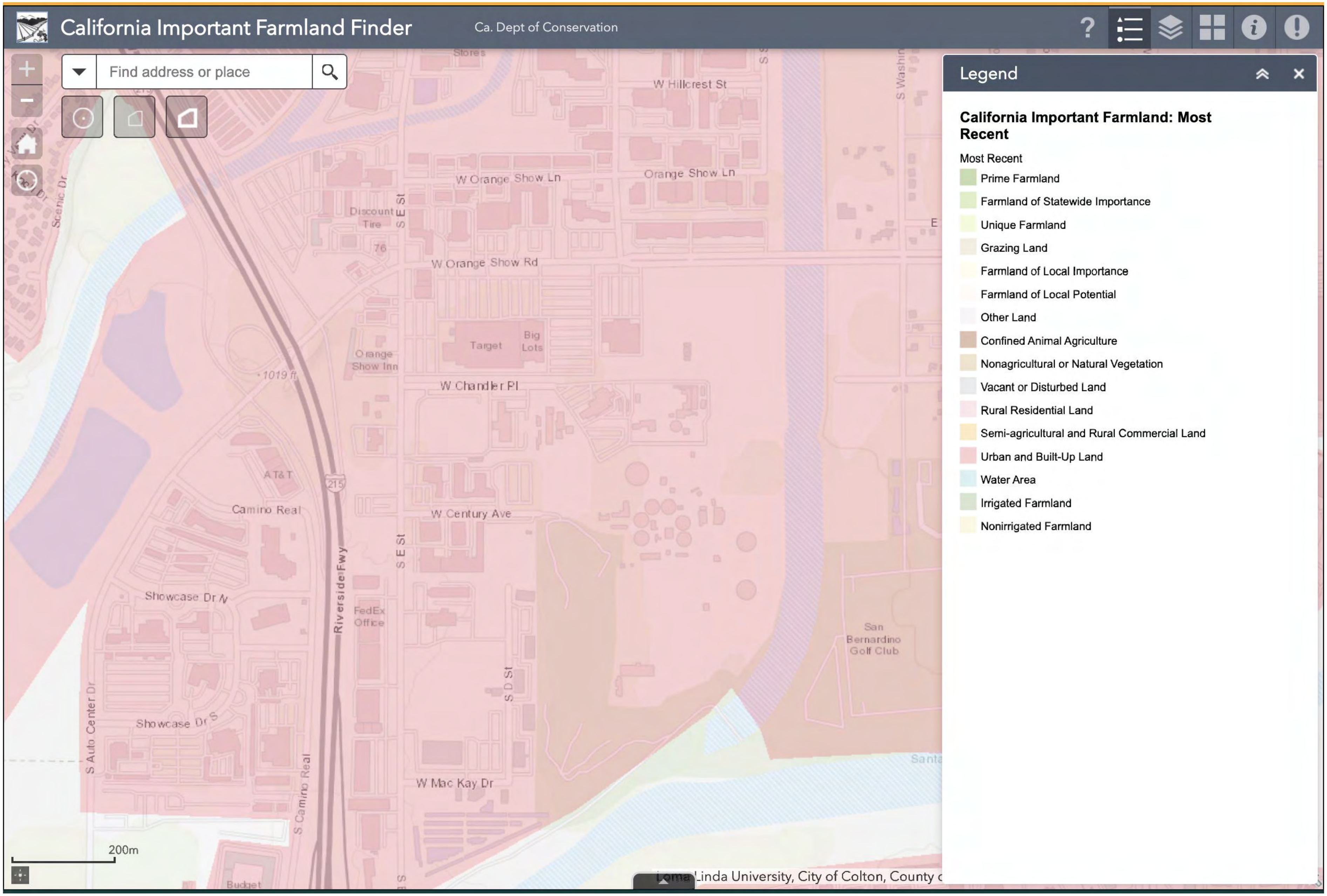

FIGURE II-1

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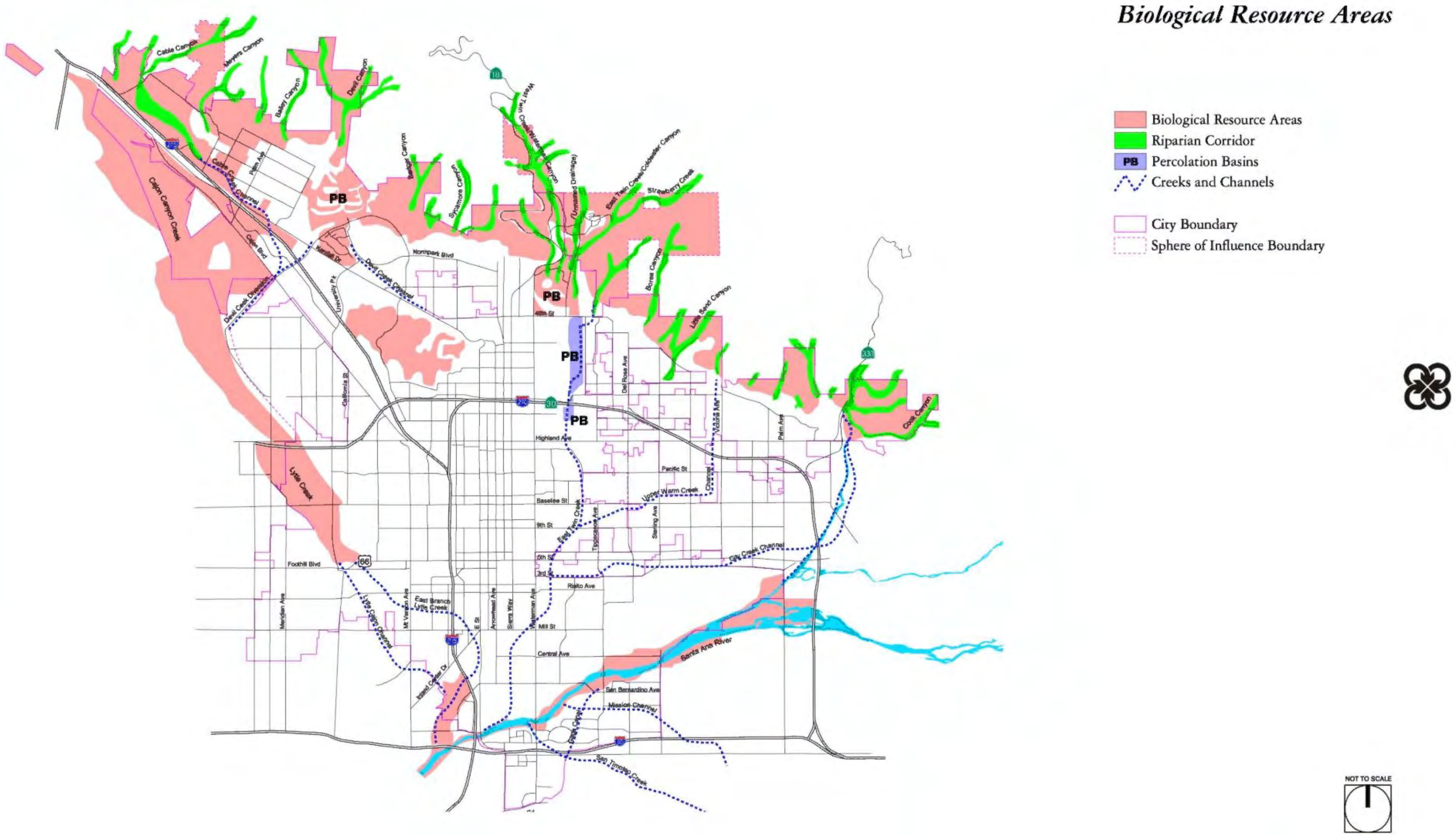
Farmland Map



SOURCE: City of San Bernardino General Plan (Figure 5.3-2), November 2005

FIGURE IV-1

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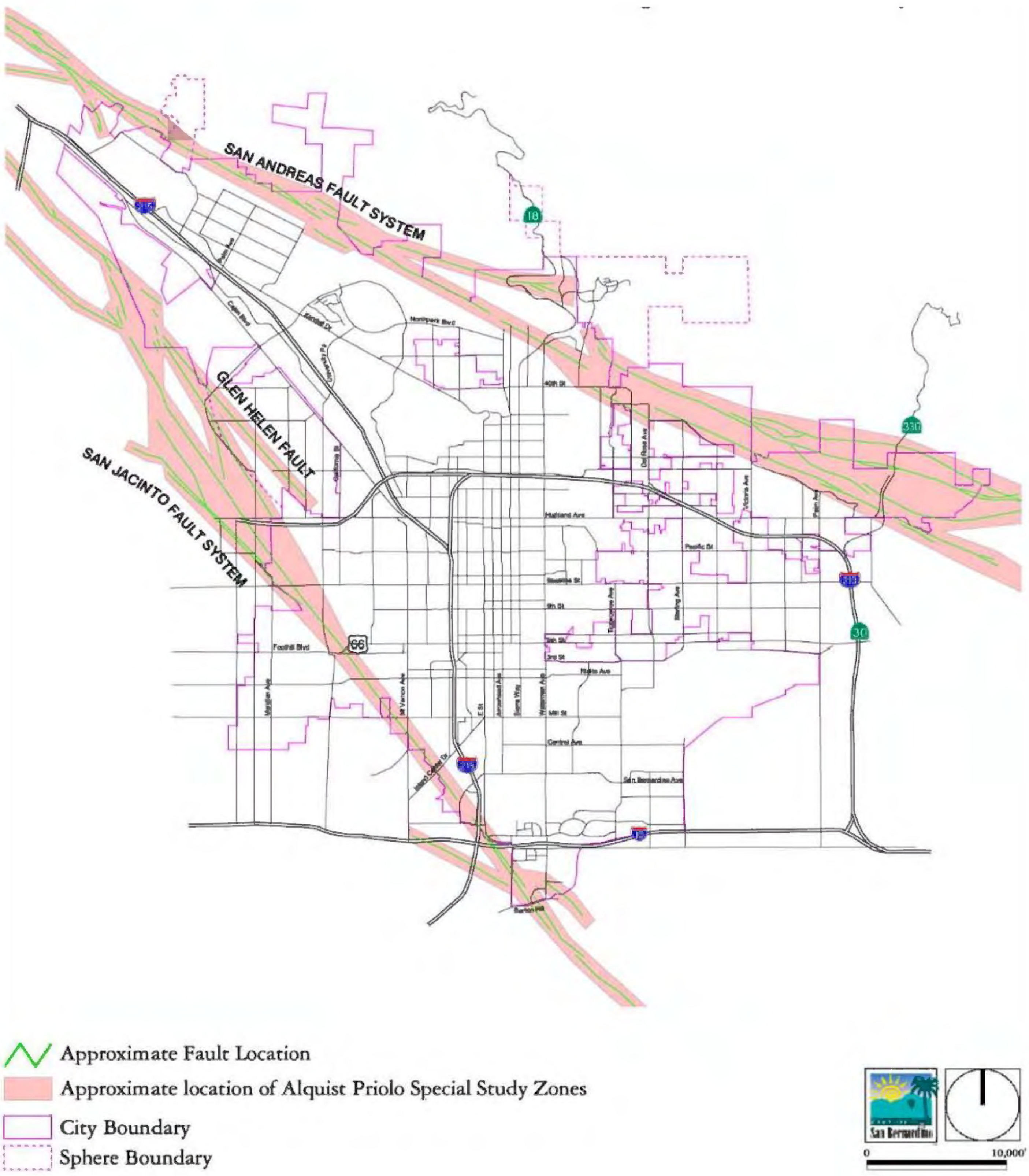
Biological Resource Areas



SOURCE: City of San Bernardino General Plan (Figure S-3), November 2005

FIGURE VII-1

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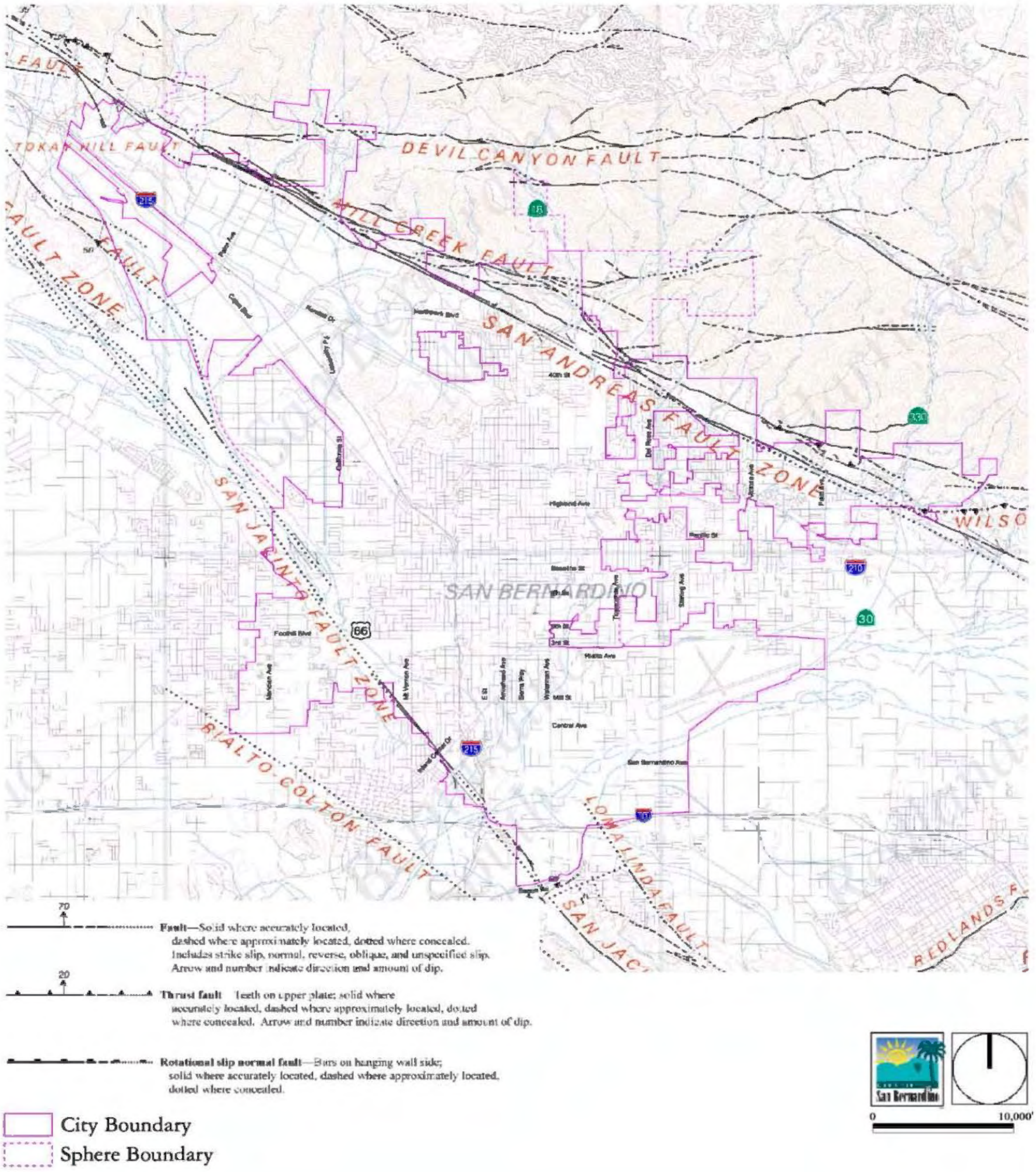
Alquist-Priolo Study Zone



SOURCE: City of San Bernardino General Plan (Figure S-4), November 2005

FIGURE VII-2

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Regional Faults

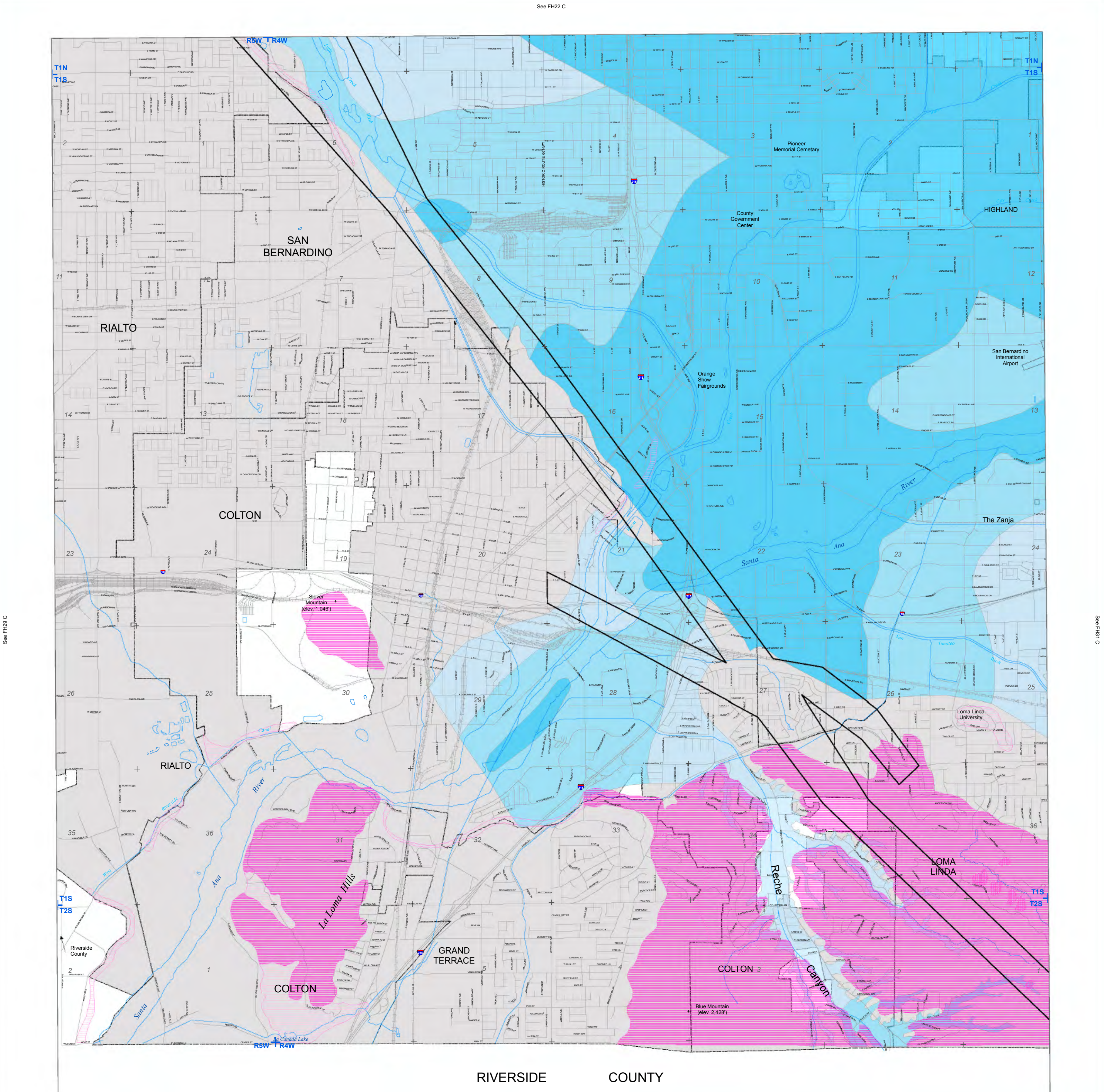


FIGURE VII-3

San Bernardino County Land Use Plan
GENERAL PLAN
Geologic Hazard Overlays

SCALE 1:14,400

1,250 625 0 1,250 2,500 3,750 5,000 Feet

0.5 0.25 0 0.5 1 Miles

Generalized Landslide Susceptibility

- ▨ Low to moderate
- ▨ Moderate to high
- ▨ Mapped, Existing Landslide
- ▨ Rockfall/Debris-Flow Hazard Area (Forest Falls Only)

Map data originally compiled on 1:48,000 scale mosaicked maps photo-reduced from 7-1/2 minute USGS quads by D.M. Morton, U.S. Geological Survey, 1974 and by S.S. Tan, State Division of Mines and Geology, 1989.

Positional accuracy of map data is at best plus or minus 150 feet.

Zone of Suspected Liquefaction Susceptibility

- ☐ Zone of Susceptibility

The Zone of Suspected Liquefaction Susceptibility layer compiled by the San Bernardino County Geologist, 2009

Positional accuracy of map data is at best plus or minus 200 feet.

Generalized Liquefaction Susceptibility

- ▨ Low
- ▨ Medium
- ▨ High

Map data originally compiled on 1:48,000 scale mosaicked maps photo-reduced from 7-1/2 minute USGS quads by J.E. Matti and S.E. Carson, 1986.

Positional accuracy of map data is at best plus or minus 150 feet.

Earthquake Fault Zones

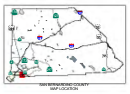
- ▬ ▬ Earthquake Fault Zone Boundary
- ▬ ▪ ▬ County Designated Fault Zones

☐ Cities

Map data compiled on 7-1/2 and 15-minute USGS quadrangle maps by the State of California, Division of Mines and Geology, 1987.

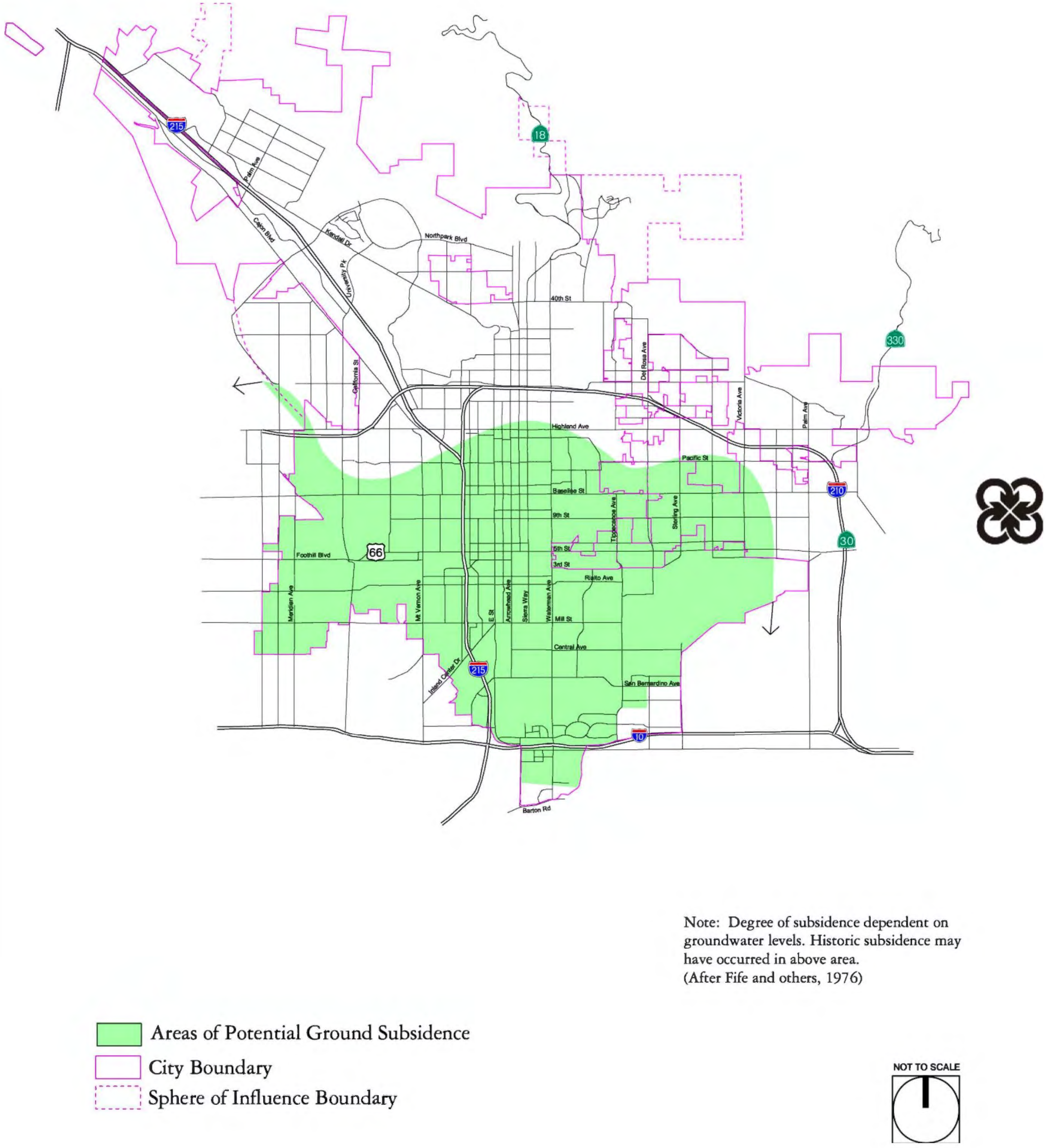
Positional accuracy of map data is at best plus or minus 150 feet.

NOTICE:
Effective January 1, 1994, the name "Special Studies Zones" has been changed to "Earthquake Fault Zones" and Chap. 7.5, Div. 2, of the Public Resources Code has been renamed the "Alquist-Priolo Earthquake Fault Zoning Act."



FH30 C
San Bernardino S

Z:\ProjectWorkFiles\GenPlan\GeoMaps\Geo_Detail2.mxd
Plot Date: 03/09/2010



Note: Degree of subsidence dependent on groundwater levels. Historic subsidence may have occurred in above area.
(After Fife and others, 1976)

🟩 Areas of Potential Ground Subsidence

☐ City Boundary

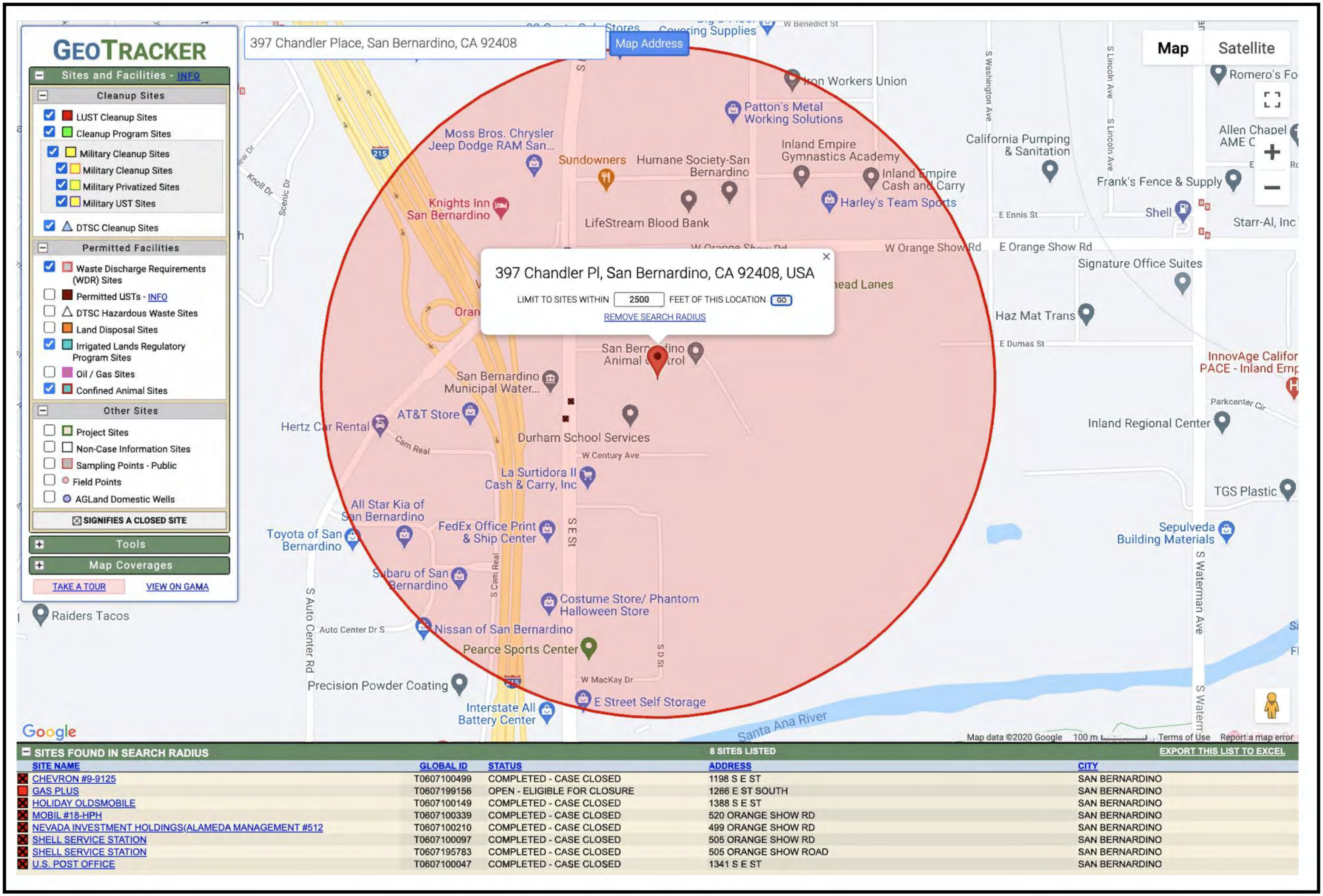
⬚ Sphere of Influence Boundary

SOURCE: City of San Bernardino General Plan (Figure 5.5-3), November 2005

FIGURE VII-4

Tom Dodson & Associates
Environmental Consultants

Potential Subsidence Areas



397 Chandler Place, San Bernardino, CA 92408

397 Chandler Pl, San Bernardino, CA 92408, USA

LIMIT TO SITES WITHIN 2500 FEET OF THIS LOCATION GO

REMOVE SEARCH RADIUS

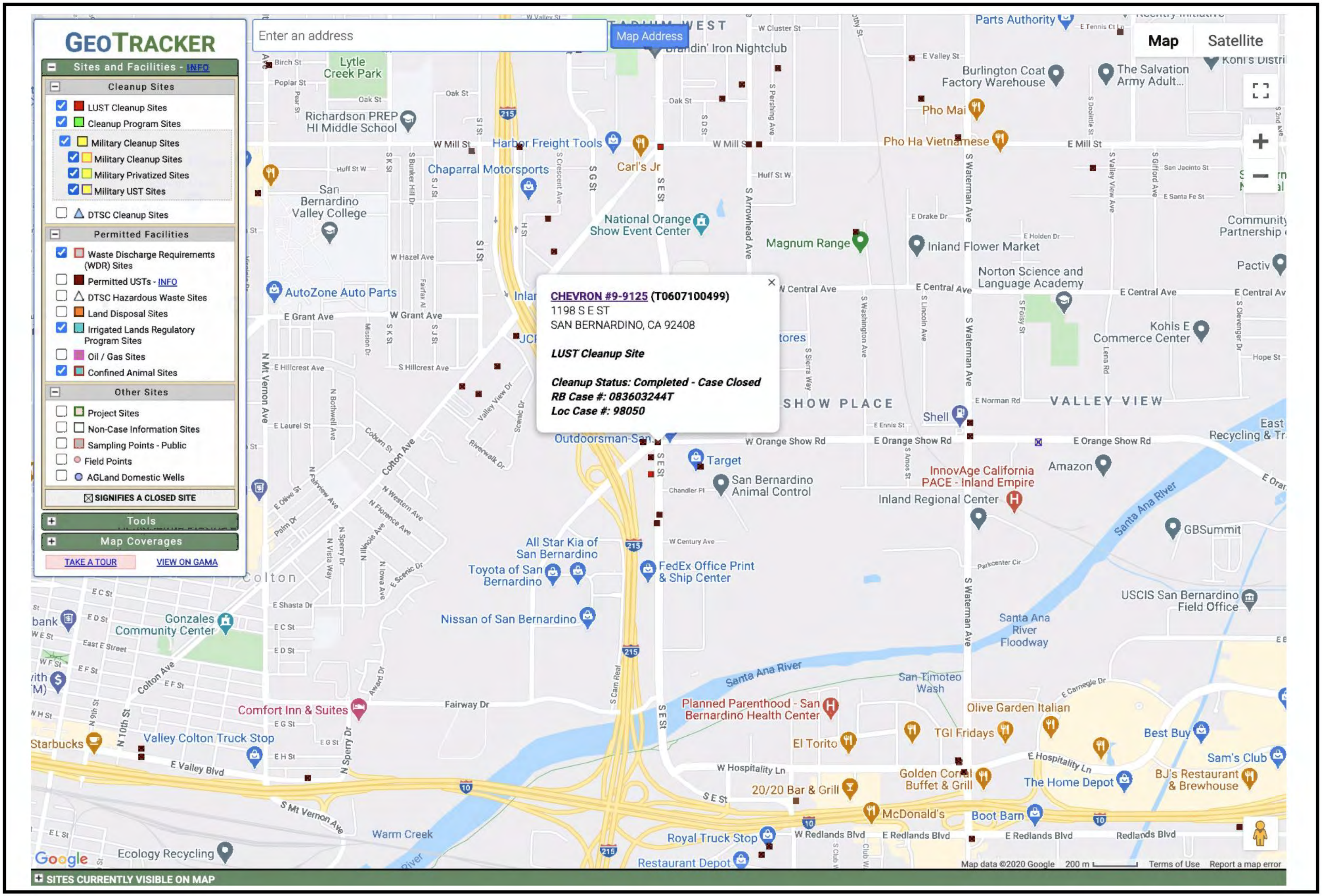
SITES FOUND IN SEARCH RADIUS — 8 SITES LISTED — EXPORT THIS LIST TO EXCEL

	SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒	CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
🟥	GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒	HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒	MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒	NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒	U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-1

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 1



GEOTRACKER

⊟ Sites and Facilities - INFO

⊟ Cleanup Sites

- ☑ 🟥 LUST Cleanup Sites
- ☑ 🟩 Cleanup Program Sites
- ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Privatized Sites
  - ☑ 🟨 Military UST Sites
- ☐ △ DTSC Cleanup Sites

⊟ Permitted Facilities

- ☑ 🟥 Waste Discharge Requirements (WDR) Sites
- ☐ 🟥 Permitted USTs - INFO
- ☐ △ DTSC Hazardous Waste Sites
- ☐ 🟧 Land Disposal Sites
- ☑ 🟩 Irrigated Lands Regulatory Program Sites
- ☐ 🟪 Oil / Gas Sites
- ☑ 🟩 Confined Animal Sites

⊟ Other Sites

- ☐ 🟩 Project Sites
- ☐ ☐ Non-Case Information Sites
- ☐ ▨ Sampling Points - Public
- ☐ ○ Field Points
- ☐ ○ AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

⊞ Tools

⊞ Map Coverages

TAKE A TOUR VIEW ON GAMA

Enter an address Map Address

Map Satellite

CHEVRON #9-9125 (T0607100499)
1198 S E ST
SAN BERNARDINO, CA 92408

LUST Cleanup Site

Cleanup Status: Completed - Case Closed
RB Case #: 083603244T
Loc Case #: 98050

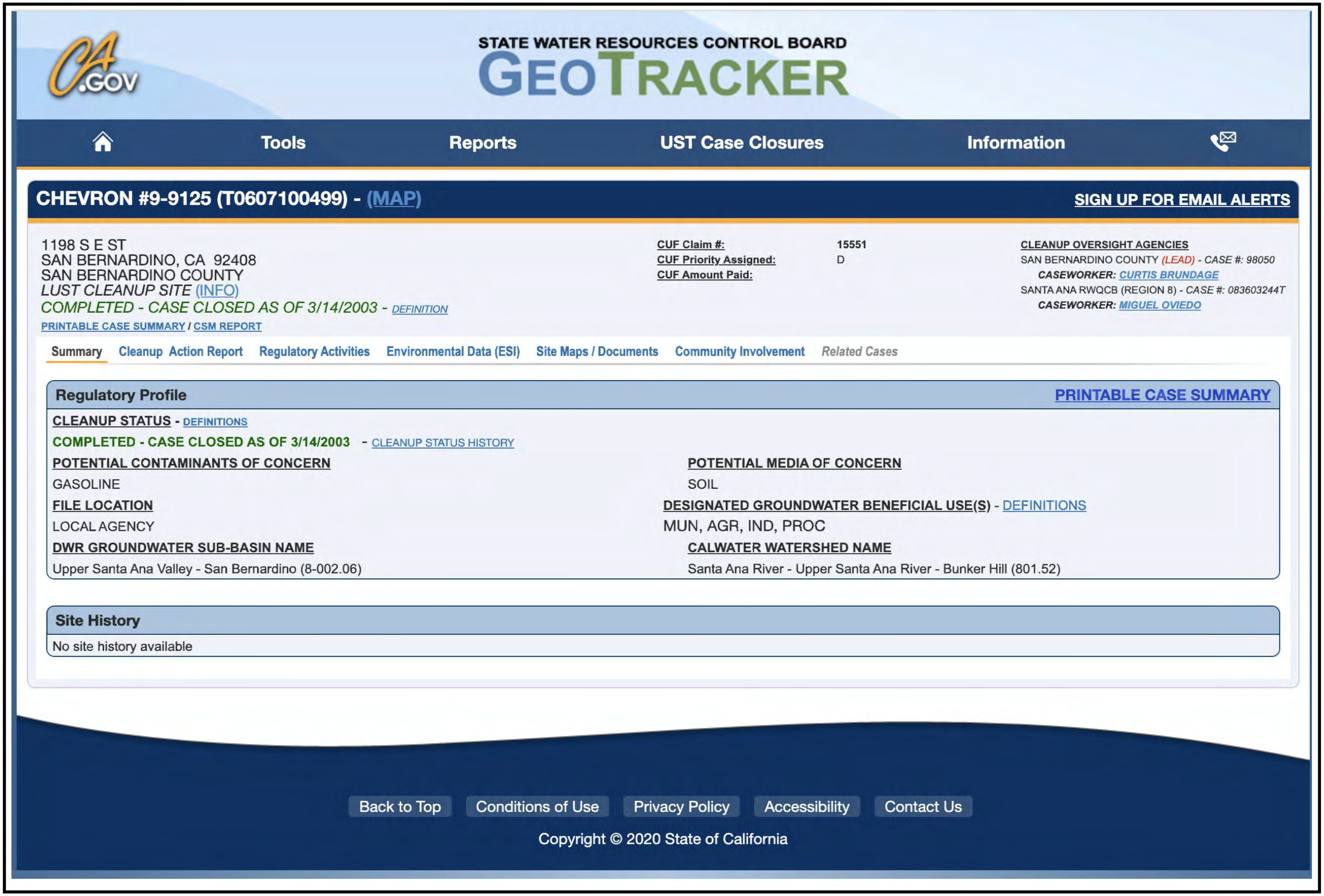
⊞ SITES CURRENTLY VISIBLE ON MAP

Map data ©2020 Google 200 m Terms of Use Report a map error

FIGURE IX-2

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 2



CHEVRON #9-9125 (T0607100499) - (MAP)

1198 S E ST
SAN BERNARDINO, CA 92408
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
COMPLETED - CASE CLOSED AS OF 3/14/2003 - *DEFINITION*
PRINTABLE CASE SUMMARY / CSM REPORT

CUF Claim #:	15551
CUF Priority Assigned:	D
CUF Amount Paid:	

CLEANUP OVERSIGHT AGENCIES
SAN BERNARDINO COUNTY *(LEAD)* - *CASE #: 98050*
CASEWORKER: *CURTIS BRUNDAGE*
SANTA ANA RWQCB (REGION 8) - *CASE #: 083603244T*
CASEWORKER: *MIGUEL OVIEDO*

Regulatory Profile

CLEANUP STATUS - DEFINITIONS
COMPLETED - CASE CLOSED AS OF 3/14/2003 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN	**POTENTIAL MEDIA OF CONCERN**
GASOLINE	SOIL
FILE LOCATION	**DESIGNATED GROUNDWATER BENEFICIAL USE(S)** - DEFINITIONS
LOCAL AGENCY	MUN, AGR, IND, PROC
DWR GROUNDWATER SUB-BASIN NAME	**CALWATER WATERSHED NAME**
Upper Santa Ana Valley - San Bernardino (8-002.06)	Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

Site History

No site history available

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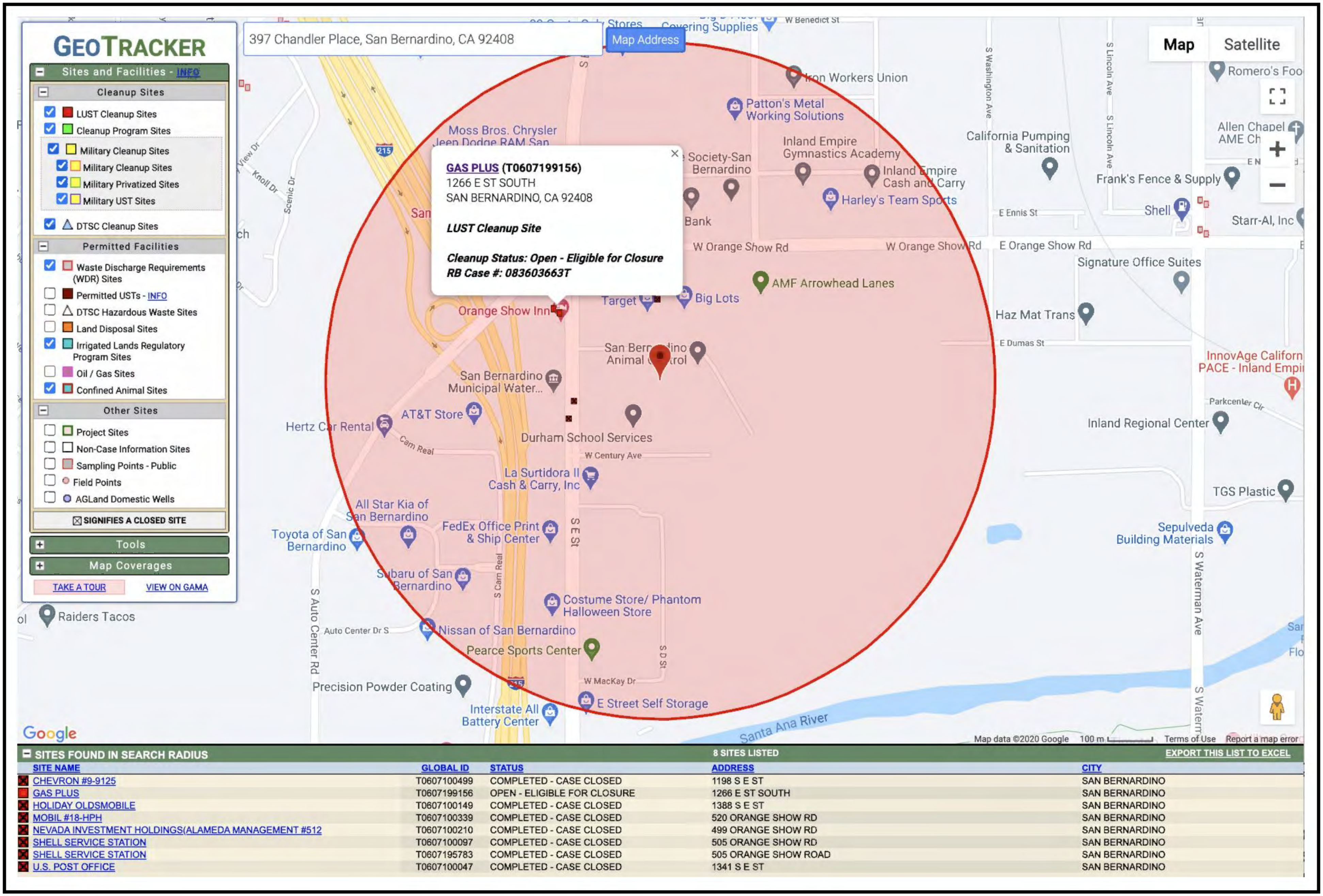
FIGURE IX-3

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 3



GEOTRACKER

397 Chandler Place, San Bernardino, CA 92408 [Map Address]

Sites and Facilities - INFO

Cleanup Sites
- ☑ 🟥 LUST Cleanup Sites
- ☑ 🟩 Cleanup Program Sites
- ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Privatized Sites
  - ☑ 🟨 Military UST Sites
- ☑ △ DTSC Cleanup Sites

Permitted Facilities
- ☑ ☐ Waste Discharge Requirements (WDR) Sites
- ☐ ■ Permitted USTs - INFO
- ☐ △ DTSC Hazardous Waste Sites
- ☐ 🟧 Land Disposal Sites
- ☑ ☐ Irrigated Lands Regulatory Program Sites
- ☐ 🟪 Oil / Gas Sites
- ☑ ☐ Confined Animal Sites

Other Sites
- ☐ 🟩 Project Sites
- ☐ ☐ Non-Case Information Sites
- ☐ ☐ Sampling Points - Public
- ☐ ○ Field Points
- ☐ ○ AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

Tools

Map Coverages

TAKE A TOUR VIEW ON GAMA

GAS PLUS (T0607199156)
1266 E ST SOUTH
SAN BERNARDINO, CA 92408

LUST Cleanup Site

Cleanup Status: Open - Eligible for Closure
RB Case #: 083603663T

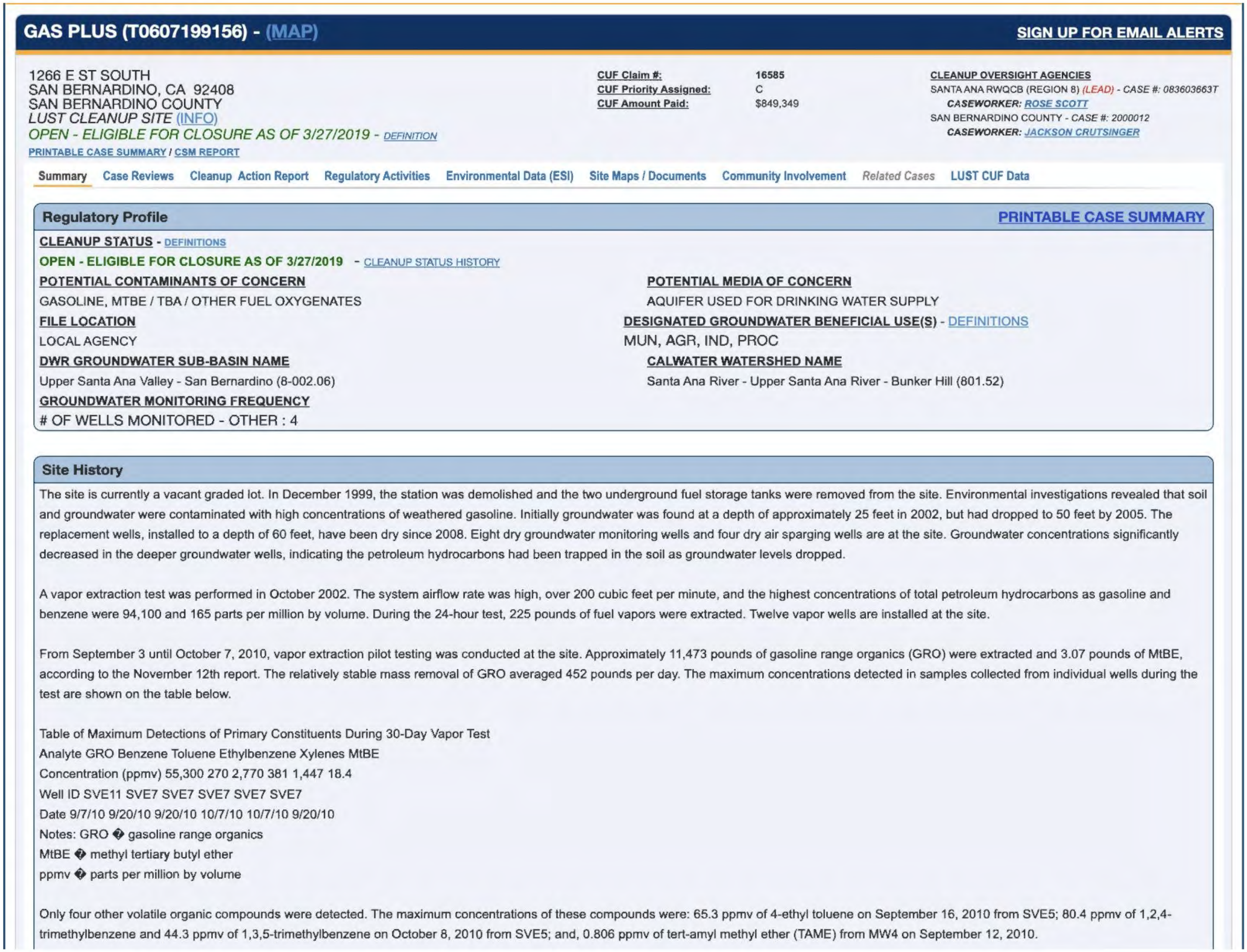
SITES FOUND IN SEARCH RADIUS — 8 SITES LISTED — EXPORT THIS LIST TO EXCEL

	SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒	CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
🟥	GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒	HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒	MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒	NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒	U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-4

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 4



GAS PLUS (T0607199156) - (MAP)

1266 E ST SOUTH
SAN BERNARDINO, CA 92408
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
OPEN - ELIGIBLE FOR CLOSURE AS OF 3/27/2019 - DEFINITION

CUF Claim #:	**16585**
CUF Priority Assigned:	C
CUF Amount Paid:	$849,349

CLEANUP OVERSIGHT AGENCIES
SANTA ANA RWQCB (REGION 8) *(LEAD) - CASE #: 083603663T*
CASEWORKER: ***ROSE SCOTT***
SAN BERNARDINO COUNTY - *CASE #: 2000012*
CASEWORKER: ***JACKSON CRUTSINGER***

Regulatory Profile

CLEANUP STATUS - DEFINITIONS
OPEN - ELIGIBLE FOR CLOSURE AS OF 3/27/2019 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN
GASOLINE, MTBE / TBA / OTHER FUEL OXYGENATES

POTENTIAL MEDIA OF CONCERN
AQUIFER USED FOR DRINKING WATER SUPPLY

FILE LOCATION
LOCAL AGENCY

DESIGNATED GROUNDWATER BENEFICIAL USE(S) - DEFINITIONS
MUN, AGR, IND, PROC

DWR GROUNDWATER SUB-BASIN NAME
Upper Santa Ana Valley - San Bernardino (8-002.06)

CALWATER WATERSHED NAME
Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

GROUNDWATER MONITORING FREQUENCY
\# OF WELLS MONITORED - OTHER : 4

Site History

The site is currently a vacant graded lot. In December 1999, the station was demolished and the two underground fuel storage tanks were removed from the site. Environmental investigations revealed that soil and groundwater were contaminated with high concentrations of weathered gasoline. Initially groundwater was found at a depth of approximately 25 feet in 2002, but had dropped to 50 feet by 2005. The replacement wells, installed to a depth of 60 feet, have been dry since 2008. Eight dry groundwater monitoring wells and four dry air sparging wells are at the site. Groundwater concentrations significantly decreased in the deeper groundwater wells, indicating the petroleum hydrocarbons had been trapped in the soil as groundwater levels dropped.

A vapor extraction test was performed in October 2002. The system airflow rate was high, over 200 cubic feet per minute, and the highest concentrations of total petroleum hydrocarbons as gasoline and benzene were 94,100 and 165 parts per million by volume. During the 24-hour test, 225 pounds of fuel vapors were extracted. Twelve vapor wells are installed at the site.

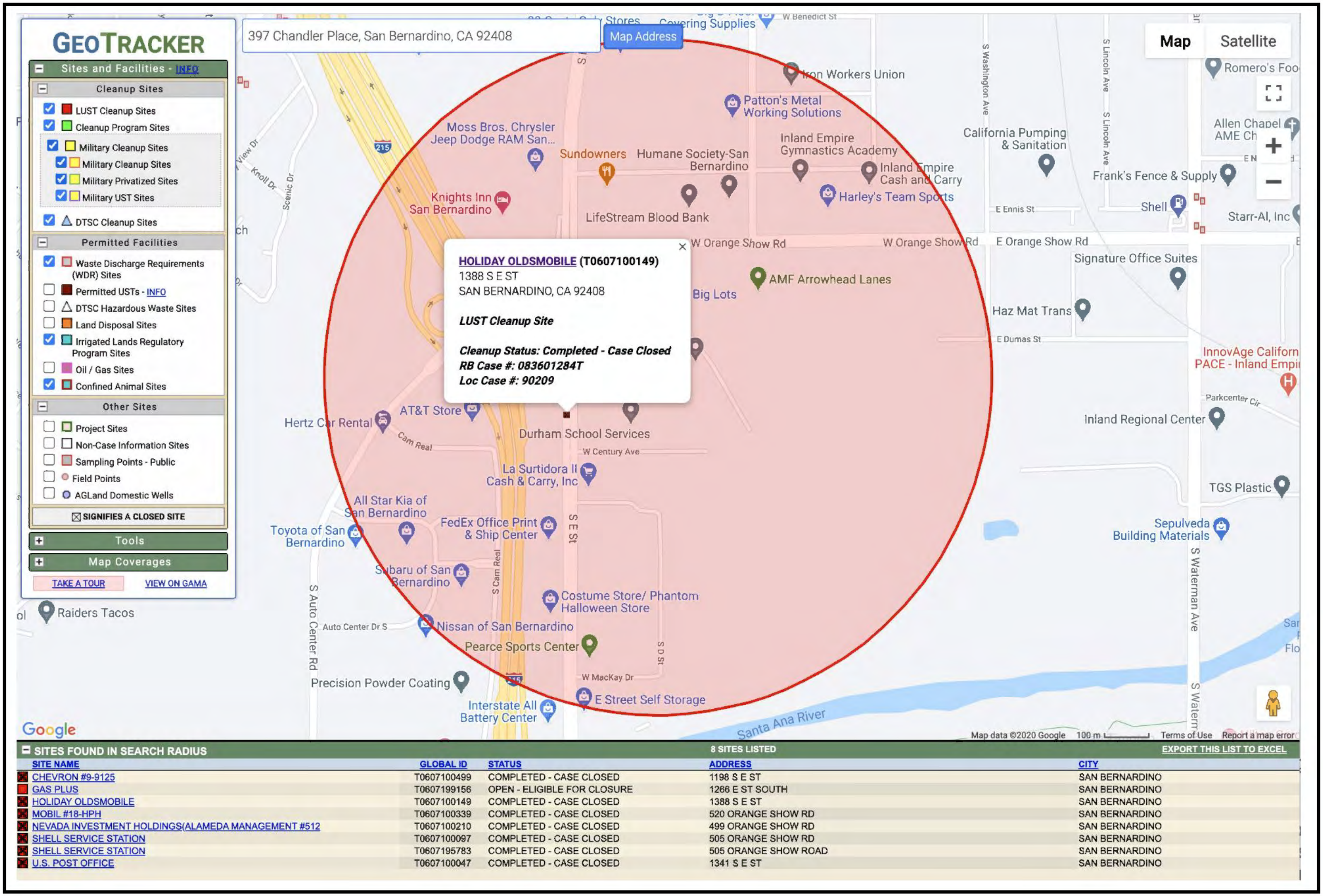
From September 3 until October 7, 2010, vapor extraction pilot testing was conducted at the site. Approximately 11,473 pounds of gasoline range organics (GRO) were extracted and 3.07 pounds of MtBE, according to the November 12th report. The relatively stable mass removal of GRO averaged 452 pounds per day. The maximum concentrations detected in samples collected from individual wells during the test are shown on the table below.

Table of Maximum Detections of Primary Constituents During 30-Day Vapor Test
Analyte GRO Benzene Toluene Ethylbenzene Xylenes MtBE
Concentration (ppmv) 55,300 270 2,770 381 1,447 18.4
Well ID SVE11 SVE7 SVE7 SVE7 SVE7 SVE7
Date 9/7/10 9/20/10 9/20/10 10/7/10 10/7/10 9/20/10
Notes: GRO � gasoline range organics
MtBE � methyl tertiary butyl ether
ppmv � parts per million by volume

Only four other volatile organic compounds were detected. The maximum concentrations of these compounds were: 65.3 ppmv of 4-ethyl toluene on September 16, 2010 from SVE5; 80.4 ppmv of 1,2,4-trimethylbenzene and 44.3 ppmv of 1,3,5-trimethylbenzene on October 8, 2010 from SVE5; and, 0.806 ppmv of tert-amyl methyl ether (TAME) from MW4 on September 12, 2010.

FIGURE IX-5

GeoTracker, page 5



397 Chandler Place, San Bernardino, CA 92408

Sites and Facilities - INFO

Cleanup Sites

- ☑ 🟥 LUST Cleanup Sites
- ☑ 🟩 Cleanup Program Sites
- ☑ Military Cleanup Sites
  - ☑ Military Cleanup Sites
  - ☑ Military Privatized Sites
  - ☑ Military UST Sites
- ☑ △ DTSC Cleanup Sites

Permitted Facilities

- ☑ Waste Discharge Requirements (WDR) Sites
- ☐ Permitted USTs - INFO
- ☐ △ DTSC Hazardous Waste Sites
- ☐ Land Disposal Sites
- ☑ Irrigated Lands Regulatory Program Sites
- ☐ Oil / Gas Sites
- ☑ Confined Animal Sites

Other Sites

- ☐ Project Sites
- ☐ Non-Case Information Sites
- ☐ Sampling Points - Public
- ☐ Field Points
- ☐ ○ AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

Tools

Map Coverages

TAKE A TOUR   VIEW ON GAMA

HOLIDAY OLDSMOBILE (T0607100149)
1388 S E ST
SAN BERNARDINO, CA 92408

LUST Cleanup Site

Cleanup Status: Completed - Case Closed
RB Case #: 083601284T
Loc Case #: 90209

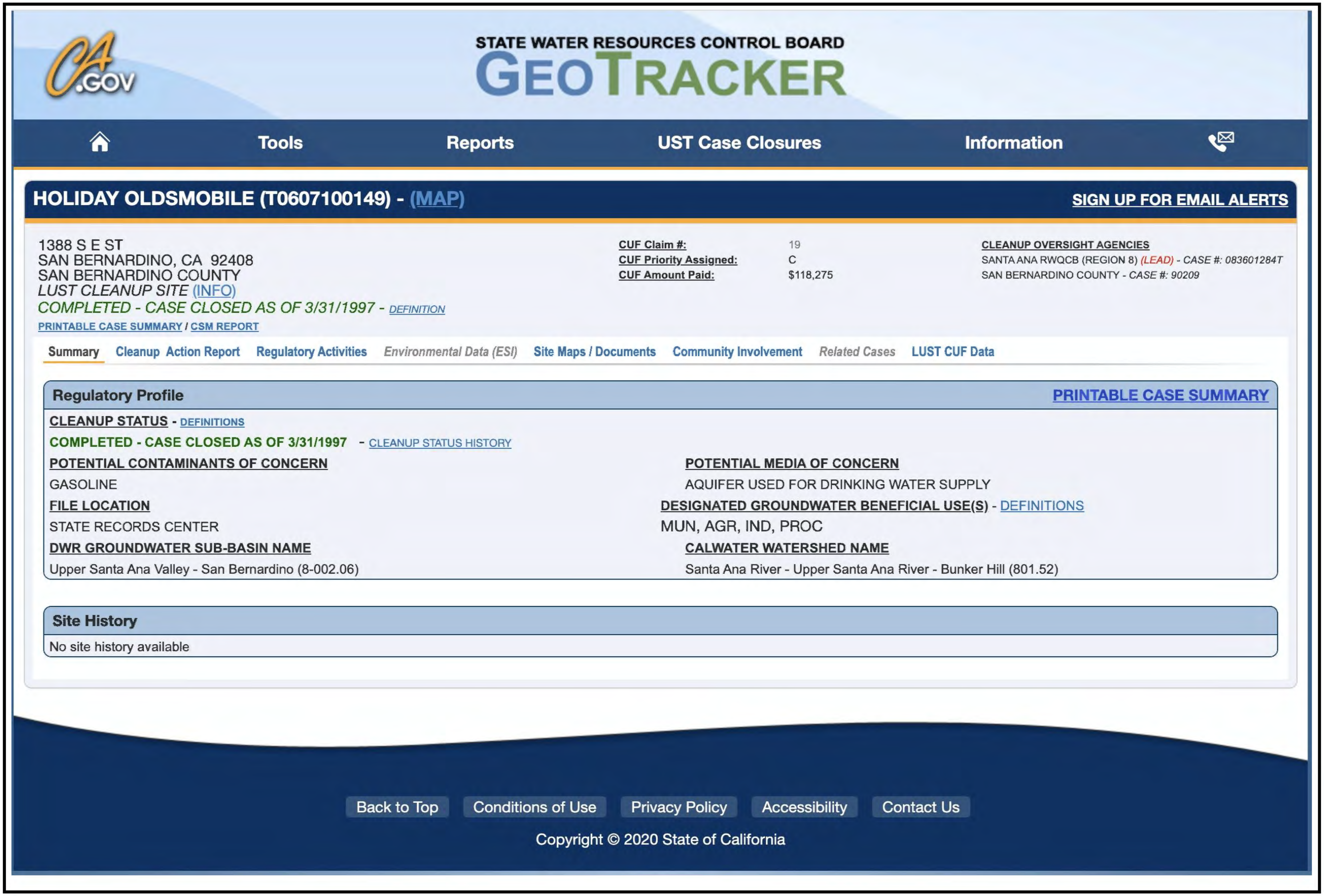
SITES FOUND IN SEARCH RADIUS — 8 SITES LISTED — EXPORT THIS LIST TO EXCEL

SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒ CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
☒ GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒ HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒ MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒ NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒ U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-6

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 6



HOLIDAY OLDSMOBILE (T0607100149) - (MAP)

SIGN UP FOR EMAIL ALERTS

1388 S E ST
SAN BERNARDINO, CA 92408
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
COMPLETED - CASE CLOSED AS OF 3/31/1997 - DEFINITION
PRINTABLE CASE SUMMARY / CSM REPORT

CUF Claim #:	19
CUF Priority Assigned:	C
CUF Amount Paid:	$118,275

CLEANUP OVERSIGHT AGENCIES
SANTA ANA RWQCB (REGION 8) *(LEAD)* - *CASE #: 083601284T*
SAN BERNARDINO COUNTY - *CASE #: 90209*

Regulatory Profile — PRINTABLE CASE SUMMARY

CLEANUP STATUS - DEFINITIONS
COMPLETED - CASE CLOSED AS OF 3/31/1997 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN
GASOLINE

POTENTIAL MEDIA OF CONCERN
AQUIFER USED FOR DRINKING WATER SUPPLY

FILE LOCATION
STATE RECORDS CENTER

DESIGNATED GROUNDWATER BENEFICIAL USE(S) - DEFINITIONS
MUN, AGR, IND, PROC

DWR GROUNDWATER SUB-BASIN NAME
Upper Santa Ana Valley - San Bernardino (8-002.06)

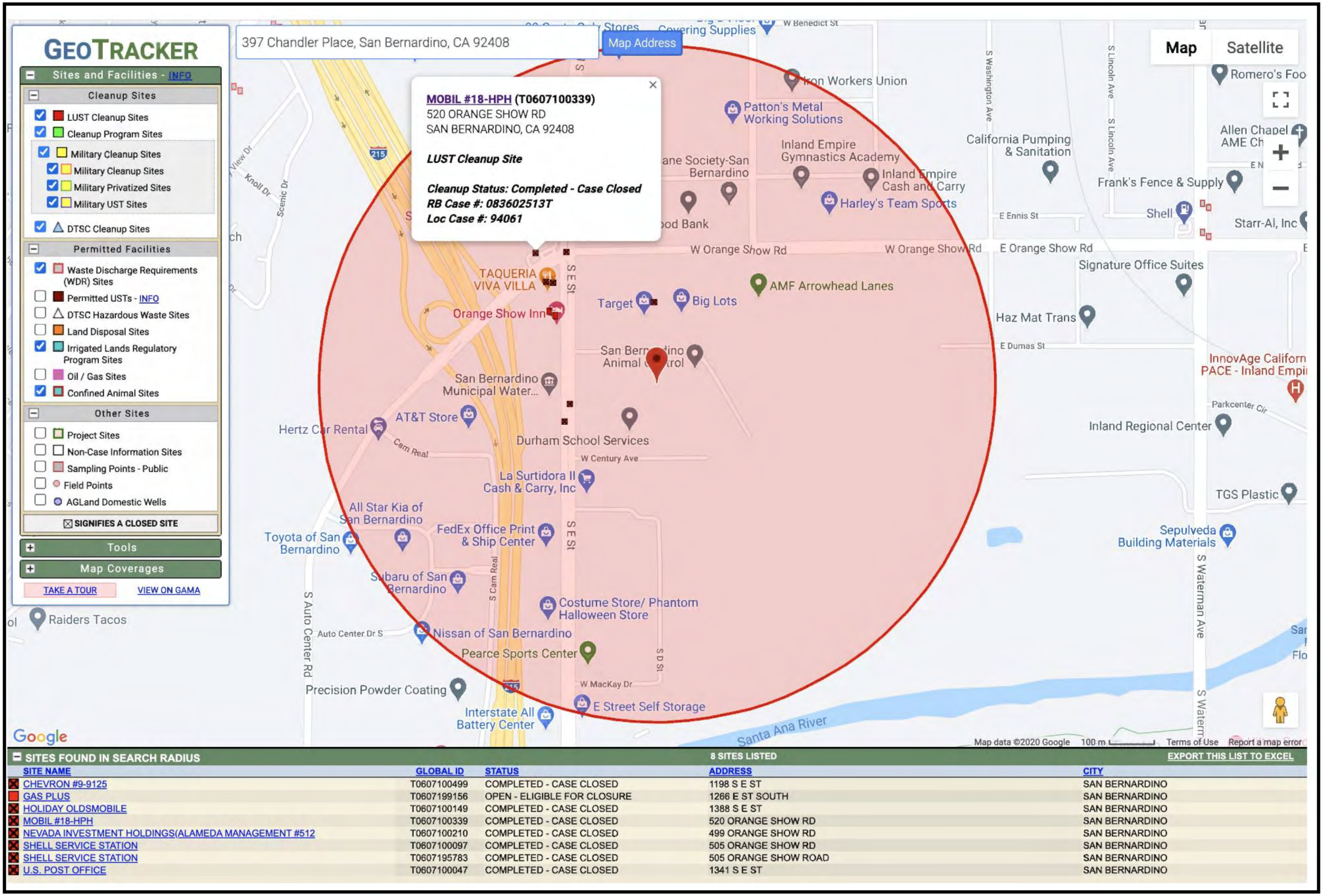
CALWATER WATERSHED NAME
Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

Site History
No site history available

FIGURE IX-7

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 7



MOBIL #18-HPH (T0607100339)
520 ORANGE SHOW RD
SAN BERNARDINO, CA 92408

LUST Cleanup Site

Cleanup Status: Completed - Case Closed
RB Case #: 083602513T
Loc Case #: 94061

Sites and Facilities - INFO

Cleanup Sites
- ☑ 🟥 LUST Cleanup Sites
- ☑ 🟩 Cleanup Program Sites
- ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Privatized Sites
  - ☑ 🟨 Military UST Sites
- ☑ △ DTSC Cleanup Sites

Permitted Facilities
- ☑ ☐ Waste Discharge Requirements (WDR) Sites
- ☐ ■ Permitted USTs - INFO
- ☐ △ DTSC Hazardous Waste Sites
- ☐ 🟧 Land Disposal Sites
- ☑ 🟦 Irrigated Lands Regulatory Program Sites
- ☐ 🟪 Oil / Gas Sites
- ☑ 🟩 Confined Animal Sites

Other Sites
- ☐ 🟩 Project Sites
- ☐ ☐ Non-Case Information Sites
- ☐ ☐ Sampling Points - Public
- ☐ ○ Field Points
- ☐ ● AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

Tools

Map Coverages

TAKE A TOUR VIEW ON GAMA

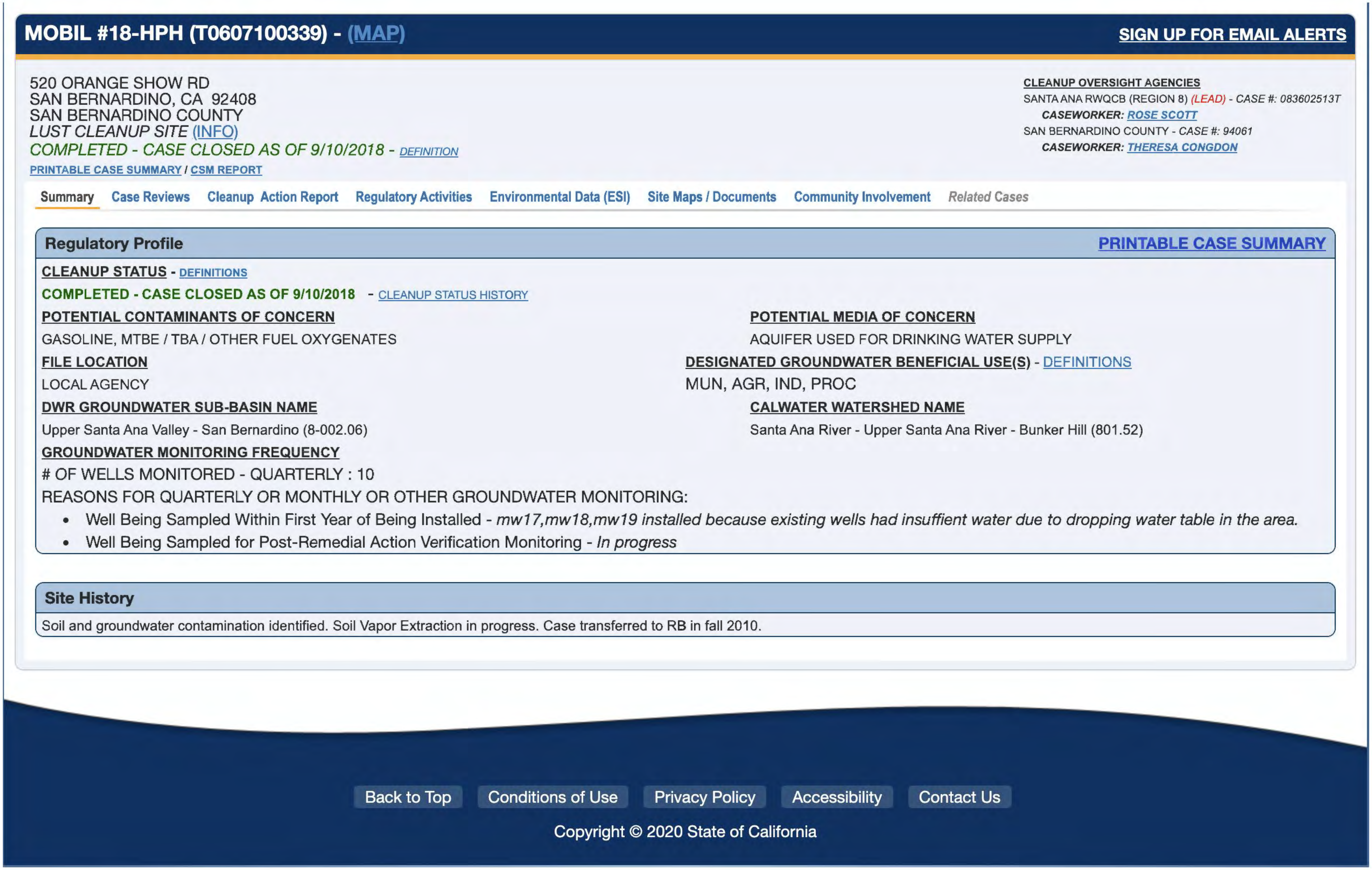
SITES FOUND IN SEARCH RADIUS 8 SITES LISTED EXPORT THIS LIST TO EXCEL

	SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒	CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
🟥	GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒	HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒	MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒	NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒	U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-8

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 8



MOBIL #18-HPH (T0607100339) - (MAP)

SIGN UP FOR EMAIL ALERTS

520 ORANGE SHOW RD
SAN BERNARDINO, CA 92408
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
COMPLETED - CASE CLOSED AS OF 9/10/2018 - *DEFINITION*
PRINTABLE CASE SUMMARY / CSM REPORT

CLEANUP OVERSIGHT AGENCIES
SANTA ANA RWQCB (REGION 8) *(LEAD)* - *CASE #: 083602513T*
CASEWORKER: ***ROSE SCOTT***
SAN BERNARDINO COUNTY - *CASE #: 94061*
CASEWORKER: ***THERESA CONGDON***

Regulatory Profile

PRINTABLE CASE SUMMARY

CLEANUP STATUS - DEFINITIONS

COMPLETED - CASE CLOSED AS OF 9/10/2018 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN
GASOLINE, MTBE / TBA / OTHER FUEL OXYGENATES

POTENTIAL MEDIA OF CONCERN
AQUIFER USED FOR DRINKING WATER SUPPLY

FILE LOCATION
LOCAL AGENCY

DESIGNATED GROUNDWATER BENEFICIAL USE(S) - DEFINITIONS
MUN, AGR, IND, PROC

DWR GROUNDWATER SUB-BASIN NAME
Upper Santa Ana Valley - San Bernardino (8-002.06)

CALWATER WATERSHED NAME
Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

GROUNDWATER MONITORING FREQUENCY
OF WELLS MONITORED - QUARTERLY : 10
REASONS FOR QUARTERLY OR MONTHLY OR OTHER GROUNDWATER MONITORING:
- Well Being Sampled Within First Year of Being Installed - *mw17,mw18,mw19 installed because existing wells had insuffient water due to dropping water table in the area.*
- Well Being Sampled for Post-Remedial Action Verification Monitoring - *In progress*

Site History

Soil and groundwater contamination identified. Soil Vapor Extraction in progress. Case transferred to RB in fall 2010.

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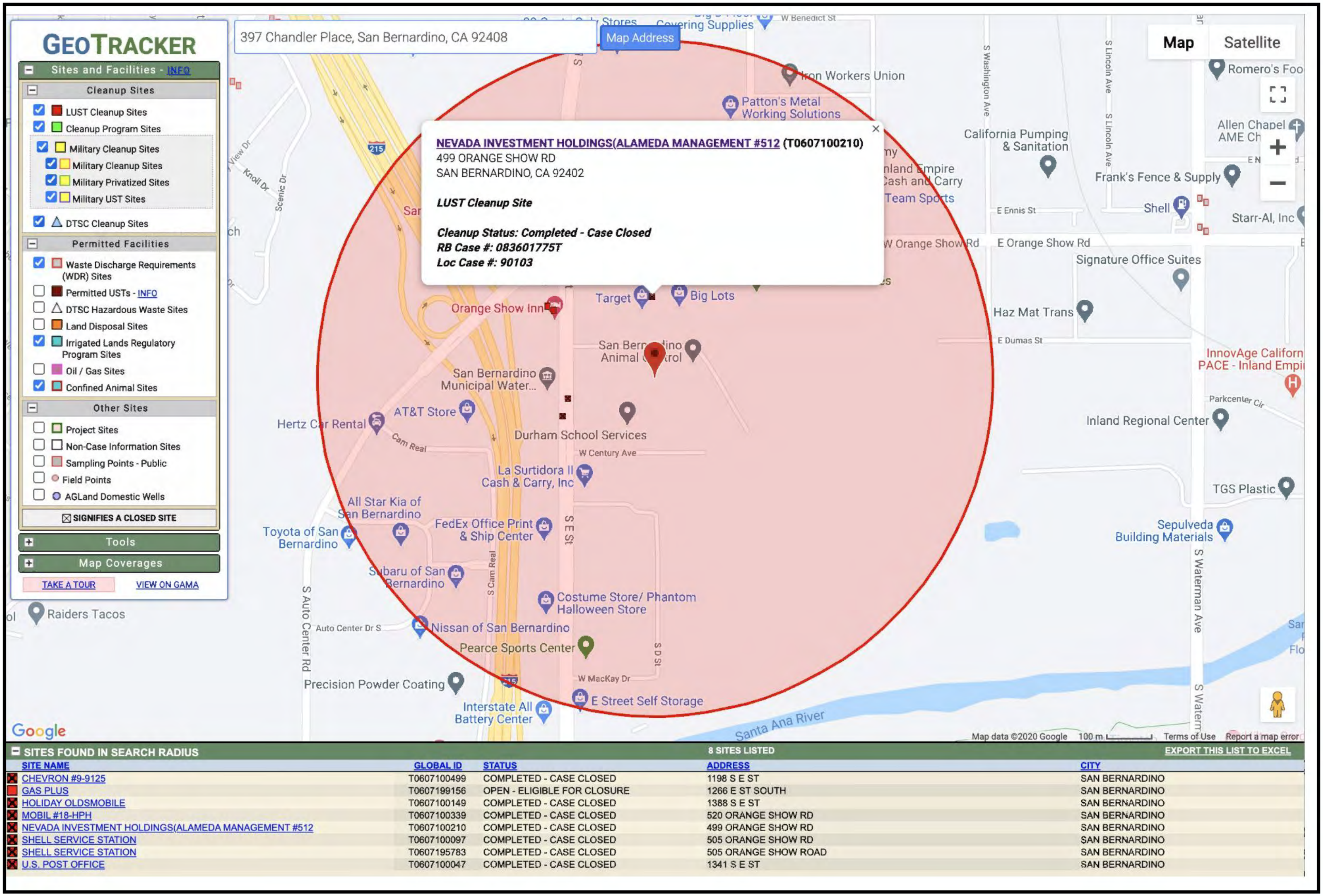
FIGURE IX-9

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 9



Sites and Facilities - INFO

Cleanup Sites

- ☑ 🟥 LUST Cleanup Sites
- ☑ 🟩 Cleanup Program Sites
- ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Privatized Sites
  - ☑ 🟨 Military UST Sites
- ☑ △ DTSC Cleanup Sites

Permitted Facilities

- ☑ 🟥 Waste Discharge Requirements (WDR) Sites
- ☐ 🟫 Permitted USTs - INFO
- ☐ △ DTSC Hazardous Waste Sites
- ☐ 🟧 Land Disposal Sites
- ☑ 🟦 Irrigated Lands Regulatory Program Sites
- ☐ 🟪 Oil / Gas Sites
- ☑ 🟦 Confined Animal Sites

Other Sites

- ☐ 🟩 Project Sites
- ☐ ☐ Non-Case Information Sites
- ☐ 🟥 Sampling Points - Public
- ☐ ○ Field Points
- ☐ ○ AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512 (T0607100210)
499 ORANGE SHOW RD
SAN BERNARDINO, CA 92402

LUST Cleanup Site

Cleanup Status: Completed - Case Closed
RB Case #: 083601775T
Loc Case #: 90103

SITES FOUND IN SEARCH RADIUS — **8 SITES LISTED** — **EXPORT THIS LIST TO EXCEL**

SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒ CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
🟥 GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒ HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒ MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒ NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒ U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-10

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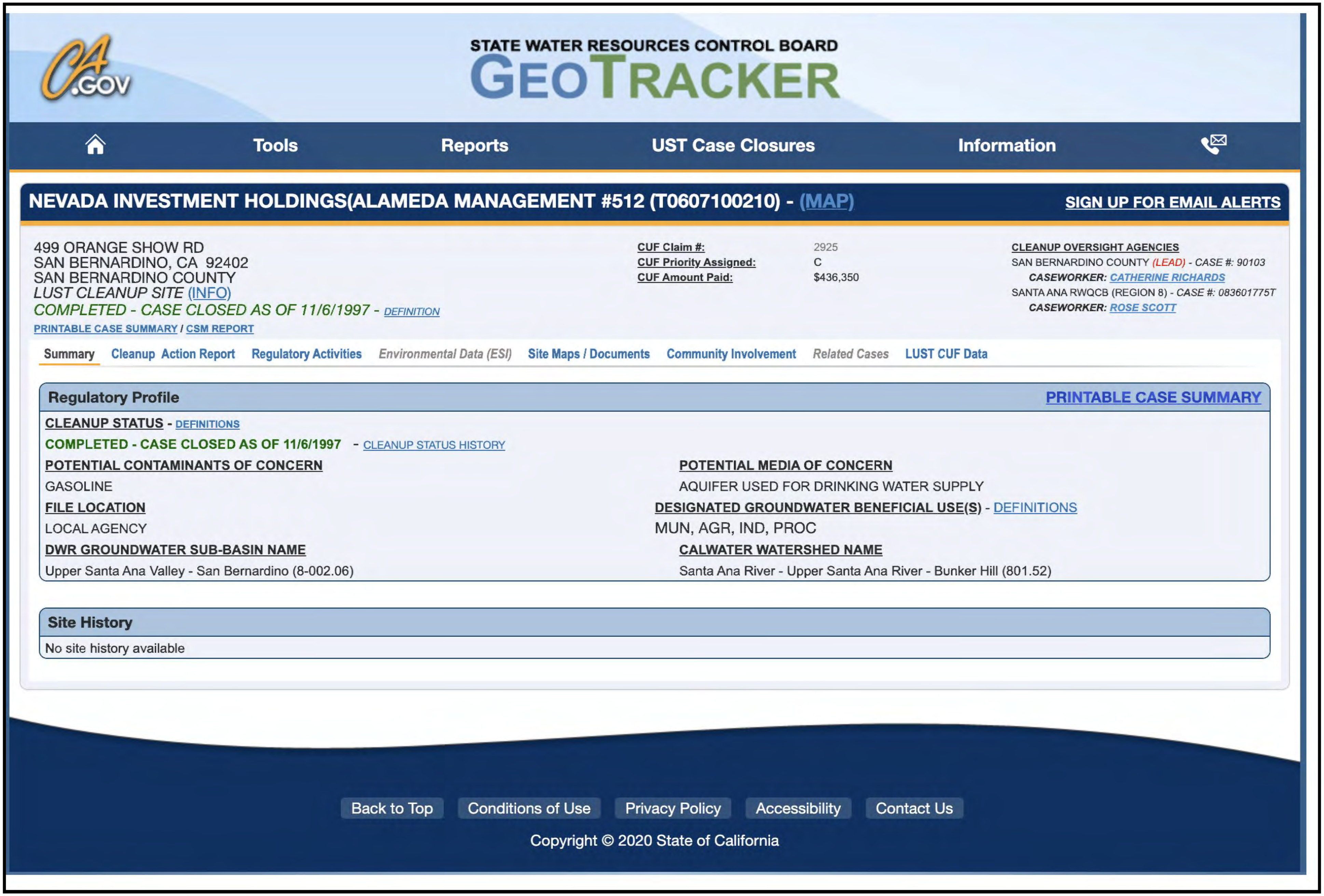
Environmental Consultants

GeoTracker, page 10



NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512 (T0607100210) - (MAP)

SIGN UP FOR EMAIL ALERTS

499 ORANGE SHOW RD
SAN BERNARDINO, CA 92402
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
COMPLETED - CASE CLOSED AS OF 11/6/1997 - DEFINITION
PRINTABLE CASE SUMMARY / CSM REPORT

CUF Claim #: 2925
CUF Priority Assigned: C
CUF Amount Paid: $436,350

CLEANUP OVERSIGHT AGENCIES
SAN BERNARDINO COUNTY *(LEAD)* - *CASE #: 90103*
CASEWORKER: *CATHERINE RICHARDS*
SANTA ANA RWQCB (REGION 8) - *CASE #: 083601775T*
CASEWORKER: *ROSE SCOTT*

Regulatory Profile PRINTABLE CASE SUMMARY

CLEANUP STATUS - DEFINITIONS
COMPLETED - CASE CLOSED AS OF 11/6/1997 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN
GASOLINE

POTENTIAL MEDIA OF CONCERN
AQUIFER USED FOR DRINKING WATER SUPPLY

FILE LOCATION
LOCAL AGENCY

DESIGNATED GROUNDWATER BENEFICIAL USE(S) - DEFINITIONS
MUN, AGR, IND, PROC

DWR GROUNDWATER SUB-BASIN NAME
Upper Santa Ana Valley - San Bernardino (8-002.06)

CALWATER WATERSHED NAME
Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

Site History
No site history available

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FIGURE IX-11

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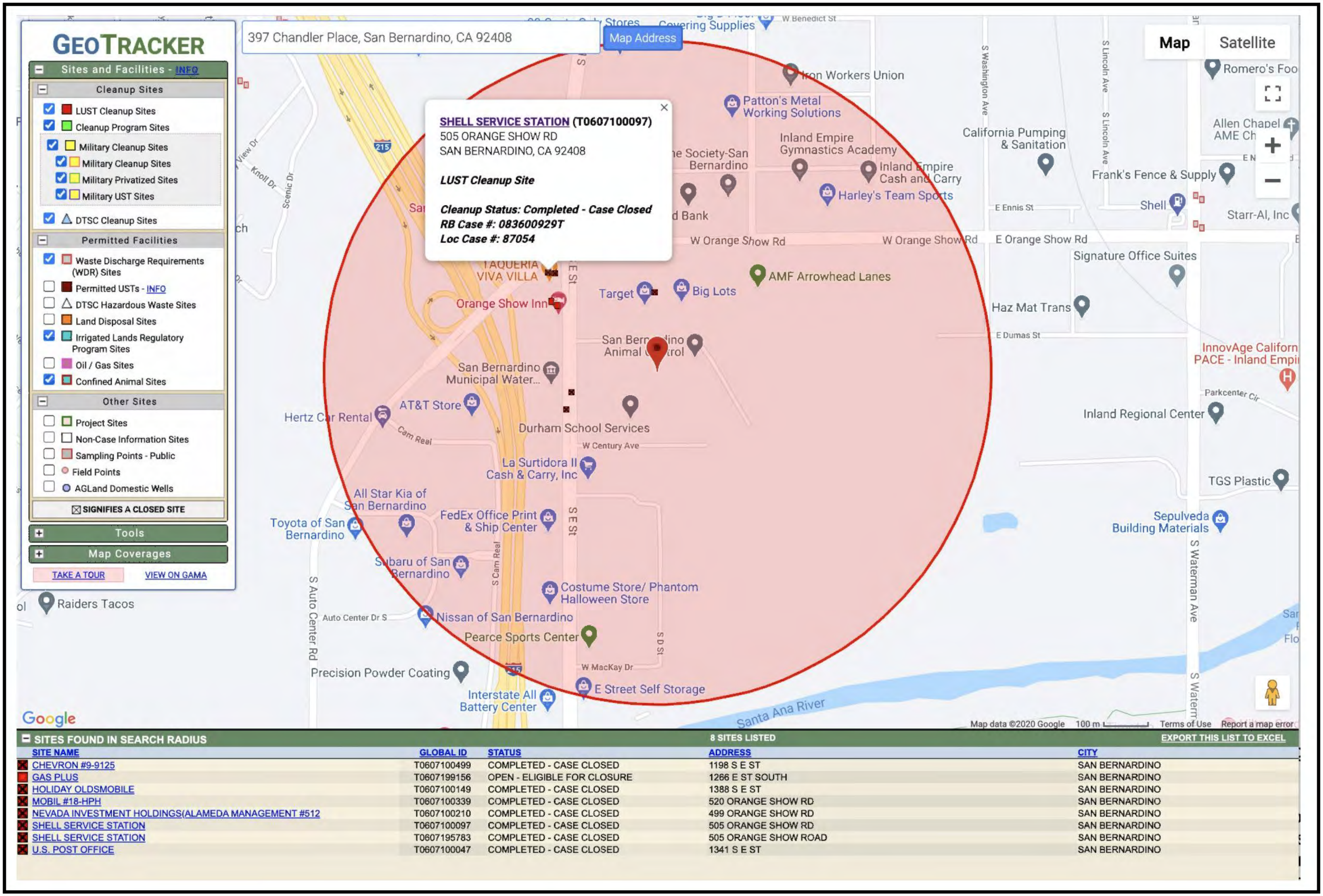
Environmental Consultants

GeoTracker, page 11



Sites and Facilities - INFO

Cleanup Sites

- ☑ 🟥 LUST Cleanup Sites
- ☑ 🟩 Cleanup Program Sites
- ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Privatized Sites
  - ☑ 🟨 Military UST Sites
- ☑ △ DTSC Cleanup Sites

Permitted Facilities

- ☑ 🟥 Waste Discharge Requirements (WDR) Sites
- ☐ 🟫 Permitted USTs - INFO
- ☐ △ DTSC Hazardous Waste Sites
- ☐ 🟧 Land Disposal Sites
- ☑ 🟦 Irrigated Lands Regulatory Program Sites
- ☐ 🟪 Oil / Gas Sites
- ☑ 🟦 Confined Animal Sites

Other Sites

- ☐ 🟩 Project Sites
- ☐ ☐ Non-Case Information Sites
- ☐ 🟥 Sampling Points - Public
- ☐ ○ Field Points
- ☐ ● AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

Tools

Map Coverages

TAKE A TOUR VIEW ON GAMA

SHELL SERVICE STATION (T0607100097)
505 ORANGE SHOW RD
SAN BERNARDINO, CA 92408

LUST Cleanup Site

Cleanup Status: Completed - Case Closed
RB Case #: 083600929T
Loc Case #: 87054

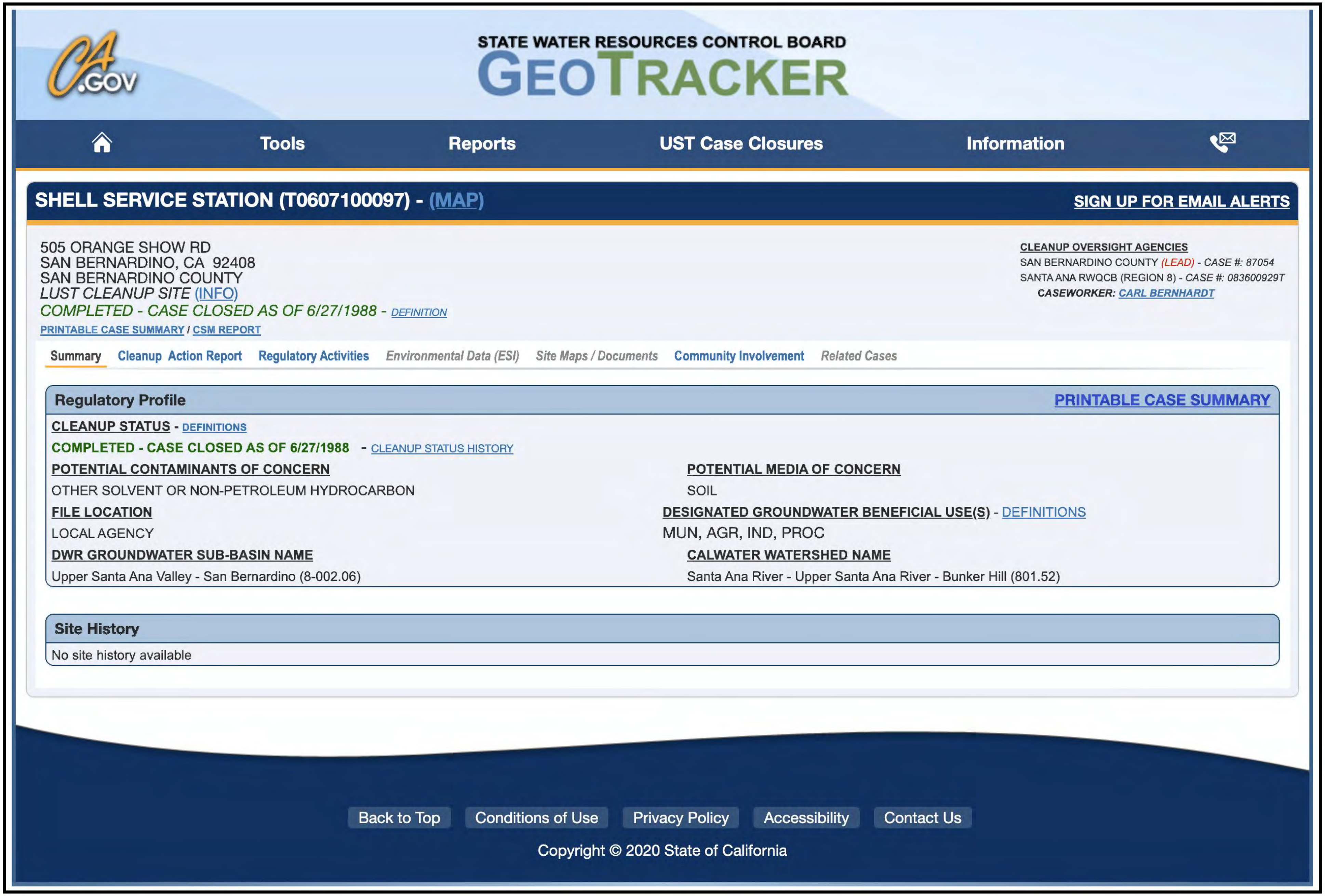
SITES FOUND IN SEARCH RADIUS 8 SITES LISTED EXPORT THIS LIST TO EXCEL

SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒ CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
🟥 GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒ HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒ MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒ NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒ U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-12

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 12



SHELL SERVICE STATION (T0607100097) - (MAP)

505 ORANGE SHOW RD
SAN BERNARDINO, CA 92408
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
COMPLETED - CASE CLOSED AS OF 6/27/1988 - *DEFINITION*
PRINTABLE CASE SUMMARY / CSM REPORT

CLEANUP OVERSIGHT AGENCIES
SAN BERNARDINO COUNTY *(LEAD) - CASE #: 87054*
SANTA ANA RWQCB (REGION 8) - *CASE #: 083600929T*
CASEWORKER: *CARL BERNHARDT*

Regulatory Profile — PRINTABLE CASE SUMMARY

CLEANUP STATUS - DEFINITIONS
COMPLETED - CASE CLOSED AS OF 6/27/1988 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN	**POTENTIAL MEDIA OF CONCERN**
OTHER SOLVENT OR NON-PETROLEUM HYDROCARBON	SOIL
FILE LOCATION	**DESIGNATED GROUNDWATER BENEFICIAL USE(S)** - DEFINITIONS
LOCAL AGENCY	MUN, AGR, IND, PROC
DWR GROUNDWATER SUB-BASIN NAME	**CALWATER WATERSHED NAME**
Upper Santa Ana Valley - San Bernardino (8-002.06)	Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

Site History

No site history available

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FIGURE IX-13

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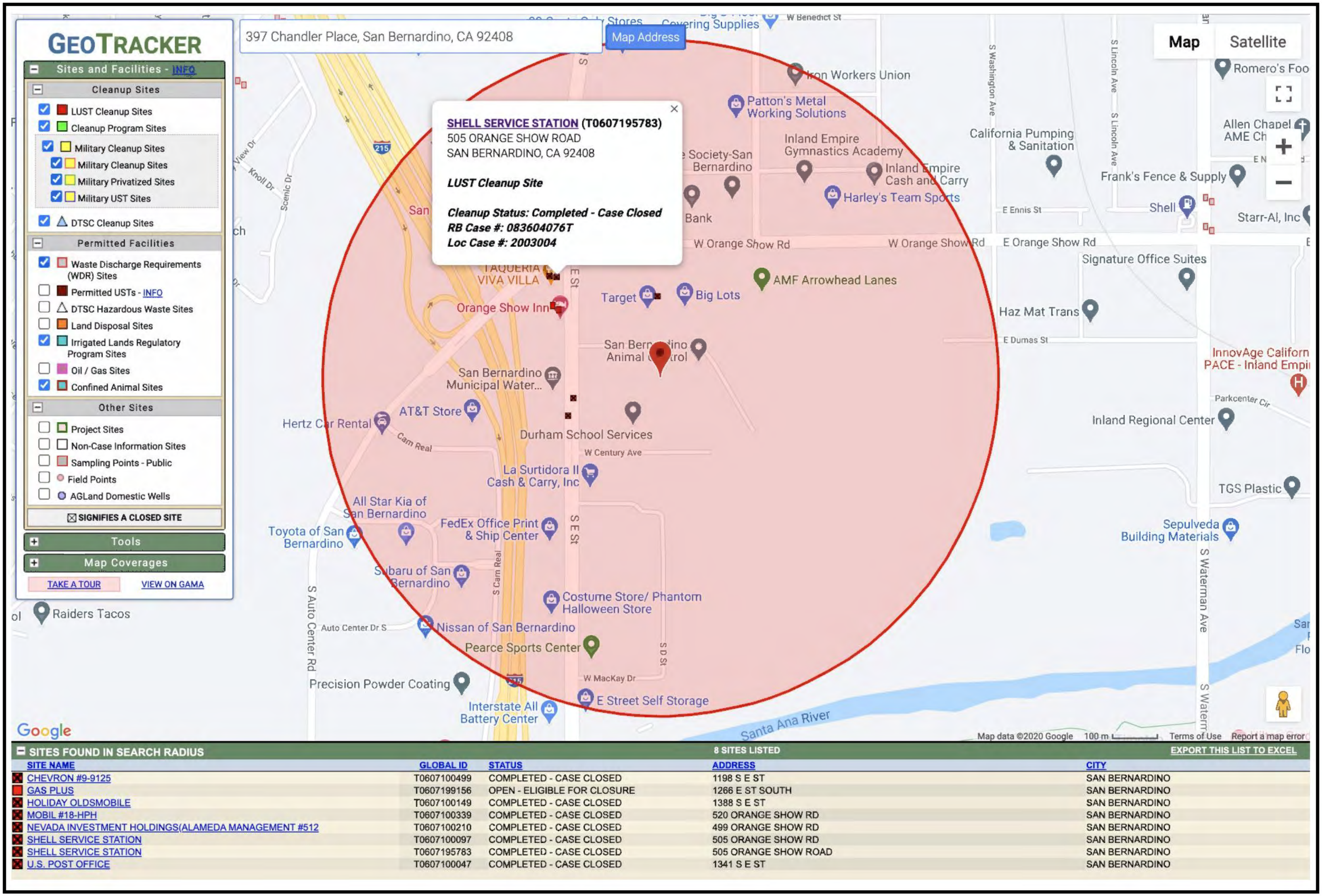
Environmental Consultants

GeoTracker, page 13



397 Chandler Place, San Bernardino, CA 92408

SHELL SERVICE STATION (T0607195783)
505 ORANGE SHOW ROAD
SAN BERNARDINO, CA 92408

LUST Cleanup Site

Cleanup Status: Completed - Case Closed
RB Case #: 083604076T
Loc Case #: 2003004

Sites and Facilities - INFO

Cleanup Sites
- ☑ 🟥 LUST Cleanup Sites
- ☑ 🟩 Cleanup Program Sites
- ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Cleanup Sites
  - ☑ 🟨 Military Privatized Sites
  - ☑ 🟨 Military UST Sites
- ☑ △ DTSC Cleanup Sites

Permitted Facilities
- ☑ 🟥 Waste Discharge Requirements (WDR) Sites
- ☐ 🟥 Permitted USTs - INFO
- ☐ △ DTSC Hazardous Waste Sites
- ☐ 🟧 Land Disposal Sites
- ☑ 🟦 Irrigated Lands Regulatory Program Sites
- ☐ 🟪 Oil / Gas Sites
- ☑ 🟦 Confined Animal Sites

Other Sites
- ☐ 🟩 Project Sites
- ☐ ☐ Non-Case Information Sites
- ☐ 🟥 Sampling Points - Public
- ☐ ○ Field Points
- ☐ ○ AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

Tools

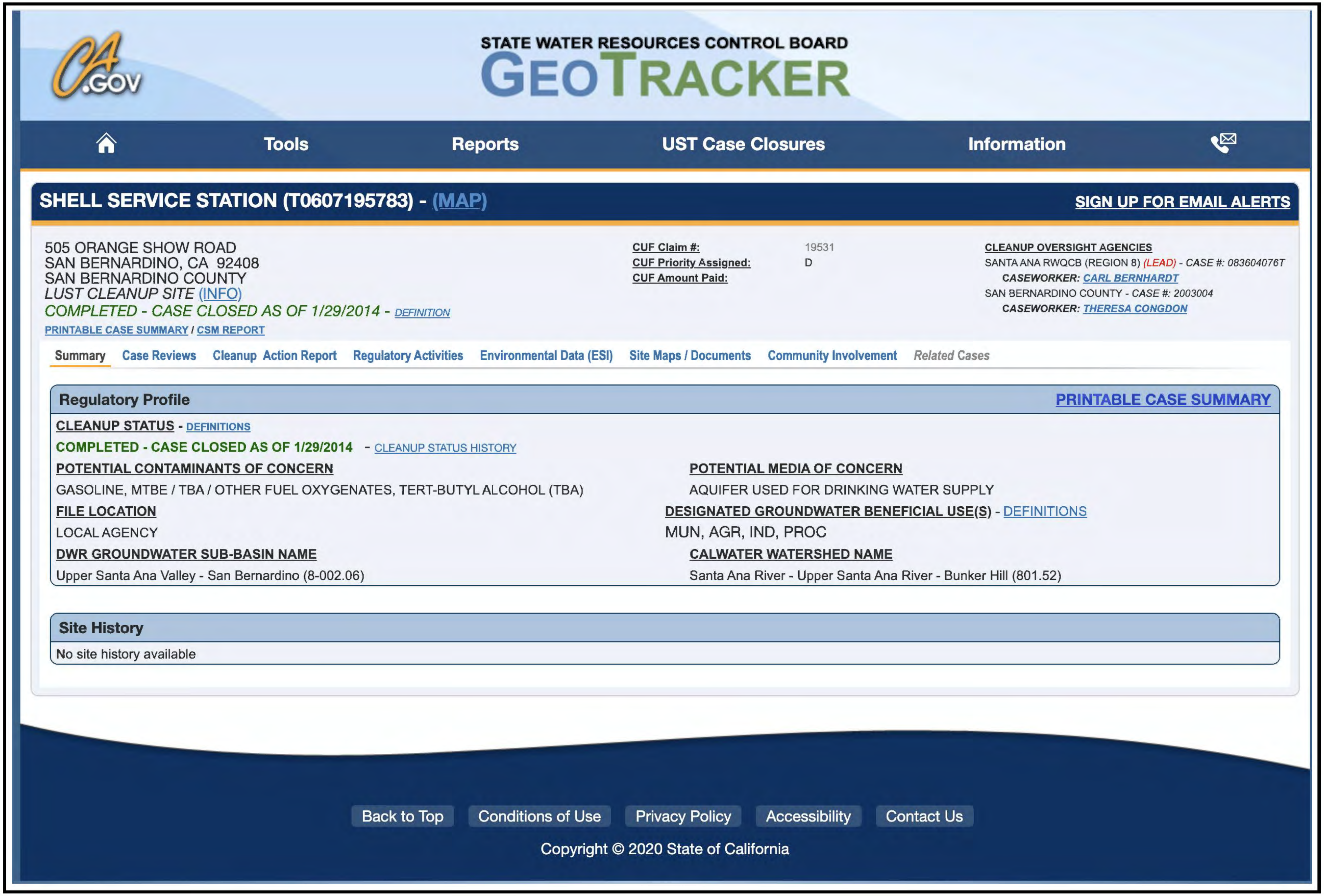
Map Coverages

TAKE A TOUR   VIEW ON GAMA

SITES FOUND IN SEARCH RADIUS — 8 SITES LISTED — EXPORT THIS LIST TO EXCEL

SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒ CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
🟥 GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒ HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒ MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒ NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒ SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒ U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-14



SHELL SERVICE STATION (T0607195783) - (MAP)

SIGN UP FOR EMAIL ALERTS

505 ORANGE SHOW ROAD
SAN BERNARDINO, CA 92408
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
COMPLETED - CASE CLOSED AS OF 1/29/2014 - *DEFINITION*
PRINTABLE CASE SUMMARY / CSM REPORT

CUF Claim #: 19531
CUF Priority Assigned: D
CUF Amount Paid:

CLEANUP OVERSIGHT AGENCIES
SANTA ANA RWQCB (REGION 8) *(LEAD)* - *CASE #: 083604076T*
CASEWORKER: *CARL BERNHARDT*
SAN BERNARDINO COUNTY - *CASE #: 2003004*
CASEWORKER: *THERESA CONGDON*

Regulatory Profile

PRINTABLE CASE SUMMARY

CLEANUP STATUS - DEFINITIONS
COMPLETED - CASE CLOSED AS OF 1/29/2014 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN
GASOLINE, MTBE / TBA / OTHER FUEL OXYGENATES, TERT-BUTYL ALCOHOL (TBA)

POTENTIAL MEDIA OF CONCERN
AQUIFER USED FOR DRINKING WATER SUPPLY

FILE LOCATION
LOCAL AGENCY

DESIGNATED GROUNDWATER BENEFICIAL USE(S) - DEFINITIONS
MUN, AGR, IND, PROC

DWR GROUNDWATER SUB-BASIN NAME
Upper Santa Ana Valley - San Bernardino (8-002.06)

CALWATER WATERSHED NAME
Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

Site History
No site history available

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FIGURE IX-15

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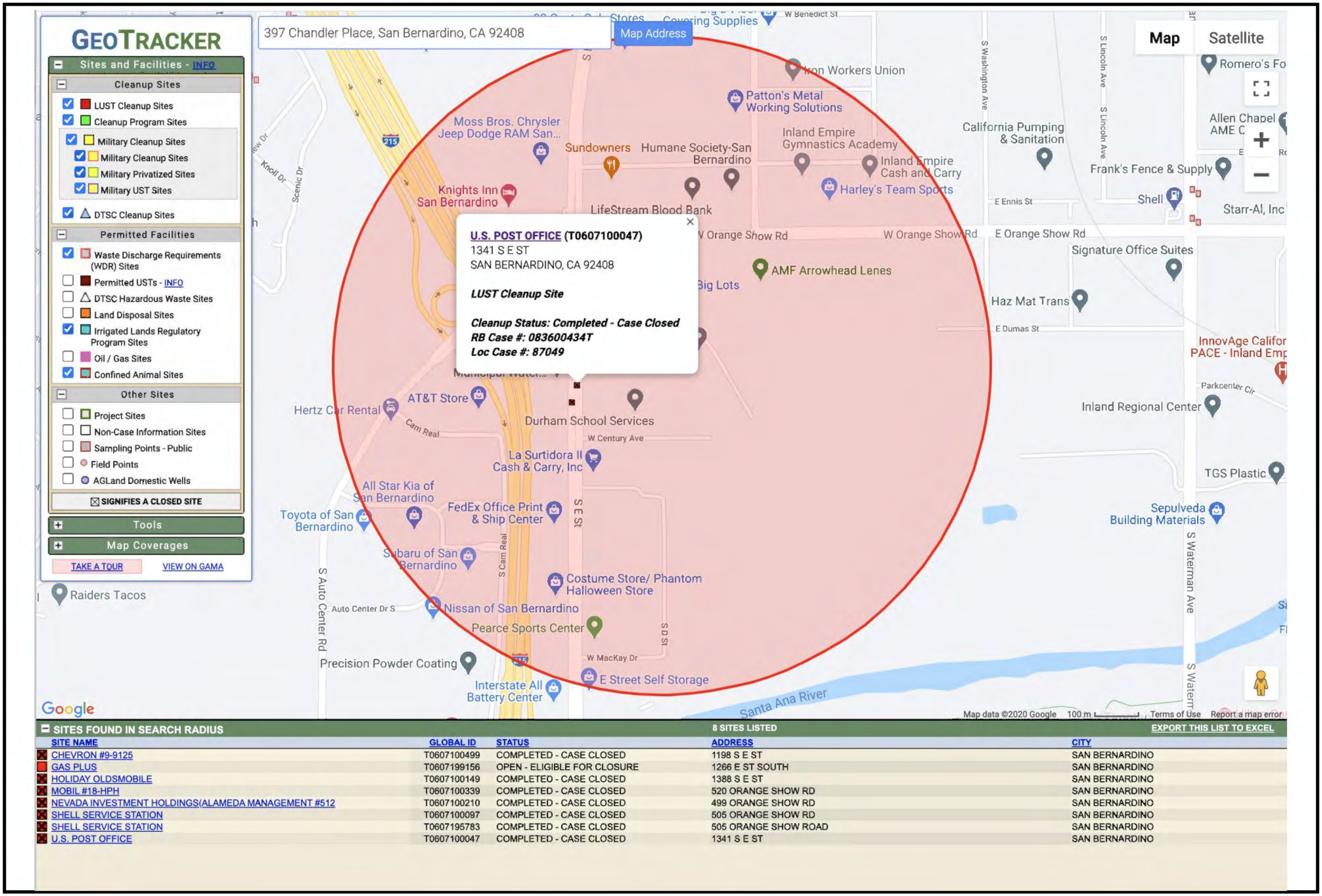
Environmental Consultants

GeoTracker, page 15



Cleanup Sites
- ☑ LUST Cleanup Sites
- ☑ Cleanup Program Sites
- ☑ Military Cleanup Sites
  - ☑ Military Cleanup Sites
  - ☑ Military Privatized Sites
  - ☑ Military UST Sites
- ☑ DTSC Cleanup Sites

Permitted Facilities
- ☑ Waste Discharge Requirements (WDR) Sites
- ☐ Permitted USTs - INFO
- ☐ DTSC Hazardous Waste Sites
- ☐ Land Disposal Sites
- ☑ Irrigated Lands Regulatory Program Sites
- ☐ Oil / Gas Sites
- ☑ Confined Animal Sites

Other Sites
- ☐ Project Sites
- ☐ Non-Case Information Sites
- ☐ Sampling Points - Public
- ☐ Field Points
- ☐ AGLand Domestic Wells

☒ SIGNIFIES A CLOSED SITE

Tools

Map Coverages

TAKE A TOUR VIEW ON GAMA

U.S. POST OFFICE (T0607100047)
1341 S E ST
SAN BERNARDINO, CA 92408

LUST Cleanup Site

Cleanup Status: Completed - Case Closed
RB Case #: 083600434T
Loc Case #: 87049

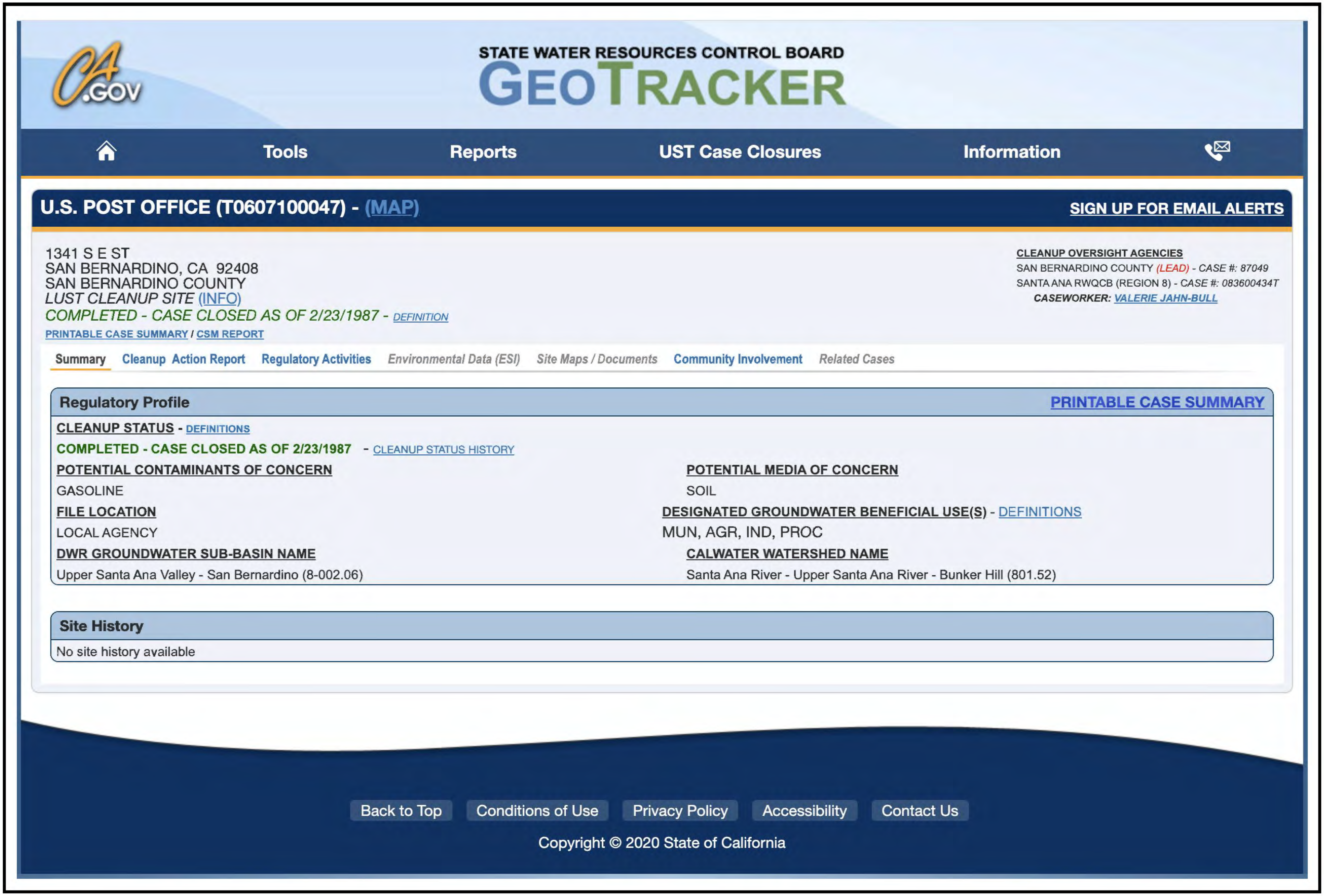
SITES FOUND IN SEARCH RADIUS — 8 SITES LISTED — EXPORT THIS LIST TO EXCEL

	SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
☒	CHEVRON #9-9125	T0607100499	COMPLETED - CASE CLOSED	1198 S E ST	SAN BERNARDINO
🟥	GAS PLUS	T0607199156	OPEN - ELIGIBLE FOR CLOSURE	1266 E ST SOUTH	SAN BERNARDINO
☒	HOLIDAY OLDSMOBILE	T0607100149	COMPLETED - CASE CLOSED	1388 S E ST	SAN BERNARDINO
☒	MOBIL #18-HPH	T0607100339	COMPLETED - CASE CLOSED	520 ORANGE SHOW RD	SAN BERNARDINO
☒	NEVADA INVESTMENT HOLDINGS(ALAMEDA MANAGEMENT #512	T0607100210	COMPLETED - CASE CLOSED	499 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607100097	COMPLETED - CASE CLOSED	505 ORANGE SHOW RD	SAN BERNARDINO
☒	SHELL SERVICE STATION	T0607195783	COMPLETED - CASE CLOSED	505 ORANGE SHOW ROAD	SAN BERNARDINO
☒	U.S. POST OFFICE	T0607100047	COMPLETED - CASE CLOSED	1341 S E ST	SAN BERNARDINO

FIGURE IX-16

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 16



U.S. POST OFFICE (T0607100047) - (MAP)

1341 S E ST
SAN BERNARDINO, CA 92408
SAN BERNARDINO COUNTY
LUST CLEANUP SITE (INFO)
COMPLETED - CASE CLOSED AS OF 2/23/1987 - *DEFINITION*
PRINTABLE CASE SUMMARY / CSM REPORT

CLEANUP OVERSIGHT AGENCIES
SAN BERNARDINO COUNTY *(LEAD)* - *CASE #: 87049*
SANTA ANA RWQCB (REGION 8) - *CASE #: 083600434T*
CASEWORKER: *VALERIE JAHN-BULL*

Regulatory Profile

CLEANUP STATUS - DEFINITIONS
COMPLETED - CASE CLOSED AS OF 2/23/1987 - CLEANUP STATUS HISTORY

POTENTIAL CONTAMINANTS OF CONCERN
GASOLINE

POTENTIAL MEDIA OF CONCERN
SOIL

FILE LOCATION
LOCAL AGENCY

DESIGNATED GROUNDWATER BENEFICIAL USE(S) - DEFINITIONS
MUN, AGR, IND, PROC

DWR GROUNDWATER SUB-BASIN NAME
Upper Santa Ana Valley - San Bernardino (8-002.06)

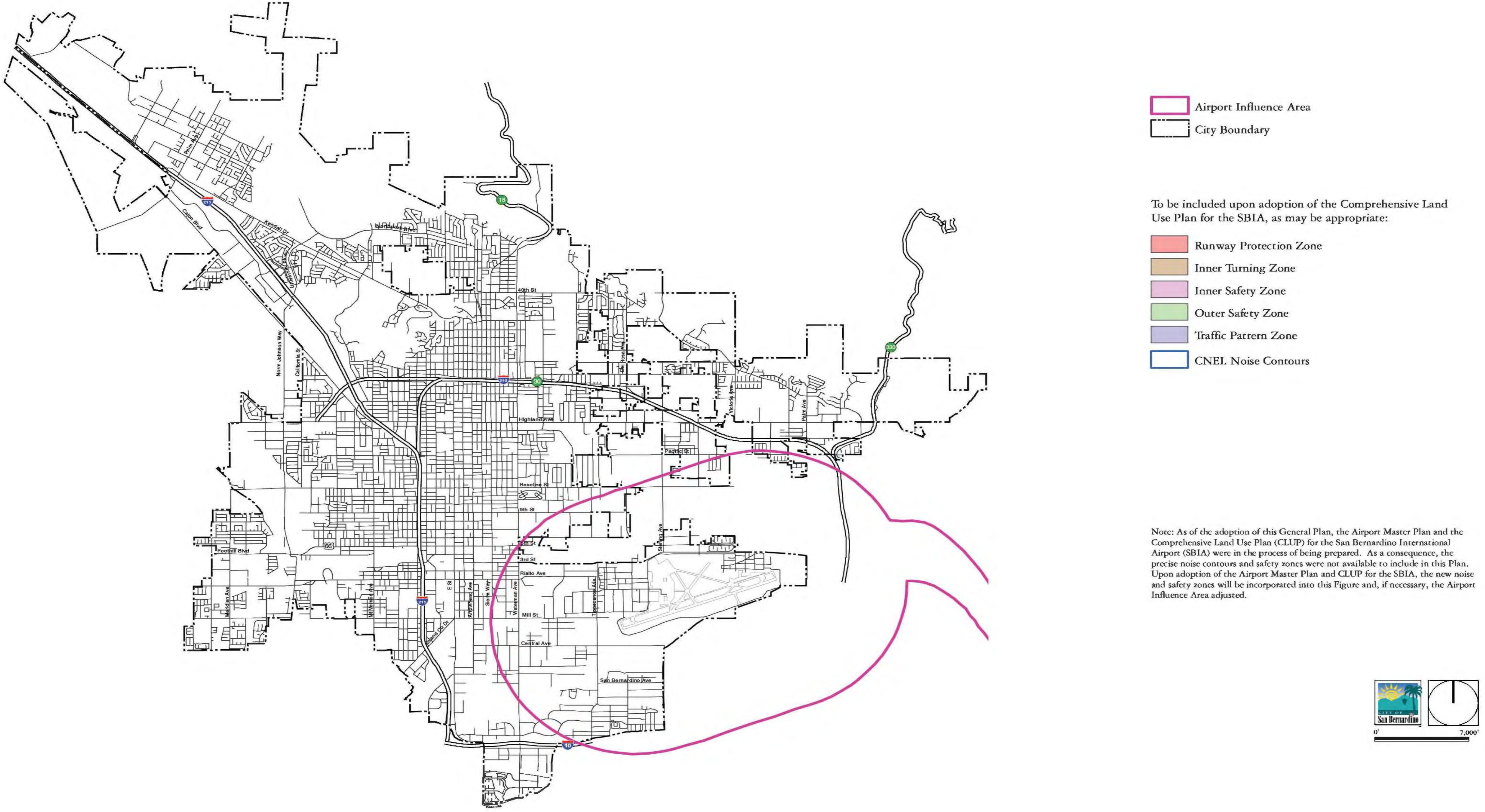
CALWATER WATERSHED NAME
Santa Ana River - Upper Santa Ana River - Bunker Hill (801.52)

Site History
No site history available

FIGURE IX-17

Tom Dodson & Associates
Environmental Consultants

GeoTracker, page 17

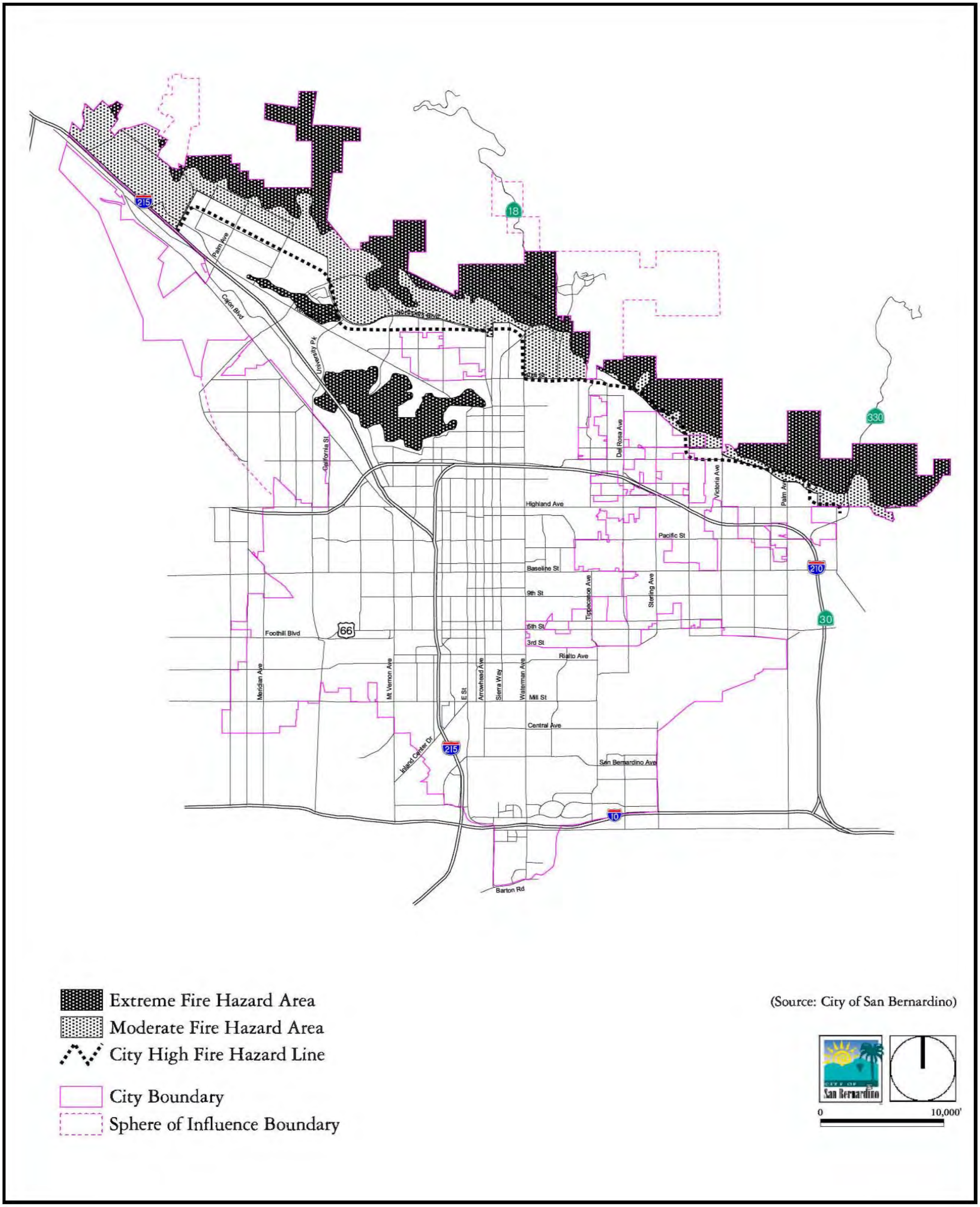


Note: As of the adoption of this General Plan, the Airport Master Plan and the Comprehensive Land Use Plan (CLUP) for the San Bernardino International Airport (SBIA) were in the process of being prepared. As a consequence, the precise noise contours and safety zones were not available to include in this Plan. Upon adoption of the Airport Master Plan and CLUP for the SBIA, the new noise and safety zones will be incorporated into this Figure and, if necessary, the Airport Influence Area adjusted.

SOURCE: City of San Bernardino General Plan (LU-4), November 2005

FIGURE IX-18

San Bernardino International Airport Planning Boundaries



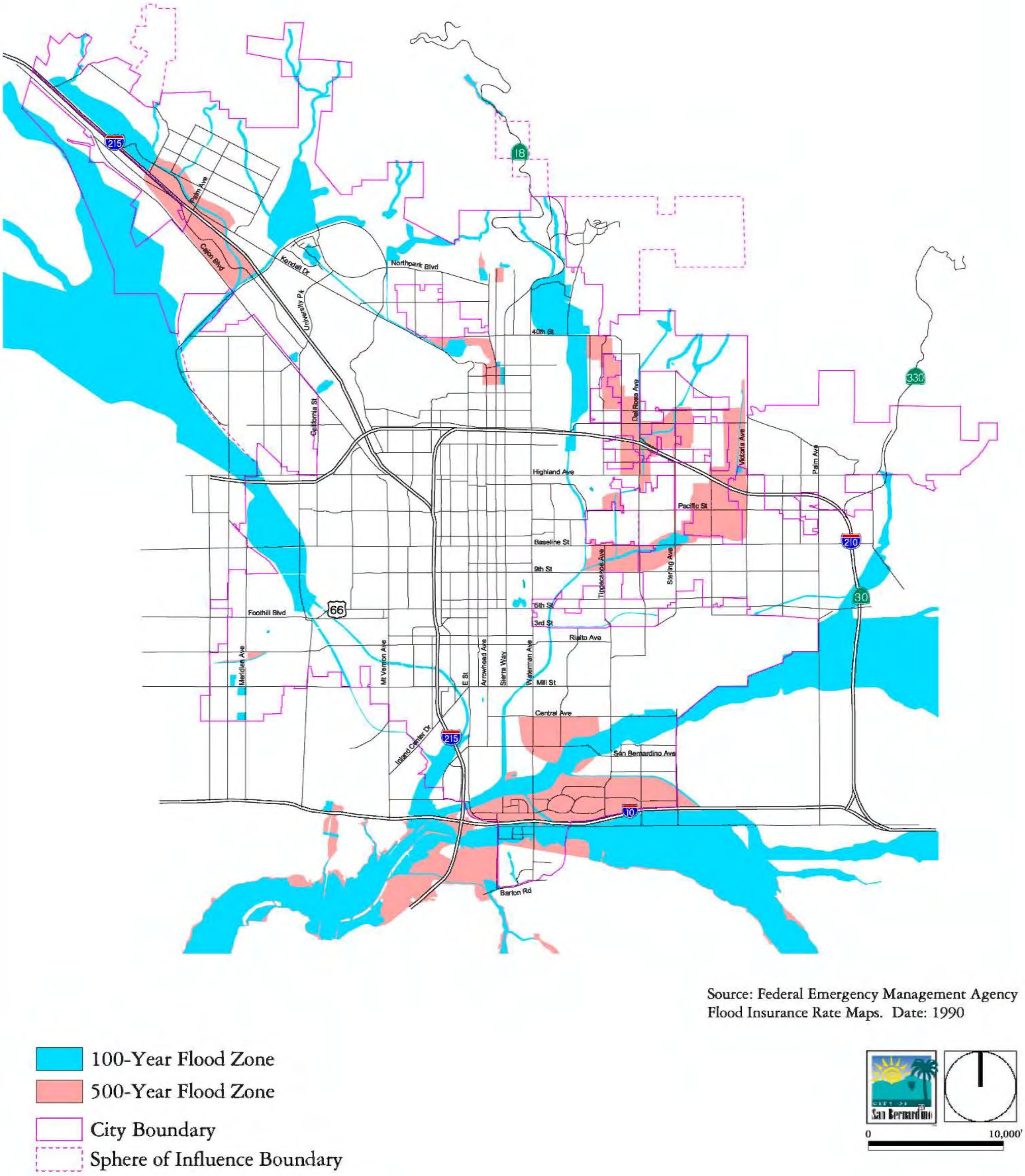
(Source: City of San Bernardino)

SOURCE: City of San Bernardino General Plan (Figure S-9), November 2005

FIGURE IX-19

Tom Dodson & Associates
Environmental Consultants

Fire Hazard Areas

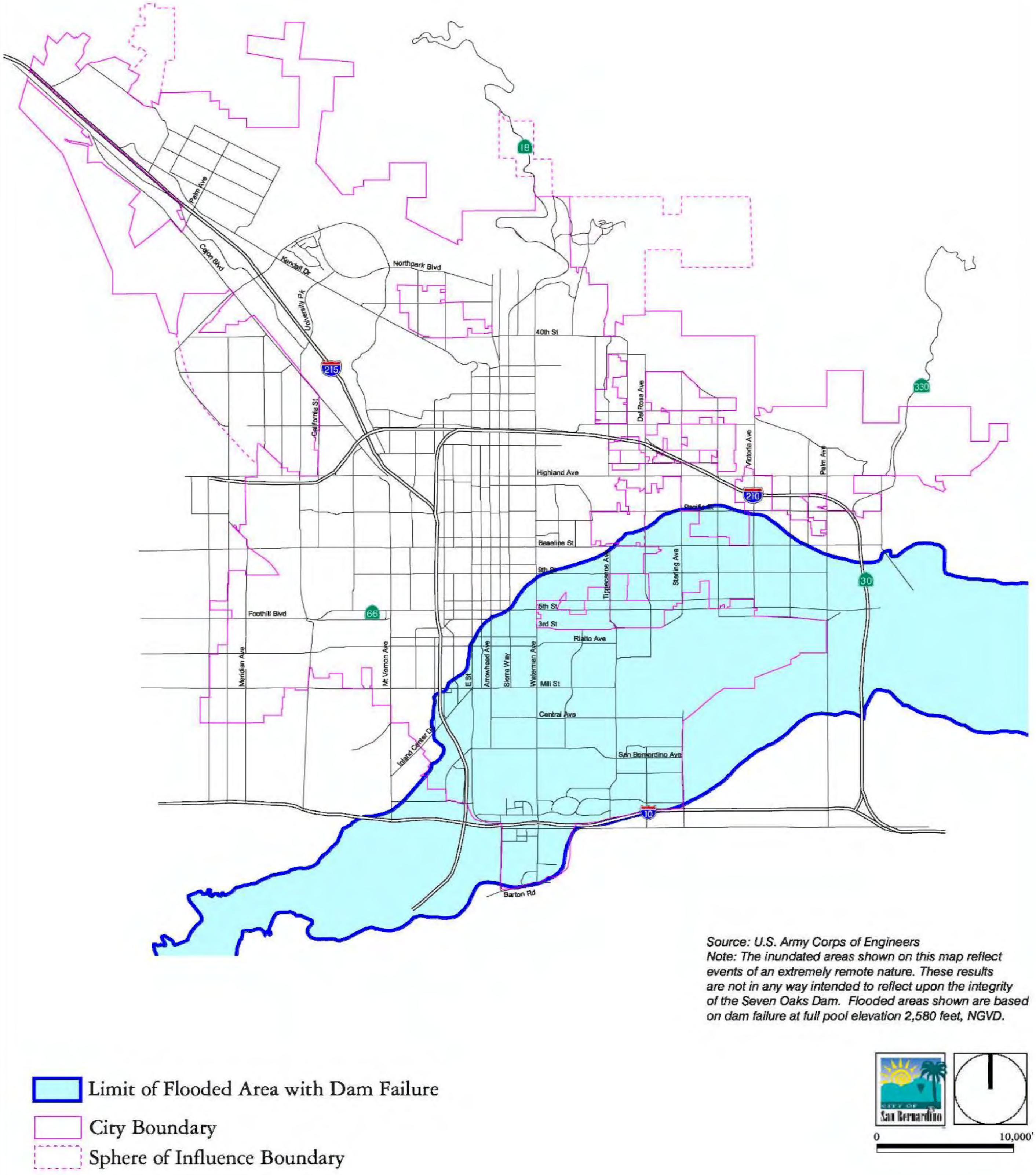


Source: Federal Emergency Management Agency Flood Insurance Rate Maps. Date: 1990

SOURCE: City of San Bernardino General Plan (Figure S-1), November 2005

FIGURE X-1

100-Year Floodplain

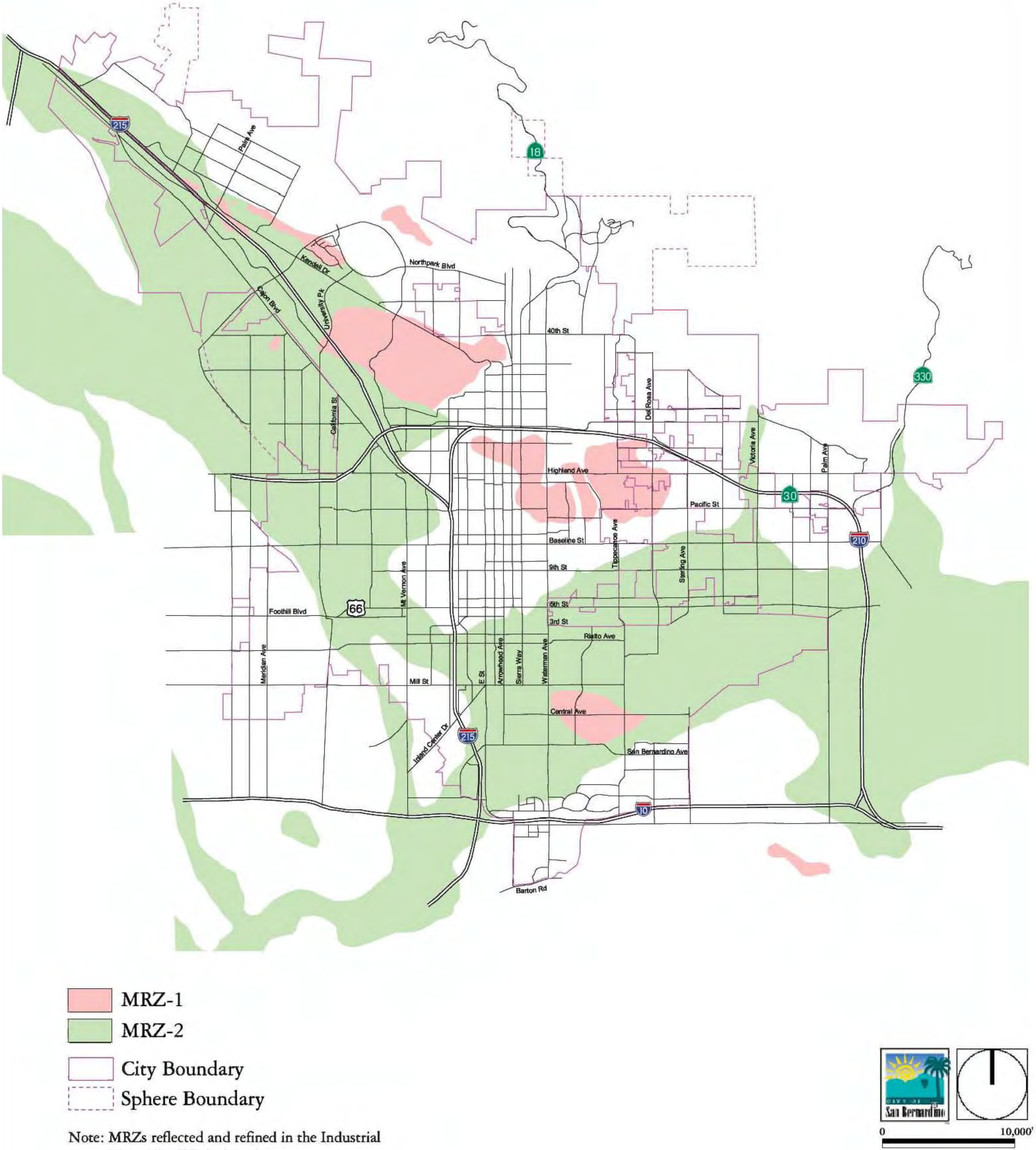


Source: U.S. Army Corps of Engineers
Note: The inundated areas shown on this map reflect events of an extremely remote nature. These results are not in any way intended to reflect upon the integrity of the Seven Oaks Dam. Flooded areas shown are based on dam failure at full pool elevation 2,580 feet, NGVD.

SOURCE: City of San Bernardino General Plan (Figure S-2), November 2005

FIGURE X-2

Seven Oaks Dam Inundation



Note: MRZs reflected and refined in the Industrial Extractive (IE) designation.

SOURCE: City of San Bernardino General Plan (Figure NRC-3), November 2005

FIGURE XII-1

Tom Dodson & Associates
Environmental Consultants

Mineral Resource Zones

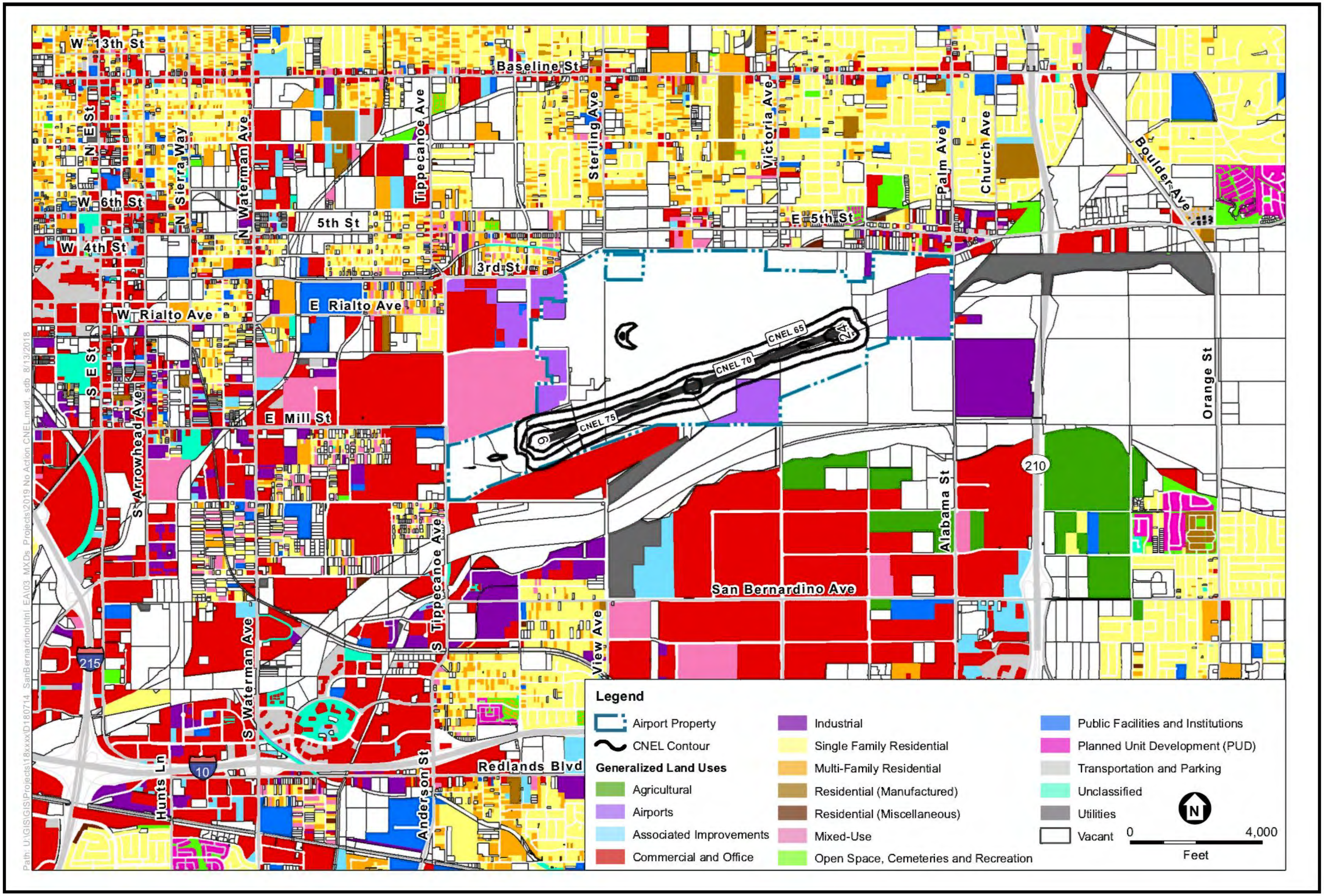


FIGURE XIII-1

Tom Dodson & Associates
Environmental Consultants

Existing Airport Noise Contours

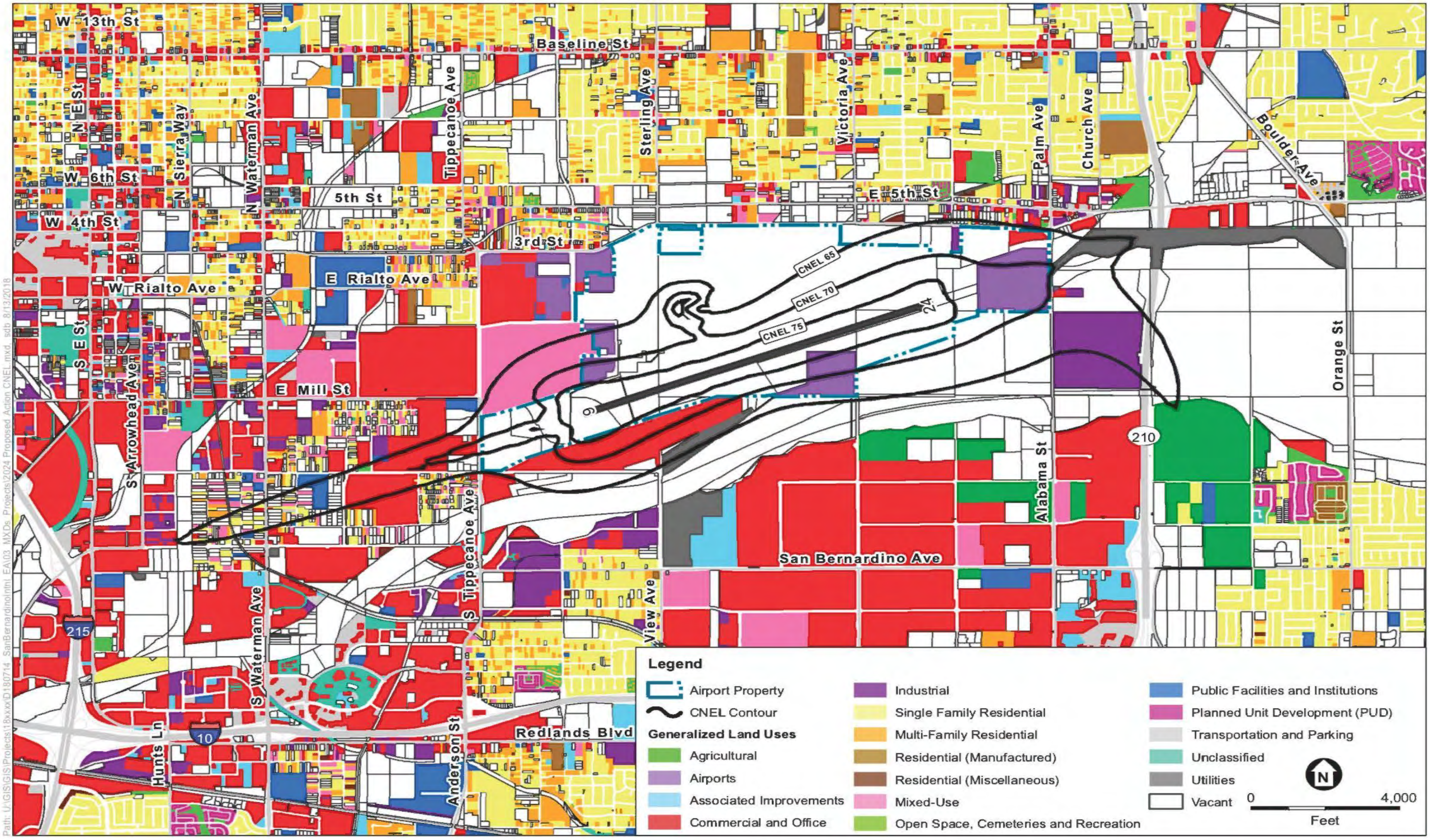
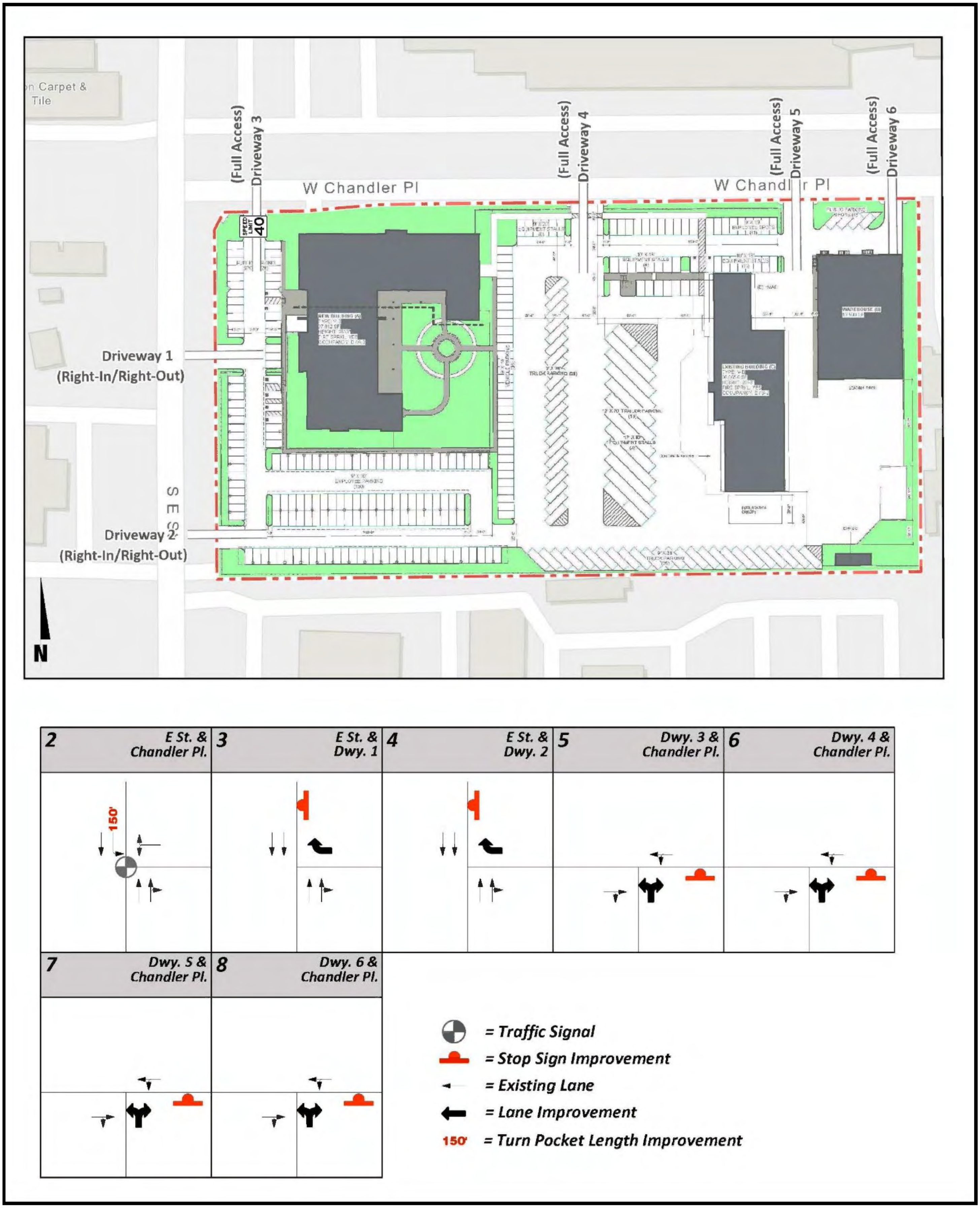


FIGURE XIII-2

Tom Dodson & Associates
Environmental Consultants

Future Airport Noise Contours

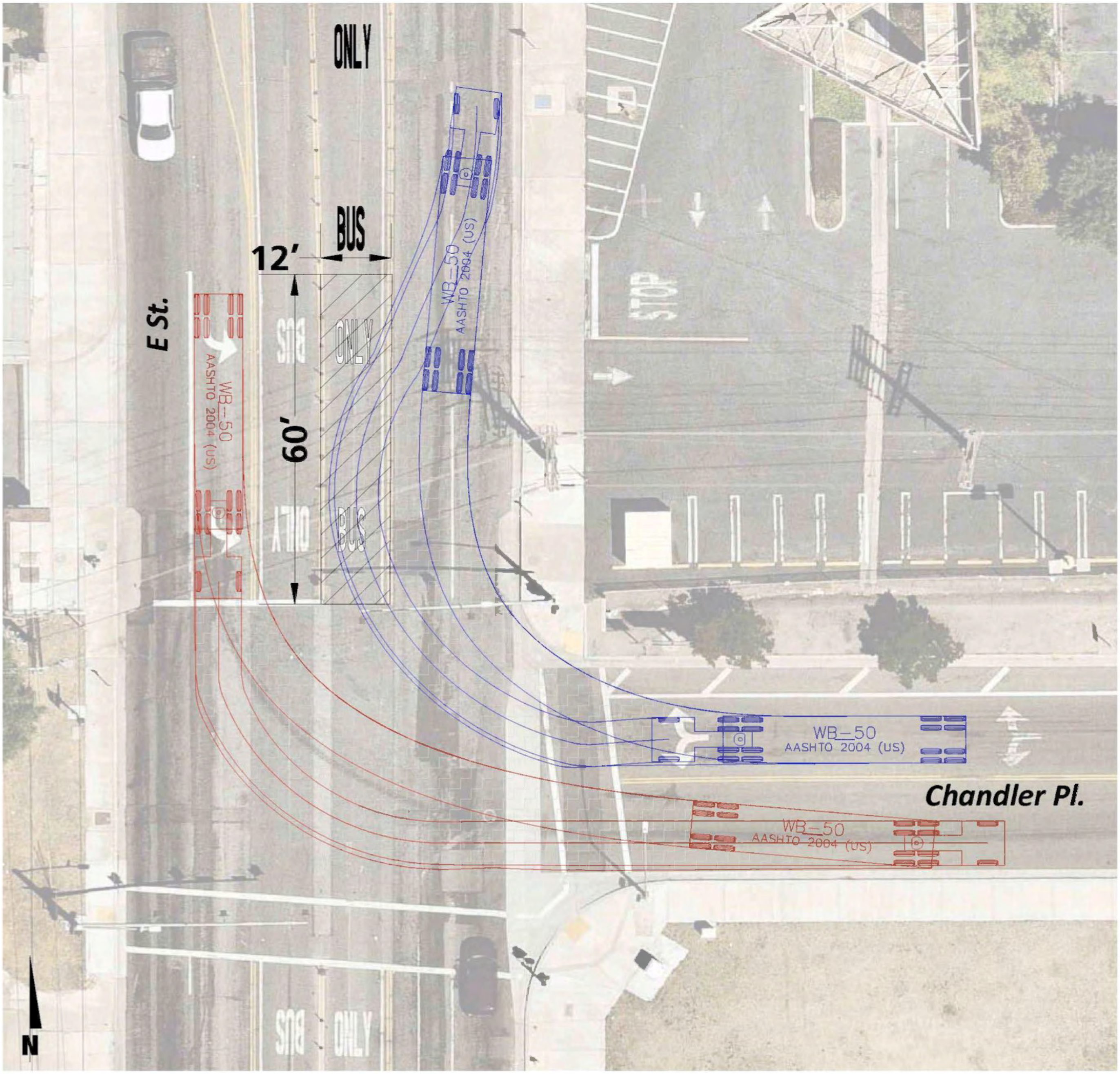


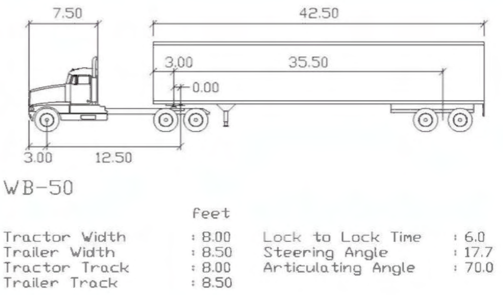
SOURCE: Urban Crossroads

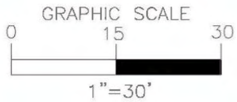
FIGURE XVII-1

Tom Dodson & Associates
Environmental Consultants

Recommended Traffic Improvements



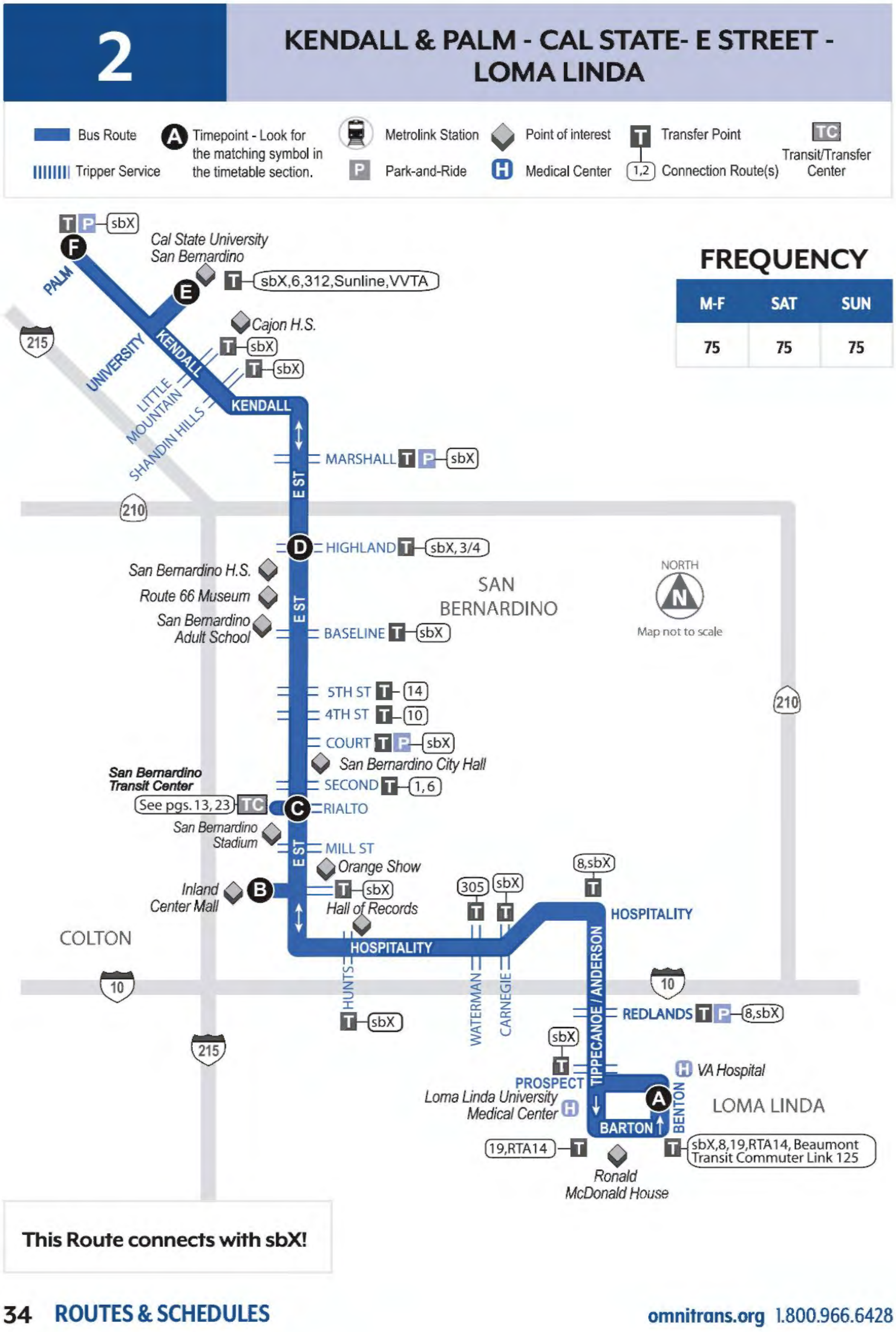




SOURCE: Urban Crossroads

FIGURE XVII-2

Recommended Bus Lane Restriping



2 KENDALL & PALM - CAL STATE- E STREET - LOMA LINDA

FREQUENCY		
M-F	SAT	SUN
75	75	75

This Route connects with sbX!

34 ROUTES & SCHEDULES

omnitrans.org 1.800.966.6428

SOURCE: Omnitrans

FIGURE XVII-3

Transit Routes

FREQUENCY

M-F	SAT
20/30	30

Did you know that there are four Park and Ride locations along Route 2 and sbX?
They offer free, lighted parking.
Look for the icon on the route map.

28 **ROUTES & SCHEDULES**

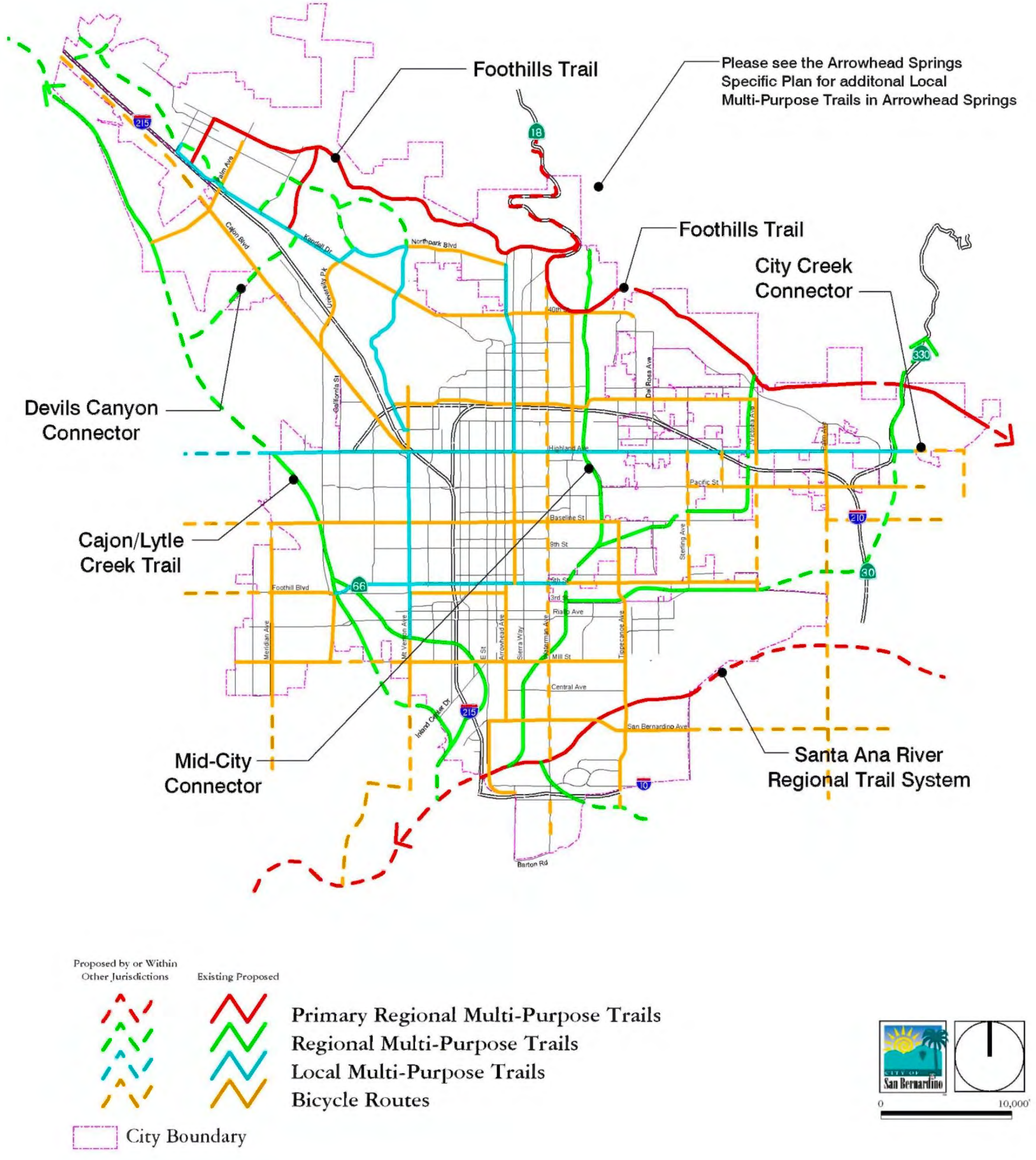
omnitrans.org 1.800.966.6428

SOURCE: Omnitrans

FIGURE XVII-4

Tom Dodson & Associates
Environmental Consultants

Transit Routes



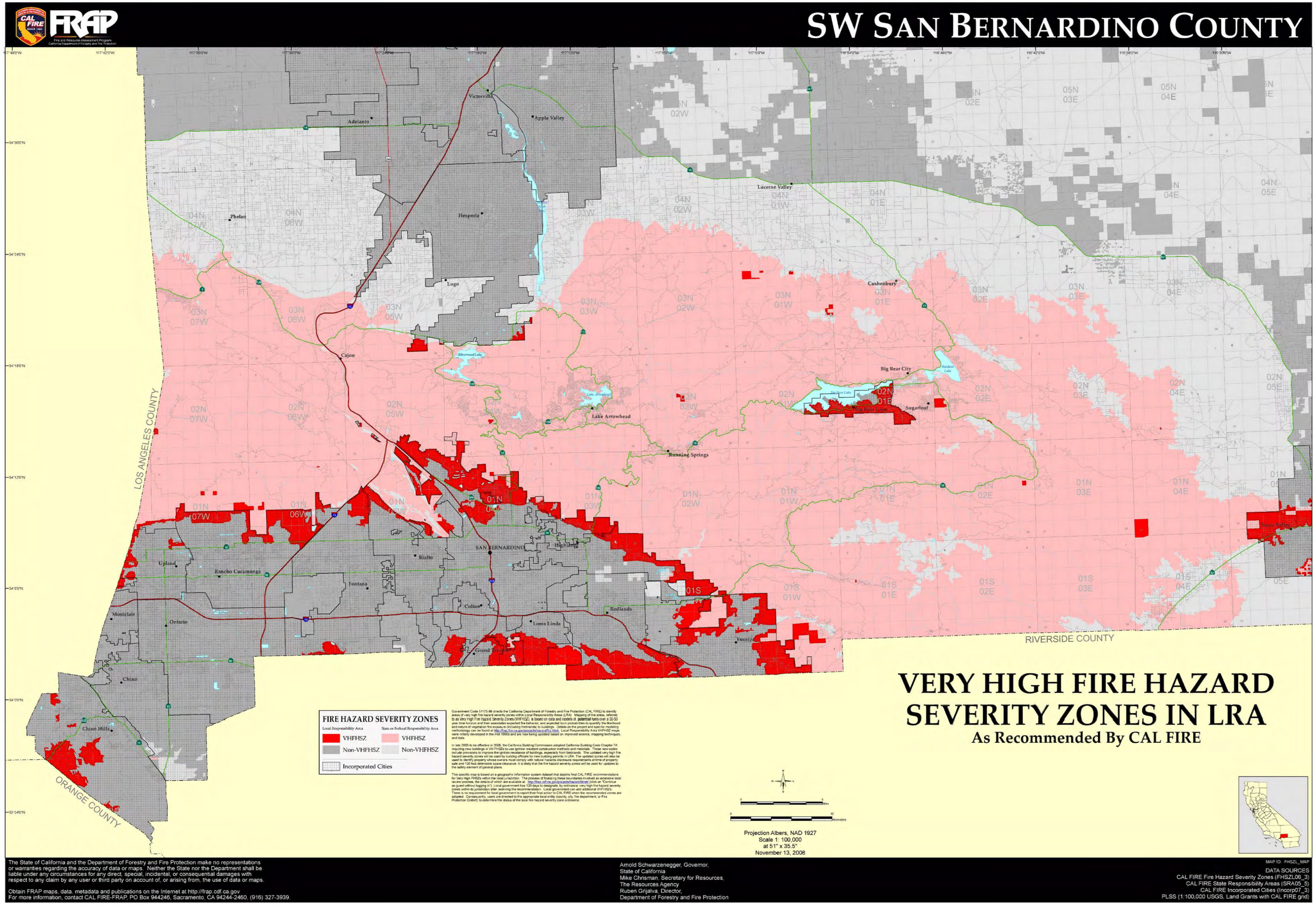
SOURCE: City of San Bernardino General Plan (Figure PRT-2), November 2005

FIGURE XVII-5

Tom Dodson & Associates
Environmental Consultants

Conceptual Trail System

SW SAN BERNARDINO COUNTY



VERY HIGH FIRE HAZARD SEVERITY ZONES IN LRA

As Recommended By CAL FIRE

Government Code 51175-89 directs the California Department of Forestry and Fire Protection (CAL FIRE) to identify areas of very high fire hazard severity zones within Local Responsibility Areas (LRA). Mapping of the areas, referred to as Very High Fire Hazard Severity Zones (VHFHSZ), is based on data and models of, potential fuels over a 30-50 year time horizon and their associated expected fire behavior, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure (including firebrands) to buildings. Details on the project and specific modeling methodology can be found at http://frap.fire.ca.gov/projects/hazard/fhz.html. Local Responsibility Area VHFHSZ maps were initially developed in the mid-1990s and are now being updated based on improved science, mapping techniques, and data.

In late 2005 to be effective in 2008, the California Building Commission adopted California Building Code Chapter 7A requiring new buildings in VH FHSZs to use ignition resistant construction methods and materials. These new codes include provisions to improve the ignition resistance of buildings, especially from firebrands. The updated very high fire hazard severity zones will be used by building officials for new building permits in LRA. The updated zones will also be used to identify property whose owners must comply with natural hazards disclosure requirements at time of property sale and 100 foot defensible space clearance. It is likely that the fire hazard severity zones will be used for updates to the safety element of general plans.

This specific map is based on a geographic information system dataset that depicts final CAL FIRE recommendations for Very High FHSZs within the local jurisdiction. The process of finalizing these boundaries involved an extensive local review process, the details of which are available at http://frap.cdf.ca.gov/projects/hazard/btnet/ (click on "Continue as guest without logging in"). Local government has 120 days to designate, by ordinance, very high fire hazard severity zones within its jurisdiction after receiving the recommendation. Local government can add additional VHFHSZs. There is no requirement for local government to report their final action to CAL FIRE when the recommended zones are adopted. Consequently, users are directed to the appropriate local entity (county, city, fire department, or Fire Protection District) to determine the status of the local fire hazard severity zone ordinance.

Projection Albers, NAD 1927
Scale 1: 100,000
at 51" x 35.5"
November 13, 2008

Obtain FRAP maps, data, metadata and publications on the Internet at http://frap.cdf.ca.gov
For more information, contact CAL FIRE-FRAP, PO Box 944246, Sacramento, CA 94244-2460, (916) 327-3939.

Arnold Schwarzenegger, Governor,
State of California
Mike Chrisman, Secretary for Resources,
The Resources Agency
Ruben Grijalva, Director,
Department of Forestry and Fire Protection

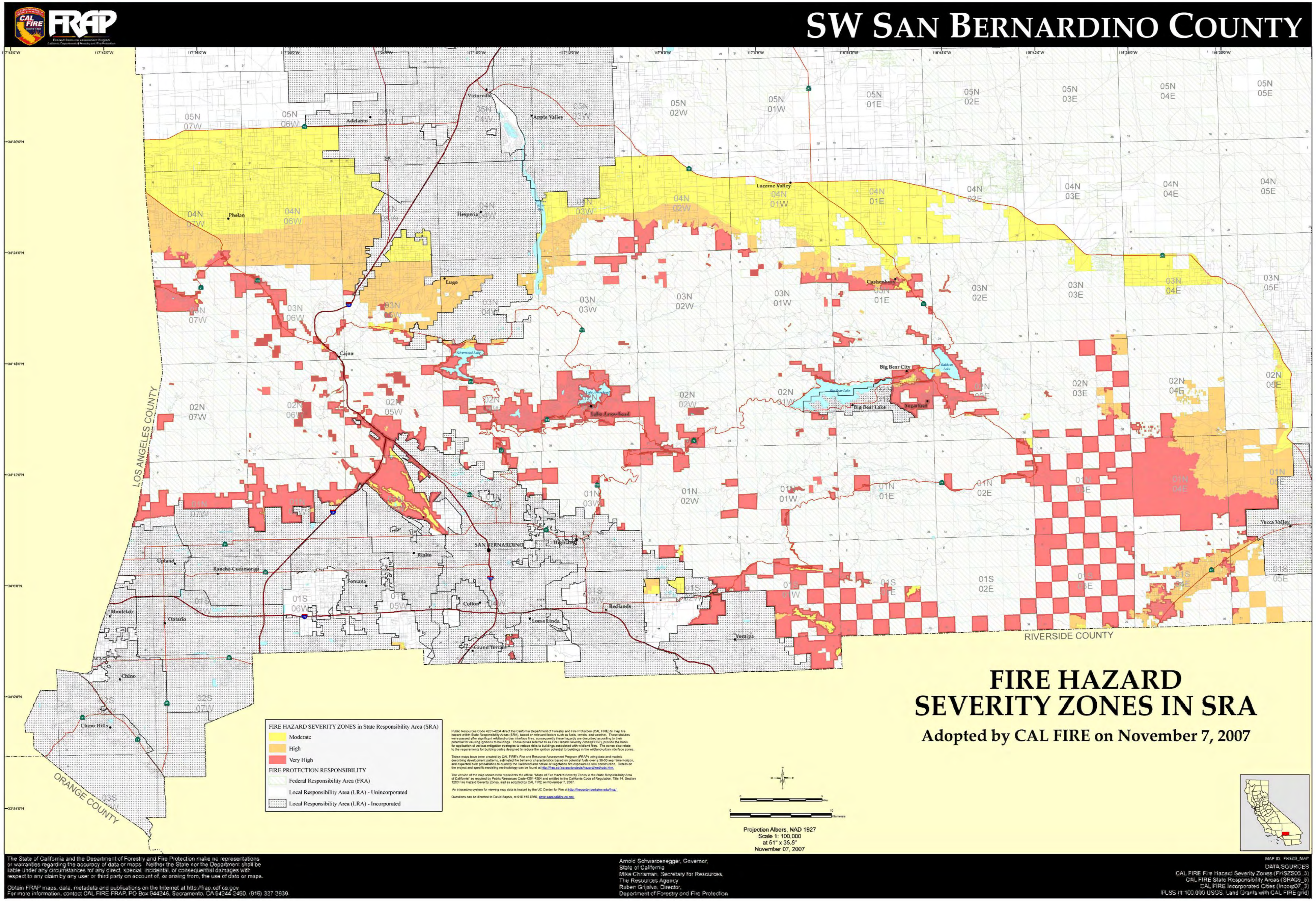
MAP ID: FHSZL_MAP

DATA SOURCES
CAL FIRE Fire Hazard Severity Zones (FHSZL06_3)
CAL FIRE State Responsibility Areas (SRA05_5)
CAL FIRE Incorporated Cities (Incorp07_3)
PLSS (1:100,000 USGS, Land Grants with CAL FIRE grid)

FIGURE XX-1

Tom Dodson & Associates
Environmental Consultants

Very High Fire Hazard Severity Zones in LRA



Public Resources Code 4201-4204 direct the California Department of Forestry and Fire Protection (CAL FIRE) to map fire hazard within State Responsibility Areas (SRA), based on relevant factors such as fuels, terrain, and weather. These statutes were passed after significant wildland-urban interface fires; consequently these hazards are described according to their potential for causing ignitions to buildings. These zones referred to as Fire Hazard Severity Zones(FHSZ), provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildland fires. The zones also relate to the requirements for building codes designed to reduce the ignition potential to buildings in the wildland-urban interface zones.

These maps have been created by CAL FIRE's Fire and Resource Assessment Program (FRAP) using data and models describing development patterns, estimated fire behavior characteristics based on potential fuels over a 30-50 year time horizon, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure to new construction. Details on the project and specific modeling methodology can be found at http://frap.cdf.ca.gov/projects/hazard/methods.htm.

The version of the map shown here represents the official "Maps of Fire Hazard Severity Zones in the State Responsibility Area of California" as required by Public Resources Code 4201-4204 and entitled in the California Code of Regulation, Title 14, Section 1280 Fire Hazard Severity Zones, and as adopted by CAL FIRE on November 7, 2007.

An interactive system for viewing map data is hosted by the UC Center for Fire at http://firecenter.berkeley.edu/fhsz/

Questions can be directed to David Sapsis, at 916.445.5369, dave.sapsis@fire.ca.gov.

Obtain FRAP maps, data, metadata and publications on the Internet at http://frap.cdf.ca.gov
For more information, contact CAL FIRE-FRAP, PO Box 944246, Sacramento, CA 94244-2460, (916) 327-3939.

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CAL FIRE Fire Hazard Severity Zones (FHSZS06_3)
CAL FIRE State Responsibility Areas (SRA05_5)
CAL FIRE Incorporated Cities (Incorp07_3)
PLSS (1:100,000 USGS, Land Grants with CAL FIRE grid)

FIGURE XX-2

Tom Dodson & Associates
Environmental Consultants

Fire Hazard Severity Zones in SRA

APPENDIX 1

AIR QUALITY and GHG IMPACT ANALYSES

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT WATER FACLITIES RELOCATION PROJECT

CITY OF SAN BERNARDINO, CALIFORNIA

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Date:

March 3, 2021

Project No.: P20-029 AQ

ATMOSPHERIC SETTING

REGIONAL CLIMATE

The climate the eastern San Bernardino Valley, as with all of Southern California, is governed largely by the strength and location of the semi-permanent high-pressure center over the Pacific Ocean and the moderating effects of the nearby vast oceanic heat reservoir. Local climatic conditions are characterized by very warm summers, mild winters, infrequent rainfall, moderate daytime on-shore breezes, and comfortable humidity levels. Unfortunately, the same climatic conditions that create such a desirable living climate combine to severely restrict the ability of the local atmosphere to disperse the large volumes of air pollution generated by the population and industry attracted in part by the climate.

The project will be situated in an area where the pollutants generated in coastal portions of the Los Angeles basin undergo photochemical reactions and then move inland across the project site during the daily sea breeze cycle. The resulting smog at times gives San Bernardino County some of the worst air quality in all of California. Fortunately, significant air quality improvement in the last decade suggests that healthful air quality may someday be attained despite the limited regional meteorological dispersion potential.

Winds across the project area are an important meteorological parameter because they control both the initial rate of dilution of locally generated air pollutant emissions as well as controlling their regional trajectory. Winds across the project site display a very unidirectional onshore flow from the southwest-west that is strongest in summer with a weaker offshore return flow from the northeast that is strongest on winter nights when the land is colder than the ocean. The onshore winds during the day average 6-8 mph while the offshore flow is often calm or drifts slowly westward at 1-3 mph.

During the daytime, any locally generated air emissions are thus rapidly transported eastward toward Banning Pass without generating any localized air quality impacts. The nocturnal drainage winds which move slowly across the area have some potential for localized stagnation, but fortunately, these winds have their origin in the adjacent mountains where background pollution levels are low such that any localized contributions do not create any unhealthful impacts.

In conjunction with the two characteristic wind regimes that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. The summer on-shore flow is capped by a massive dome of warm, sinking air which caps a shallow layer of cooler ocean air. These marine/subsidence inversions act like a giant lid over the basin. They allow for local mixing of emissions, but they confine the entire polluted air mass within the basin until it escapes into the desert or along the thermal chimneys formed along heated mountain slopes.

In winter, when the air near the ground cools while the air aloft remains warm, radiation inversions are formed that trap low-level emissions such as automobile exhaust near their source. As background levels of primary vehicular exhaust rise during the seaward return flow, the combination of rising non-local baseline levels plus emissions trapped locally by these radiation inversions creates micro-scale air pollution "hot spots" near freeways, shopping centers and other traffic concentrations in coastal areas of the Los Angeles Basin. Because the nocturnal airflow down the adjacent slopes to the north has its origin in very lightly developed areas of the San Bernardino Mountains, background pollution levels at night in winter are very low in the project vicinity. Localized air pollution contributions are insufficient to create a "hot spot" potential when superimposed upon the clean nocturnal baseline. The combination of winds and inversions are thus critical determinants in leading to the degraded air quality in summer, and the generally good air quality in winter in the project area.

AIR QUALITY SETTING

AMBIENT AIR QUALITY STANDARDS (AAQS)

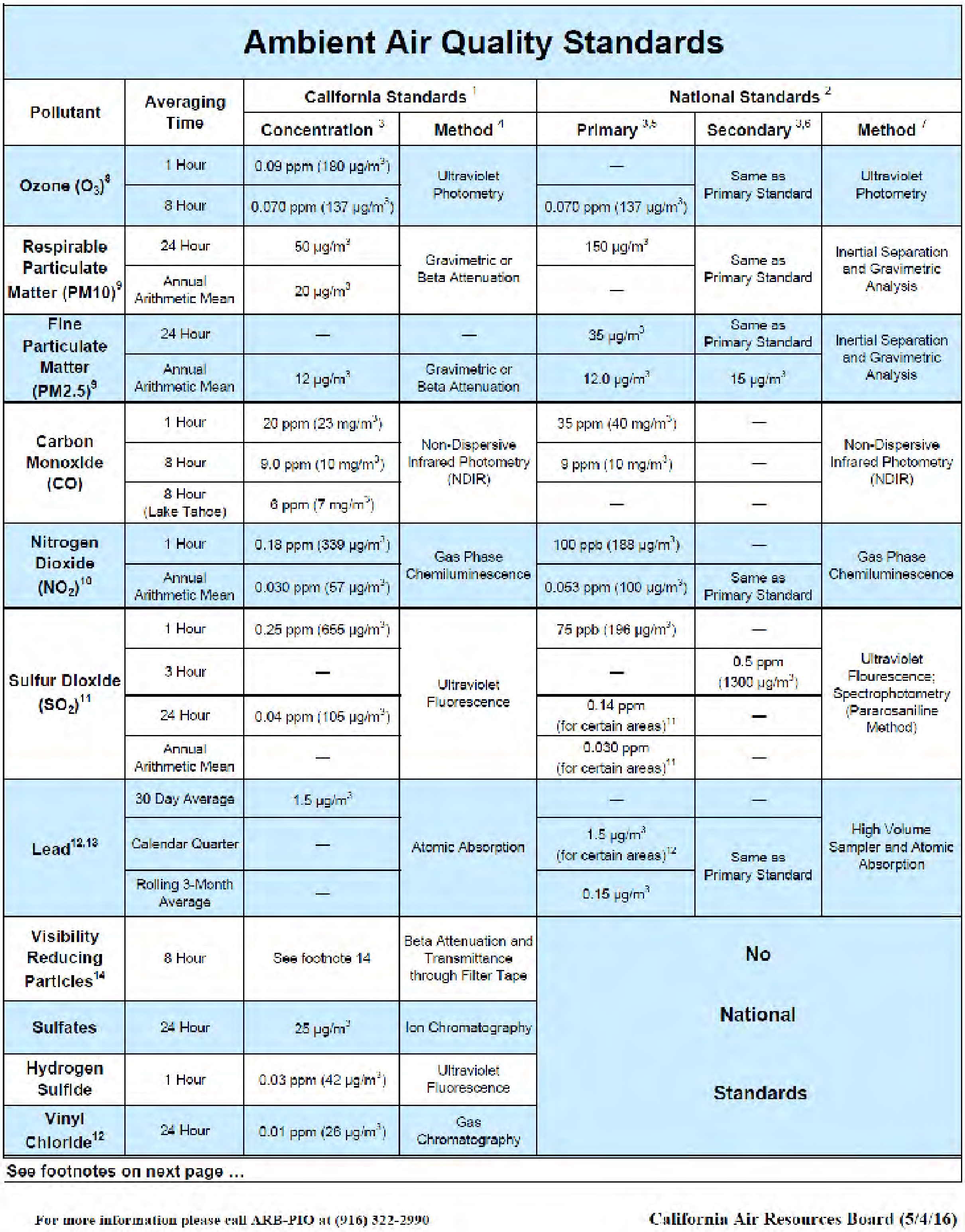
In order to gauge the significance of the air quality impacts of the proposed project, those impacts, together with existing background air quality levels, must be compared to the applicable ambient air quality standards. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect those people most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise, called "sensitive receptors." Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed. Recent research has shown, however, that chronic exposure to ozone (the primary ingredient in photochemical smog) may lead to adverse respiratory health even at concentrations close to the ambient standard.

National AAQS were established in 1971 for six pollution species with states retaining the option to add other pollutants, require more stringent compliance, or to include different exposure periods. The initial attainment deadline of 1977 was extended several times in air quality problem areas like Southern California. In 2003, the Environmental Protection Agency (EPA) adopted a rule, which extended and established a new attainment deadline for ozone for the year 2021. Because the State of California had established AAQS several years before the federal action and because of unique air quality problems introduced by the restrictive dispersion meteorology, there is considerable difference between state and national clean air standards. Those standards currently in effect in California are shown in Table 1. Sources and health effects of various pollutants are shown in Table 2.

The Federal Clean Air Act Amendments (CAAA) of 1990 required that the U.S. Environmental Protection Agency (EPA) review all national AAQS in light of currently known health effects. EPA was charged with modifying existing standards or promulgating new ones where appropriate. EPA subsequently developed standards for chronic ozone exposure (8+ hours per day) and for very small diameter particulate matter (called "PM-2.5"). New national AAQS were adopted in 1997 for these pollutants.

Planning and enforcement of the federal standards for PM-2.5 and for ozone (8-hour) were challenged by trucking and manufacturing organizations. In a unanimous decision, the U.S. Supreme Court ruled that EPA did not require specific congressional authorization to adopt national clean air standards. The Court also ruled that health-based standards did not require preparation of a cost-benefit analysis. The Court did find, however, that there was some inconsistency between existing and "new" standards in their required attainment schedules. Such attainment-planning schedule inconsistencies centered mainly on the 8-hour ozone standard. EPA subsequently agreed to downgrade the attainment designation for a large number of communities to “non-attainment” for the 8-hour ozone standard.

Table 1



Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O$_3$)[8]	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.070 ppm (137 $\mu g/m^3$)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	12.0 $\mu g/m^3$	15 $\mu g/m^3$	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO$_2$)[10]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Gas Phase Chemiluminescence	100 ppb (188 $\mu g/m^3$)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)		0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO$_2$)[11]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Ultraviolet Fluorescence	75 ppb (196 $\mu g/m^3$)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 $\mu g/m^3$)	
	24 Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 $\mu g/m^3$		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

See footnotes on next page …

For more information please call ARB-PIO at (916) 322-2990

California Air Resources Board (5/4/16)

Table 1 (continued)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (5/4/16)**

Table 2
Health Effects of Major Criteria Pollutants

Pollutants	**Sources**	**Primary Effects**
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust. • Natural events, such as decomposition of organic matter.	• Reduced tolerance for exercise. • Impairment of mental function. • Impairment of fetal development. • Death at high levels of exposure. • Aggravation of some heart diseases (angina).
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust. • High temperature stationary combustion. • Atmospheric reactions.	• Aggravation of respiratory illness. • Reduced visibility. • Reduced plant growth. • Formation of acid rain.
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	• Aggravation of respiratory and cardiovascular diseases. • Irritation of eyes. • Impairment of cardiopulmonary function. • Plant leaf injury.
Lead (Pb)	• Contaminated soil.	• Impairment of blood function and nerve construction. • Behavioral and hearing problems in children.
Respirable Particulate Matter (PM-10)	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.	• Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardio respiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.
Fine Particulate Matter (PM-2.5)	• Fuel combustion in motor vehicles, equipment, and industrial sources. • Residential and agricultural burning. • Industrial processes. • Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.	• Increases respiratory disease. • Lung damage. • Cancer and premature death. • Reduces visibility and results in surface soiling.
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels. • Smelting of sulfur-bearing metal ores. • Industrial processes.	• Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board, 2002.

Evaluation of the most current data on the health effects of inhalation of fine particulate matter prompted the California Air Resources Board (ARB) to recommend adoption of the statewide PM-2.5 standard that is more stringent than the federal standard. This standard was adopted in 2002. The State PM-2.5 standard is more of a goal in that it does not have specific attainment planning requirements like a federal clean air standard, but only requires continued progress towards attainment.

Similarly, the ARB extensively evaluated health effects of ozone exposure. A new state standard for an 8-hour ozone exposure was adopted in 2005, which aligned with the exposure period for the federal 8-hour standard. The California 8-hour ozone standard of 0.07 ppm is more stringent than the federal 8-hour standard of 0.075 ppm. The state standard, however, does not have a specific attainment deadline. California air quality jurisdictions are required to make steady progress towards attaining state standards, but there are no hard deadlines or any consequences of non-attainment. During the same re-evaluation process, the ARB adopted an annual state standard for nitrogen dioxide ($NO_{2)}$ that is more stringent than the corresponding federal standard, and strengthened the state one-hour NO_2 standard.

As part of EPA’s 2002 consent decree on clean air standards, a further review of airborne particulate matter (PM) and human health was initiated. A substantial modification of federal clean air standards for PM was promulgated in 2006. Standards for PM-2.5 were strengthened, a new class of PM in the 2.5 to 10 micron size was created, some PM-10 standards were revoked, and a distinction between rural and urban air quality was adopted. In December, 2012, the federal annual standard for PM-2.5 was reduced from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ which matches the California AAQS. The severity of the basin’s non-attainment status for PM-2.5 may be increased by this action and thus require accelerated planning for future PM-2.5 attainment.

In response to continuing evidence that ozone exposure at levels just meeting federal clean air standards is demonstrably unhealthful, EPA had proposed a further strengthening of the 8-hour standard. A new 8-hour ozone standard was adopted in 2015 after extensive analysis and public input. The adopted national 8-hour ozone standard is 0.07 ppm which matches the current California standard. It will require three years of ambient data collection, then 2 years of non-attainment findings and planning protocol adoption, then several years of plan development and approval. Final air quality plans for the new standard are likely to be adopted around 2022. Ultimate attainment of the new standard in ozone problem areas such as Southern California might be after 2025.

In 2010 a new federal one-hour primary standard for nitrogen dioxide (NO_2) was adopted. This standard is more stringent than the existing state standard. Based upon air quality monitoring data in the South Coast Air Basin, the California Air Resources Board has requested the EPA to designate the basin as being in attainment for this standard. The federal standard for sulfur dioxide (SO_2) was also recently revised. However, with minimal combustion of coal and mandatory use of low sulfur fuels in California, SO_2 is typically not a problem pollutant.

BASELINE AIR QUALITY

Existing and probable future levels of air quality in the project area can be best inferred from ambient air quality measurements conducted by the South Coast Air Quality Management District (SCAQMD) at its Central San Bernardino monitoring station. This station measures both regional pollution levels such as dust (particulates) and smog, as well as levels of primary vehicular pollutants such as carbon monoxide. Table 3 summarizes the last four years of the published data from the Central San Bernardino monitoring station.

Ozone and particulates are seen to be the two most significant air quality concerns. Ozone is the primary ingredient in photochemical smog. Slightly more than 15 percent of all days exceed the California one-hour standard. The 8-hour state ozone standard has been exceeded an average of 27 percent of all days in the past four years. The federal 8-hour standard is exceeded 21 percent of all days. For the last four years, ozone levels have neither improved nor gotten noticeably worse although 2019 shows the most promising numbers. While ozone levels are still high, they are much lower than 10 to 20 years ago. Attainment of all clean air standards in the project vicinity is not likely to occur soon, but the severity and frequency of violations is expected to continue to slowly decline during the current decade.

In addition to gaseous air pollution concerns, San Bernardino experiences frequent violations of standards for 10-micron diameter respirable particulate matter (PM-10). High dust levels occur during Santa Ana wind conditions, as well as from the trapped accumulation of soot, roadway dust and byproducts of atmospheric chemical reactions during warm season days with poor visibility. Table 3 shows that almost 10 percent of all days in the last four years experienced a violation of the State PM-10 standard. However, the three-times less stringent federal standard has not been exceeded in the same period.

A substantial fraction of PM-10 is comprised of ultra-small diameter particulates capable of being inhaled into deep lung tissue (PM-2.5). Peak annual PM-2.5 levels are sometimes almost as high as PM-10, which includes PM-2.5 as a sub-set. However, there has only been one violation of the 24-hour standard of 35 $\mu g/m^3$ in all monitoring days for the last four years.

While many of the major ozone precursor emissions (automobiles, solvents, paints, etc.) have been substantially reduced, most major PM-10 sources (construction dust, vehicular turbulence along roadway shoulders, truck exhaust, etc.) have not been as effectively reduced. Prospects of ultimate attainment of ozone standards are better than for particulate matter.

More localized pollutants such as carbon monoxide, nitrogen oxides, etc. are very low near the project site because background levels, never approach allowable levels. There is substantial excess dispersive capacity to accommodate localized vehicular air pollutants such as NOx or CO without any threat of violating applicable AAQS.

Table 3
Air Quality Monitoring Summary (2016-2019)
(Estimated Number of Days Standards Were Exceeded)

Pollutant/Standard	**2016**	**2017**	**2018**	**2019**
Ozone				
1-Hour > 0.09 ppm (S)	41	81	63	41
8-Hour > 0.07 ppm (S)	106	112	102	67
8- Hour > 0.075 ppm (F)	76	88	71	73
Max. 1-Hour Conc. (ppm)	0.158	0.158	0.138	0.127
Max. 8-Hour Conc. (ppm)	0.118	0.136	0.116	0.114
Carbon Monoxide				
8- Hour > 9. ppm (S,F)	0	0	0	0
Max 8-hour Conc. (ppm)	1.7	2.3	2.5	1.1
Nitrogen Dioxide				
1-Hour > 0.18 ppm (S)	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.060	0.065	0.057	0.059
Respirable Particulates (PM-10)				
24-Hour > 50 µg/m^3 (S)	33/333	35/356	25/355	36/269
24-Hour > 150 µg/m^3 (F)	0/333	0/356	0/335	0/269
Max. 24-Hr. Conc. (µg/m^3)	91.	86.	129.	112.
Fine Particulates (PM-2.5)				
24-Hour > 35 µg/m^3 (F)	0/113	1/116	0/114	0/97
Max. 24-Hr. Conc. (µg/m^3)	32.5	38.2	30.1	34.8

S=State Standard
F=Federal Standard

Source: Central San Bernardino SCAQMD Air Monitoring Summary (5203)
data: www.arb.ca.gov/adam/

AIR QUALITY PLANNING

The Federal Clean Air Act (1977 Amendments) required that designated agencies in any area of the nation not meeting national clean air standards must prepare a plan demonstrating the steps that would bring the area into compliance with all national standards. The SCAB could not meet the deadlines for ozone, nitrogen dioxide, carbon monoxide, or PM-10. In the SCAB, the agencies designated by the governor to develop regional air quality plans are the SCAQMD and the Southern California Association of Governments (SCAG). The two agencies first adopted an Air Quality Management Plan (AQMP) in 1979 and revised it several times as earlier attainment forecasts were shown to be overly optimistic.

The 1990 Federal Clean Air Act Amendment (CAAA) required that all states with air-sheds with "serious" or worse ozone problems submit a revision to the State Implementation Plan (SIP). Amendments to the SIP have been proposed, revised and approved over the past decade. The most current regional attainment emissions forecast for ozone precursors (ROG and NOx) and for carbon monoxide (CO) and for particulate matter are shown in Table 4. Substantial reductions in emissions of ROG, NOx and CO are forecast to continue throughout the next several decades. Unless new particulate control programs are implemented, PM-10 and PM-2.5 are forecast to slightly increase.

The Air Quality Management District (AQMD) adopted an updated clean air "blueprint" in August 2003. The 2003 Air Quality Management Plan (AQMP) was approved by the EPA in 2004. The AQMP outlined the air pollution measures needed to meet federal health-based standards for ozone by 2010 and for particulates (PM-10) by 2006. The 2003 AQMP was based upon the federal one-hour ozone standard which was revoked late in 2005 and replaced by an 8-hour federal standard. Because of the revocation of the hourly standard, a new air quality planning cycle was initiated.

With re-designation of the air basin as non-attainment for the 8-hour ozone standard, a new attainment plan was developed. This plan shifted most of the one-hour ozone standard attainment strategies to the 8-hour standard. As previously noted, the attainment date was to "slip" from 2010 to 2021. The updated attainment plan also includes strategies for ultimately meeting the federal PM-2.5 standard.

Because projected attainment by 2021 required control technologies that did not exist yet, the SCAQMD requested a voluntary "bump-up" from a "severe non-attainment" area to an "extreme non-attainment" designation for ozone. The extreme designation was to allow a longer time period for these technologies to develop. If attainment cannot be demonstrated within the specified deadline without relying on "black-box" measures, EPA would have been required to impose sanctions on the region had the bump-up request not been approved. In April 2010, the EPA approved the change in the non-attainment designation from "severe-17" to "extreme." This reclassification set a later attainment deadline (2024), but also required the air basin to adopt even more stringent emissions controls.

Table 4
South Coast Air Basin Emissions Forecasts (Emissions in tons/day)

Pollutant	2015[a]	2020[b]	2025[b]	2030[b]
NOx	357	289	266	257
VOC	400	393	393	391
PM-10	161	165	170	172
PM-2.5	67	68	70	71

[a] 2015 Base Year.
[b] With current emissions reduction programs and adopted growth forecasts.
Source: California Air Resources Board, 2013 Almanac of Air Quality

In other air quality attainment plan reviews, EPA had disapproved part of the SCAB PM-2.5 attainment plan included in the AQMP. EPA stated that the current attainment plan relied on PM-2.5 control regulations that had not yet been approved or implemented. It was expected that a number of rules that were pending approval would remove the identified deficiencies. If these issues were not resolved within the next several years, federal funding sanctions for transportation projects could result. The 2012 AQMP included in the current California State Implementation Plan (SIP) was expected to remedy identified PM-2.5 planning deficiencies.

The federal Clean Air Act requires that non-attainment air basins have EPA approved attainment plans in place. This requirement includes the federal one-hour ozone standard even though that standard was revoked almost ten years ago. There was no approved attainment plan for the one-hour federal standard at the time of revocation. Through a legal quirk, the SCAQMD is now required to develop an AQMP for the long since revoked one-hour federal ozone standard. Because the current SIP for the basin contains a number of control measures for the 8-hour ozone standard that are equally effective for one-hour levels, the 2012 AQMP was believed to satisfy hourly attainment planning requirements.

AQMPs are required to be updated every three years. The 2012 AQMP was adopted in early 2013. An updated AQMP was required for completion in 2016. The 2016 AQMP was adopted by the SCAQMD Board in March, 2017, and has been submitted the California Air Resources Board for forwarding to the EPA. The 2016 AQMP acknowledges that motor vehicle emissions have been effectively controlled and that reductions in NOx, the continuing ozone problem pollutant, may need to come from major stationary sources (power plants, refineries, landfill flares, etc.) . The current attainment deadlines for all federal non-attainment pollutants are now as follows:

8-hour ozone (70 ppb)	2032
Annual PM-2.5 (12 $\mu g/m^3$)	2025
8-hour ozone (75 ppb)	2024 (old standard)
1-hour ozone (120 ppb)	2023 (rescinded standard)

24-hour PM-2.5 (35 $\mu g/m^3$)	2019

The key challenge is that NOx emission levels, as a critical ozone precursor pollutant, are forecast to continue to exceed the levels that would allow the above deadlines to be met. Unless additional stringent NOx control measures are adopted and implemented, ozone attainment goals may not be met.

The proposed project does not directly relate to the AQMP in that there are no specific air quality programs or regulations governing office and warehousing projects for utility companies. Conformity with adopted plans, forecasts and programs relative to population, housing, employment and land use is the primary yardstick by which impact significance of planned growth is determined. The SCAQMD, however, while acknowledging that the AQMP is a growth-accommodating document, does not favor designating regional impacts as less-than-significant just because the proposed development is consistent with regional growth projections. Air quality impact significance for the proposed project has therefore been analyzed on a project-specific basis.

AIR QUALITY IMPACT

STANDARDS OF SIGNIFICANCE

Air quality impacts are considered "significant" if they cause clean air standards to be violated where they are currently met, or if they "substantially" contribute to an existing violation of standards. Any substantial emissions of air contaminants for which there is no safe exposure, or nuisance emissions such as dust or odors, would also be considered a significant impact.

Appendix G of the California CEQA Guidelines offers the following four tests of air quality impact significance. A project would have a potentially significant impact if it would:

a) Conflict with or obstructs implementation of the applicable air quality plan?

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

c) Expose sensitive receptors to substantial pollutant concentrations.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Primary Pollutants

Air quality impacts generally occur on two scales of motion. Near an individual source of emissions or a collection of sources such as a crowded intersection or parking lot, levels of those pollutants that are emitted in their already unhealthful form will be highest. Carbon monoxide (CO) is an example of such a pollutant. Primary pollutant impacts can generally be evaluated directly in comparison to appropriate clean air standards. Violations of these standards where they are currently met, or a measurable worsening of an existing or future violation, would be considered a significant impact. Many particulates, especially fugitive dust emissions, are also primary pollutants. Because of the non-attainment status of the South Coast Air Basin (SCAB) for PM-10, an aggressive dust control program is required to control fugitive dust during project construction.

Secondary Pollutants

Many pollutants, however, require time to transform from a more benign form to a more unhealthful contaminant. Their impact occurs regionally far from the source. Their incremental regional impact is minute on an individual basis and cannot be quantified except through complex photochemical computer models. Analysis of significance of such emissions is based upon a specified amount of emissions (pounds, tons, etc.) even though there is no way to translate those emissions directly into a corresponding ambient air quality impact.

Because of the chemical complexity of primary versus secondary pollutants, the SCAQMD has designated significant emissions levels as surrogates for evaluating regional air quality impact significance independent of chemical transformation processes. Projects with daily emissions that exceed any of the following emission thresholds are recommended by the SCAQMD to be considered significant under CEQA guidelines.

Table 5
Daily Emissions Thresholds

Pollutant	Construction	Operations
ROG	75	55
NOx	100	55
CO	550	550
PM-10	150	150
PM-2.5	55	55
SOx	150	150
Lead	3	3

Source: SCAQMD CEQA Air Quality Handbook, November, 1993 Rev.

CONSTRUCTION ACTIVITY IMPACTS

CalEEMod was developed by the SCAQMD to provide a model by which to calculate both construction emissions and operational emissions from a variety of land use projects. It calculates both the daily maximum and annual average emissions for criteria pollutants as well as total or annual greenhouse gas (GHG) emissions.

The project consists of the development of a 7.86-acre site and proposes two new structures; a new 27,812 square foot one-story structural steel administrative office building and a new 13,500 square foot one-story tilt-up concrete warehouse with loading docks. There will be 194 parking spaces. The existing building will be renovated.

The construction duration is estimated to last 14 months with a start date of April/Spring 2021 and the completion date by the April/Spring 2022. It is anticipated that a maximum number of 50 employees will be required to support the construction of the project each day. Delivery of construction supplies may generate as much as 50 round trips per day.

Construction was modeled in CalEEMod2016.3.2 using specified construction equipment and schedule for this project as shown in Table 6.

Table 6
Construction Activity Equipment Fleet

Phase Name and Duration	Equipment
Demolition (20 days)	1 Concrete Saw
	1 Dozer
	3 Loader/Backhoes
Grading (6 days)	1 Grader
	1 Dozer
	2 Loader/Backhoes
Construction (220 days)	1 Crane
	1 Loader/Backhoe
	3 Welders
	1 Generator Set
	2 Forklifts
Paving (10 days)	1 Paver
	1 Mixer
	1 Paving Equipment
	1 Loader/Backhoe
	2 Rollers

Utilizing this indicated equipment fleet and durations shown in Table 6 the following worst-case daily construction emissions are calculated by CalEEMod and are listed in Table 7.

Table 7
Construction Activity Emissions
Maximum Daily Emissions (pounds/day)

Maximal Construction Emissions	**ROG**	**NOx**	**CO**	**SO_2**	**PM-10**	**PM-2.5**
2021						
Unmitigated	2.7	21.2	19.6	0.0	8.6	4.5
Mitigated	2.7	21.2	19.6	0.0	5.0	2.7
2022						
Unmitigated	40.7	19.5	19.0	0.0	2.2	1.1
Mitigated	40.7	19.5	19.0	0.0	2.2	1.1
SCAQMD Thresholds	75	100	550	150	150	55

Peak daily construction activity emissions are estimated be below SCAQMD CEQA thresholds without the need for added mitigation. The only model-based mitigation measured applied for this project was watering exposed dirt surfaces two times per day to minimize the generation of fugitive dust generation during grading.

Construction equipment exhaust contains carcinogenic compounds within the diesel exhaust particulates. The toxicity of diesel exhaust is evaluated relative to a 24-hour per day, 365 days per year, 70-year lifetime exposure. The SCAQMD does not generally require the analysis of construction-related diesel emissions relative to health risk due to the short period for which the majority of diesel exhaust would occur. Health risk analyses are typically assessed over a 9-, 30-, or 70-year timeframe and not over a relatively brief construction period due to the lack of health risk associated with such a brief exposure.

LOCALIZED SIGNIFICANCE THRESHOLDS

The SCAQMD has developed analysis parameters to evaluate ambient air quality on a local level in addition to the more regional emissions-based thresholds of significance. These analysis elements are called Localized Significance Thresholds (LSTs). LSTs were developed in response to Governing Board’s Environmental Justice Enhancement Initiative 1-4 and the LST methodology was provisionally adopted in October 2003 and formally approved by SCAQMD’s Mobile Source Committee in February 2005.

Use of an LST analysis for a project is optional. For the proposed project, the primary source of possible LST impact would be during construction. LSTs are applicable for a sensitive receptor where it is possible that an individual could remain for 24 hours such as a residence, hospital or convalescent facility.

LSTs are only applicable to the following criteria pollutants: oxides of nitrogen (NOx), carbon monoxide (CO), and particulate matter (PM-10 and PM-2.5). LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area and distance to the nearest sensitive receptor.

LST screening tables are available for 25, 50, 100, 200- and 500-meter source-receptor distances. The nearest residence is to the northwest, across the 215 freeway, approximately 2,500 feet from the site along Scenic Drive. Therefore, a 500-meter source-receptor distance was modeled.

LST pollutant screening level concentration data is currently published for 1, 2- and 5-acre sites for varying distances. For this project, the most stringent thresholds for a 1-acre site were applied.

The following thresholds and emissions in Table 8 are therefore determined (pounds per day):

Table 8
LST and Project Emissions (pounds/day)

1.0 acre/500 meters East San Bernardino Valley	**CO**	**NOx**	**PM-10**	**PM-2.5**
LST Threshold	21,708	651	196	98
Max On-Site Emissions				
Unmitigated	20	21	9	5
Mitigated	20	21	5	3

CalEEMod Output in Appendix

LSTs were compared to the maximum daily construction activities. As seen in Table 8, with active dust suppression, mitigated emissions meet the LST for construction thresholds. LST impacts are less-than-significant even without 2 times a day watering during grading.

OPERATIONAL IMPACTS

The project will generate 344 daily trips using trip generation numbers provided in the project traffic report. The vehicle fleet for warehousing was modified to model 49% medium duty trucks and 51% heavy duty trucks to reflect the actual vehicular mix. Operational emissions were calculated using CalEEMod2016.3.2 for an assumed completion year of 2022. The operational impacts are shown in Table 9. As shown, operational emissions will not exceed applicable SCAQMD operational emissions CEQA thresholds of significance.

Table 9
Proposed Uses Daily Operational Impacts (2022)

	Operational Emissions (lbs/day)					
Source	**ROG**	**NOx**	**CO**	**SO_2**	**PM-10**	**PM-2.5**
Area	1.0	0.0	0.0	0.0	0.0	0.0
Energy	0.0	0.0	0.0	0.0	0.0	0.0
Mobile	0.9	15.5	10.0	0.1	2.8	0.8
Total	**1.9**	**15.5**	**10.0**	**0.1**	**2.8**	**0.8**
SCAQMD Threshold	55	55	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Source: CalEEMod Output in Appendix

CONSTRUCTION EMISSIONS MINIMIZATION

Construction activities are not anticipated to cause dust emissions to exceed SCAQMD CEQA thresholds. Nevertheless, emissions minimization through enhanced dust control measures is recommended for use because of the non-attainment status of the air basin. Recommended measures include:

Fugitive Dust Control

- Apply soil stabilizers or moisten inactive areas.
- Water exposed surfaces as needed to avoid visible dust leaving the construction site (typically 2-3 times/day).
- Cover all stock piles with tarps at the end of each day or as needed.
- Provide water spray during loading and unloading of earthen materials.
- Minimize in-out traffic from construction zone
- Cover all trucks hauling dirt, sand, or loose material and require all trucks to maintain at least two feet of freeboard
- Sweep streets daily if visible soil material is carried out from the construction site

Similarly, ozone precursor emissions (ROG and NOx) are calculated to be below SCAQMD CEQA thresholds. However, because of the regional non-attainment for photochemical smog, the use of reasonably available control measures for diesel exhaust is recommended. Combustion emissions control options include:

Exhaust Emissions Control

- Utilize well-tuned off-road construction equipment.
- Establish a preference for contractors using Tier 3 or better rated heavy equipment.
- Enforce 5-minute idling limits for both on-road trucks and off-road equipment.

GREENHOUSE GAS EMISSIONS

"Greenhouse gases" (so called because of their role in trapping heat near the surface of the earth) emitted by human activity are implicated in global climate change, commonly referred to as "global warming." These greenhouse gases contribute to an increase in the temperature of the earth's atmosphere by transparency to short wavelength visible sunlight, but near opacity to outgoing terrestrial long wavelength heat radiation in some parts of the infrared spectrum. The principal greenhouse gases (GHGs) are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. For purposes of planning and regulation, Section 15364.5 of the California Code of Regulations defines GHGs to include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. Fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. Industrial and commercial sources are the second largest contributors of GHG emissions with about one-fourth of total emissions.

California has passed several bills and the Governor has signed at least three executive orders regarding greenhouse gases. GHG statues and executive orders (EO) include AB 32, SB 1368, EO S-03-05, EO S-20-06 and EO S-01-07.

AB 32 is one of the most significant pieces of environmental legislation that California has adopted. Among other things, it is designed to maintain California's reputation as a "national and international leader on energy conservation and environmental stewardship." It will have wide-ranging effects on California businesses and lifestyles as well as far reaching effects on other states and countries. A unique aspect of AB 32, beyond its broad and wide-ranging mandatory provisions and dramatic GHG reductions are the short time frames within which it must be implemented. Major components of the AB 32 include:

- Require the monitoring and reporting of GHG emissions beginning with sources or categories of sources that contribute the most to statewide emissions.
- Requires immediate "early action" control programs on the most readily controlled GHG sources.
- Mandates that by 2020, California's GHG emissions be reduced to 1990 levels.
- Forces an overall reduction of GHG gases in California by 25-40%, from business as usual, to be achieved by 2020.
- Must complement efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminants.

Statewide, the framework for developing the implementing regulations for AB 32 is under way. Maximum GHG reductions are expected to derive from increased vehicle fuel efficiency, from greater use of renewable energy and from increased structural energy efficiency. Additionally, through the California Climate Action Registry (CCAR now called the Climate Action Reserve), general and industry-specific protocols for assessing and reporting GHG emissions have been developed. GHG sources are categorized into direct sources (i.e. company owned) and indirect sources (i.e. not company owned). Direct sources include combustion emissions from on-and off-road mobile sources, and fugitive emissions. Indirect sources include off-site electricity generation and non-company owned mobile sources.

THRESHOLDS OF SIGNIFICANCE

In response to the requirements of SB97, the State Resources Agency developed guidelines for the treatment of GHG emissions under CEQA. These new guidelines became state laws as part of Title 14 of the California Code of Regulations in March, 2010. The CEQA Appendix G guidelines were modified to include GHG as a required analysis element. A project would have a potentially significant impact if it:

- Generates GHG emissions, directly or indirectly, that may have a significant impact on the environment, or,

- Conflicts with an applicable plan, policy or regulation adopted to reduce GHG emissions.

Section 15064.4 of the Code specifies how significance of GHG emissions is to be evaluated. The process is broken down into quantification of project-related GHG emissions, making a determination of significance, and specification of any appropriate mitigation if impacts are found to be potentially significant. At each of these steps, the new GHG guidelines afford the lead agency with substantial flexibility.

Emissions identification may be quantitative, qualitative or based on performance standards. CEQA guidelines allow the lead agency to “select the model or methodology it considers most appropriate.” The most common practice for transportation/combustion GHG emissions quantification is to use a computer model such as CalEEMod, as was used in the ensuing analysis.

The significance of those emissions then must be evaluated; the selection of a threshold of significance must take into consideration what level of GHG emissions would be cumulatively considerable. The guidelines are clear that they do not support a zero net emissions threshold. If the lead agency does not have sufficient expertise in evaluating GHG impacts, it may rely on thresholds adopted by an agency with greater expertise.

On December 5, 2008 the SCAQMD Governing Board adopted an Interim quantitative GHG Significance Threshold for industrial projects where the SCAQMD is the lead agency (e.g., stationary source permit projects, rules, plans, etc.) of 10,000 Metric Tons (MT) CO_2 equivalent/year. In September 2010, the SCAQMD CEQA Significance Thresholds GHG Working Group released revisions which recommended a threshold of 3,000 MT CO_2e for all land use projects. This 3,000 MT/year recommendation has been used as a guideline for this analysis. In the absence of an adopted numerical threshold of significance, project related GHG emissions in excess of the guideline level are presumed to trigger a requirement for enhanced GHG reduction at the project level.

PROJECT RELATED GHG EMISSIONS GENERATION

Construction Activity GHG Emissions

The project is assumed to require approximately 14 months for construction. During project construction, the CalEEMod2016.3.2 computer model predicts that the construction activities will generate the annual CO_2e emissions identified in Table 10.

Table 10
Construction Emissions (Metric Tons CO_2e)

	CO_2e
Year 2021	397.1
Year 2022	121.6
Total	518.7
Amortized	**17.3**

CalEEMod Output provided in appendix

SCAQMD GHG emissions policy from construction activities is to amortize emissions over a 30-year lifetime. The amortized level is also provided. GHG impacts from construction are considered individually less-than-significant.

Project Operational GHG Emissions

The input assumptions for operational GHG emissions calculations, and the GHG conversion from consumption to annual regional CO_2e emissions are summarized in the CalEEMod2016.3.2 output files found in the appendix of this report.

The total operational and annualized construction emissions for the proposed project are identified in Table 11. The project GHG emissions are considered less-than-significant.

Table 11
Operational Emissions
(Metric Tons CO_2e)

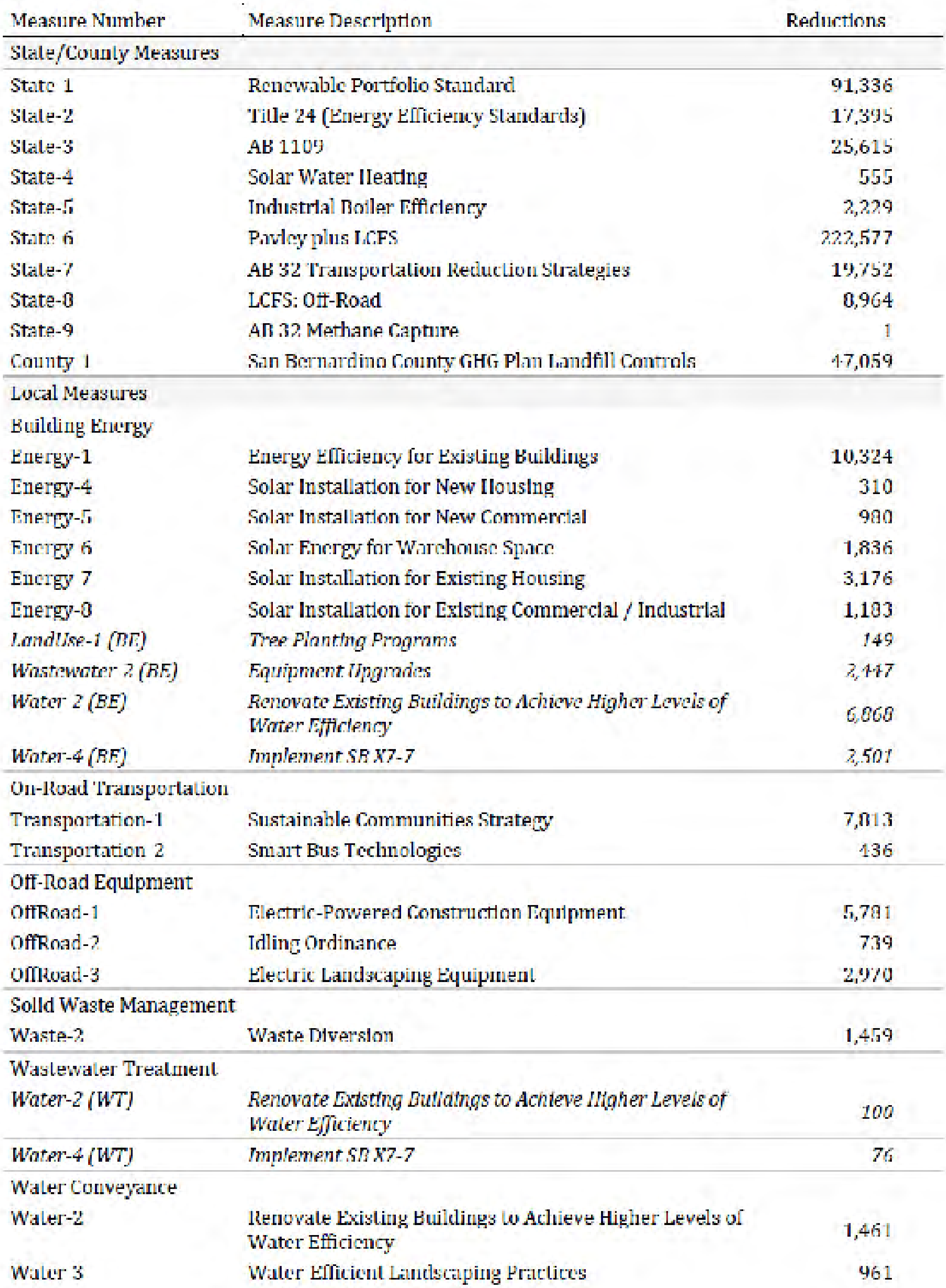
Consumption Source	
Area Sources	<0.1
Energy Utilization	110.2
Mobile Source	1,113.3
Solid Waste Generation	19.4
Water Consumption	55.3
Construction	17.3
Total	**1,315.5**
Guideline Threshold	3,000

CONSISTENCY WITH GHG PLANS, PROGRAMS AND POLICIES

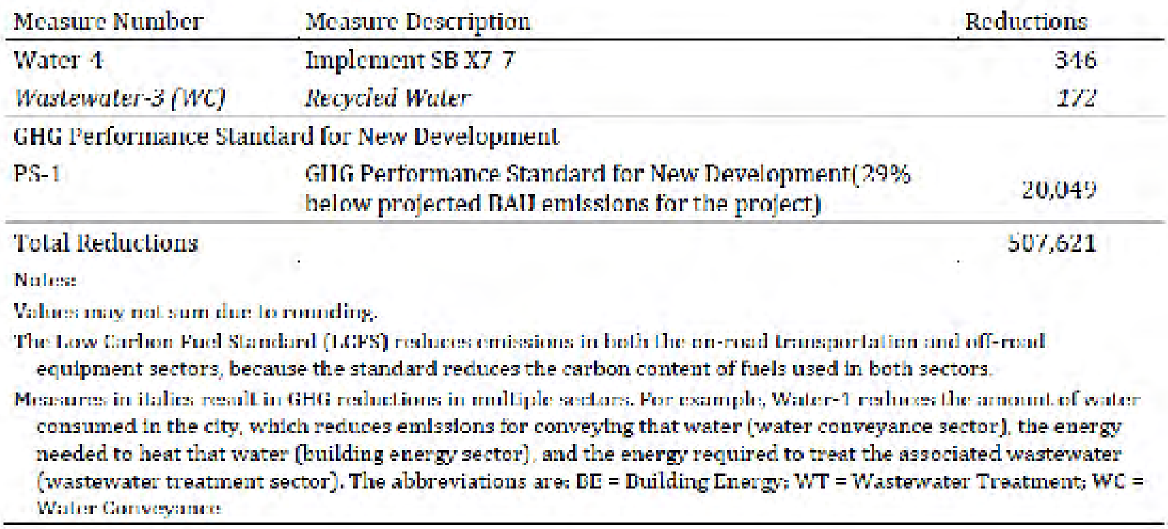
In March 2014, the San Bernardino Associated Governments and Participating San Bernardino County Cities Partnership (Partnership) created a final draft of the San Bernardino County Regional Greenhouse Gas Reduction Plan (Reduction Plan). This Reduction Plan was created in accordance to AB 32, which established a greenhouse gas limit for the state of California. The Reduction Plan seeks to create an inventory of GHG gases and develop jurisdiction-specific GHG reduction measures and baseline information that could be used by the 21 Partnership Cities of San Bernardino County, which include the City of San Bernardino.

Projects that demonstrate consistency with the strategies, actions, and emission reduction targets contained in the Reduction Plan would have a less than significant impact on climate change. In the Reduction Plan, the City of San Bernardino selected a goal to reduce community GHG emissions to a level that is 15% below its 2008 GHG emissions levels by 2020. The Project will be compliant with the goal and objectives set forth in the Partnership's Reduction Plan as shown on Table 12. Therefore, consistency with the Reduction Plan would result in a less than significant impact with respect to GHG emissions.

Table 12
GHG Reduction Measures and Estimated 2020 Reductions for San Bernardino



Measure Number	Measure Description	Reductions
State/County Measures		
State-1	Renewable Portfolio Standard	91,336
State-2	Title 24 (Energy Efficiency Standards)	17,395
State-3	AB 1109	25,615
State-4	Solar Water Heating	555
State-5	Industrial Boiler Efficiency	2,229
State-6	Pavley plus LCFS	222,577
State-7	AB 32 Transportation Reduction Strategies	19,752
State-8	LCFS: Off-Road	8,964
State-9	AB 32 Methane Capture	1
County-1	San Bernardino County GHG Plan Landfill Controls	47,059
Local Measures		
Building Energy		
Energy-1	Energy Efficiency for Existing Buildings	10,324
Energy-4	Solar Installation for New Housing	310
Energy-5	Solar Installation for New Commercial	980
Energy-6	Solar Energy for Warehouse Space	1,836
Energy-7	Solar Installation for Existing Housing	3,176
Energy-8	Solar Installation for Existing Commercial / Industrial	1,183
LandUse-1 (BE)	*Tree Planting Programs*	*149*
Wastewater-2 (BE)	*Equipment Upgrades*	*2,447*
Water-2 (BE)	*Renovate Existing Buildings to Achieve Higher Levels of Water Efficiency*	*6,868*
Water-4 (BE)	*Implement SB X7-7*	*2,501*
On-Road Transportation		
Transportation-1	Sustainable Communities Strategy	7,813
Transportation-2	Smart Bus Technologies	436
Off-Road Equipment		
OffRoad-1	Electric-Powered Construction Equipment	5,781
OffRoad-2	Idling Ordinance	739
OffRoad-3	Electric Landscaping Equipment	2,970
Solid Waste Management		
Waste-2	Waste Diversion	1,459
Wastewater Treatment		
Water-2 (WT)	*Renovate Existing Buildings to Achieve Higher Levels of Water Efficiency*	*100*
Water-4 (WT)	*Implement SB X7-7*	*76*
Water Conveyance		
Water-2	Renovate Existing Buildings to Achieve Higher Levels of Water Efficiency	1,461
Water-3	Water Efficient Landscaping Practices	961



Measure Number	Measure Description	Reductions
Water-4	Implement SB X7-7	346
Wastewater-3 (WC)	*Recycled Water*	*172*
GHG Performance Standard for New Development		
PS-1	GHG Performance Standard for New Development(29% below projected BAU emissions for the project)	20,049
Total Reductions		507,621

Notes:

Values may not sum due to rounding.

The Low Carbon Fuel Standard (LCFS) reduces emissions in both the on-road transportation and off-road equipment sectors, because the standard reduces the carbon content of fuels used in both sectors.

Measures in italics result in GHG reductions in multiple sectors. For example, Water-1 reduces the amount of water consumed in the city, which reduces emissions for conveying that water (water conveyance sector), the energy needed to heat that water (building energy sector), and the energy required to treat the associated wastewater (wastewater treatment sector). The abbreviations are: BE = Building Energy; WT = Wastewater Treatment; WC = Water Conveyance

CALEEMOD2016.3.2 COMPUTER MODEL OUTPUT

- DAILY EMISISONS
- ANNUAL EMISSIONS

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
	0.00		0.00	0.00	0
General Office Building	27.81	1000sqft	0.64	27,812.00	0
Unrefrigerated Warehouse-No Rail	13.50	1000sqft	0.31	13,500.00	0
Parking Lot	194.00	Space	1.75	77,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Trips and VMT - Worker count and construction deliveries provided by project engineer

Vehicle Trips - trips per traffic study, 344 total

Construction Off-road Equipment Mitigation -

Fleet Mix - Warehouse: 72 LDT, 76 HDT

Table Name	Column Name	Default Value	New Value
tblFleetMix	HHD	0.06	0.51
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.1010e-003	0.00
tblFleetMix	MCY	5.9030e-003	0.00
tblFleetMix	MDV	0.12	0.49
tblFleetMix	MH	9.4400e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.3570e-003	0.00
tblFleetMix	SBUS	8.0800e-004	0.00
tblFleetMix	UBUS	1.5650e-003	0.00
tblLandUse	LandUseSquareFeet	27,810.00	27,812.00
tblTripsAndVMT	VendorTripNumber	19.00	50.00
tblTripsAndVMT	WorkerTripNumber	13.00	100.00
tblTripsAndVMT	WorkerTripNumber	10.00	100.00
tblTripsAndVMT	WorkerTripNumber	47.00	100.00
tblTripsAndVMT	WorkerTripNumber	15.00	50.00
tblVehicleTrips	ST_TR	2.46	7.05
tblVehicleTrips	ST_TR	1.68	10.96
tblVehicleTrips	SU_TR	1.05	7.05
tblVehicleTrips	SU_TR	1.68	10.96
tblVehicleTrips	WD_TR	11.03	7.05
tblVehicleTrips	WD_TR	1.68	10.96

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.6825	21.1635	19.6101	0.0495	7.6701	1.0480	8.5930	3.6639	0.9781	4.5130	0.0000	4,805.9626	4,805.9626	0.6766	0.0000	4,820.2472
2022	40.7015	19.4595	18.9952	0.0490	1.4380	0.7161	2.1541	0.3887	0.6861	1.0748	0.0000	4,755.4216	4,755.4216	0.5564	0.0000	4,769.3319
Maximum	**40.7015**	**21.1635**	**19.6101**	**0.0495**	**7.6701**	**1.0480**	**8.5930**	**3.6639**	**0.9781**	**4.5130**	**0.0000**	**4,805.9626**	**4,805.9626**	**0.6766**	**0.0000**	**4,820.2472**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.6825	21.1635	19.6101	0.0495	4.0663	1.0480	4.9892	1.8118	0.9781	2.6609	0.0000	4,805.9626	4,805.9626	0.6766	0.0000	4,820.2472
2022	40.7015	19.4595	18.9952	0.0490	1.4380	0.7161	2.1541	0.3887	0.6861	1.0748	0.0000	4,755.4216	4,755.4216	0.5564	0.0000	4,769.3319
Maximum	**40.7015**	**21.1635**	**19.6101**	**0.0495**	**4.0663**	**1.0480**	**4.9892**	**1.8118**	**0.9781**	**2.6609**	**0.0000**	**4,805.9626**	**4,805.9626**	**0.6766**	**0.0000**	**4,820.2472**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.57**	**0.00**	**33.53**	**45.70**	**0.00**	**33.15**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.9585	2.2000e-004	0.0241	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0515	0.0515	1.4000e-004		0.0549
Energy	3.6600e-003	0.0333	0.0280	2.0000e-004		2.5300e-003	2.5300e-003		2.5300e-003	2.5300e-003		39.9396	39.9396	7.7000e-004	7.3000e-004	40.1770
Mobile	0.9260	15.4562	9.9739	0.0672	2.7716	0.0402	2.8118	0.7451	0.0381	0.7831		6,996.8116	6,996.8116	0.3976		7,006.7516
Total	**1.8882**	**15.4897**	**10.0259**	**0.0674**	**2.7716**	**0.0428**	**2.8144**	**0.7451**	**0.0407**	**0.7857**		**7,036.8027**	**7,036.8027**	**0.3985**	**7.3000e-004**	**7,046.9834**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.9585	2.2000e-004	0.0241	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0515	0.0515	1.4000e-004		0.0549
Energy	3.6600e-003	0.0333	0.0280	2.0000e-004		2.5300e-003	2.5300e-003		2.5300e-003	2.5300e-003		39.9396	39.9396	7.7000e-004	7.3000e-004	40.1770
Mobile	0.9260	15.4562	9.9739	0.0672	2.7716	0.0402	2.8118	0.7451	0.0381	0.7831		6,996.8116	6,996.8116	0.3976		7,006.7516
Total	**1.8882**	**15.4897**	**10.0259**	**0.0674**	**2.7716**	**0.0428**	**2.8144**	**0.7451**	**0.0407**	**0.7857**		**7,036.8027**	**7,036.8027**	**0.3985**	**7.3000e-004**	**7,046.9834**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2021	4/28/2021	5	20	
2	Grading	Grading	5/4/2021	5/11/2021	5	6	
3	Building Construction	Building Construction	5/12/2021	3/15/2022	5	220	
4	Paving	Paving	3/16/2022	3/29/2022	5	10	
5	Architectural Coating	Architectural Coating	3/30/2022	4/12/2022	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 3

Acres of Paving: 1.75

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 61,968; Non-Residential Outdoor: 20,656; Striped Parking Area: 4,656 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	100.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	100.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	100.00	50.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	50.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	9.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9930	19.6966	14.4925	0.0241		1.0409	1.0409		0.9715	0.9715		2,322.7171	2,322.7171	0.5940		2,337.5658
Total	**1.9930**	**19.6966**	**14.4925**	**0.0241**		**1.0409**	**1.0409**		**0.9715**	**0.9715**		**2,322.7171**	**2,322.7171**	**0.5940**		**2,337.5658**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5081	0.3141	4.1398	0.0110	1.1178	7.1500e-003	1.1249	0.2964	6.5800e-003	0.3030		1,094.0805	1,094.0805	0.0311		1,094.8590
Total	**0.5081**	**0.3141**	**4.1398**	**0.0110**	**1.1178**	**7.1500e-003**	**1.1249**	**0.2964**	**6.5800e-003**	**0.3030**		**1,094.0805**	**1,094.0805**	**0.0311**		**1,094.8590**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9930	19.6966	14.4925	0.0241		1.0409	1.0409		0.9715	0.9715	0.0000	2,322.7171	2,322.7171	0.5940		2,337.5658
Total	**1.9930**	**19.6966**	**14.4925**	**0.0241**		**1.0409**	**1.0409**		**0.9715**	**0.9715**	**0.0000**	**2,322.7171**	**2,322.7171**	**0.5940**		**2,337.5658**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5081	0.3141	4.1398	0.0110	1.1178	7.1500e-003	1.1249	0.2964	6.5800e-003	0.3030		1,094.0805	1,094.0805	0.0311		1,094.8590
Total	**0.5081**	**0.3141**	**4.1398**	**0.0110**	**1.1178**	**7.1500e-003**	**1.1249**	**0.2964**	**6.5800e-003**	**0.3030**		**1,094.0805**	**1,094.0805**	**0.0311**		**1,094.8590**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425		1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5523**	**0.9158**	**7.4681**	**3.3675**	**0.8425**	**4.2100**		**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5081	0.3141	4.1398	0.0110	1.1178	7.1500e-003	1.1249	0.2964	6.5800e-003	0.3030		1,094.0805	1,094.0805	0.0311		1,094.8590
Total	**0.5081**	**0.3141**	**4.1398**	**0.0110**	**1.1178**	**7.1500e-003**	**1.1249**	**0.2964**	**6.5800e-003**	**0.3030**		**1,094.0805**	**1,094.0805**	**0.0311**		**1,094.8590**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425	0.0000	1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**2.9486**	**0.9158**	**3.8643**	**1.5154**	**0.8425**	**2.3579**	**0.0000**	**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5081	0.3141	4.1398	0.0110	1.1178	7.1500e-003	1.1249	0.2964	6.5800e-003	0.3030		1,094.0805	1,094.0805	0.0311		1,094.8590
Total	**0.5081**	**0.3141**	**4.1398**	**0.0110**	**1.1178**	**7.1500e-003**	**1.1249**	**0.2964**	**6.5800e-003**	**0.3030**		**1,094.0805**	**1,094.0805**	**0.0311**		**1,094.8590**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831		2,288.9355	2,288.9355	0.4503		2,300.1935
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**		**2,288.9355**	**2,288.9355**	**0.4503**		**2,300.1935**

3.4 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1294	4.8219	0.9073	0.0135	0.3202	8.2700e-003	0.3285	0.0922	7.9100e-003	0.1001		1,422.9465	1,422.9465	0.0899		1,425.1946
Worker	0.5081	0.3141	4.1398	0.0110	1.1178	7.1500e-003	1.1249	0.2964	6.5800e-003	0.3030		1,094.0805	1,094.0805	0.0311		1,094.8590
Total	**0.6375**	**5.1359**	**5.0472**	**0.0245**	**1.4380**	**0.0154**	**1.4534**	**0.3887**	**0.0145**	**0.4031**		**2,517.0271**	**2,517.0271**	**0.1211**		**2,520.0536**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831	0.0000	2,288.9355	2,288.9355	0.4503		2,300.1935
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**	**0.0000**	**2,288.9355**	**2,288.9355**	**0.4503**		**2,300.1935**

3.4 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1294	4.8219	0.9073	0.0135	0.3202	8.2700e-003	0.3285	0.0922	7.9100e-003	0.1001		1,422.9465	1,422.9465	0.0899		1,425.1946
Worker	0.5081	0.3141	4.1398	0.0110	1.1178	7.1500e-003	1.1249	0.2964	6.5800e-003	0.3030		1,094.0805	1,094.0805	0.0311		1,094.8590
Total	**0.6375**	**5.1359**	**5.0472**	**0.0245**	**1.4380**	**0.0154**	**1.4534**	**0.3887**	**0.0145**	**0.4031**		**2,517.0271**	**2,517.0271**	**0.1211**		**2,520.0536**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731		2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**		**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1205	4.5731	0.8389	0.0134	0.3202	6.9400e-003	0.3272	0.0922	6.6400e-003	0.0989		1,411.5379	1,411.5379	0.0868		1,413.7082
Worker	0.4745	0.2824	3.8031	0.0106	1.1178	6.9400e-003	1.1247	0.2964	6.3900e-003	0.3028		1,054.6024	1,054.6024	0.0279		1,055.3007
Total	**0.5950**	**4.8555**	**4.6419**	**0.0240**	**1.4380**	**0.0139**	**1.4519**	**0.3887**	**0.0130**	**0.4017**		**2,466.1403**	**2,466.1403**	**0.1147**		**2,469.0089**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731	0.0000	2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**	**0.0000**	**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1205	4.5731	0.8389	0.0134	0.3202	6.9400e-003	0.3272	0.0922	6.6400e-003	0.0989		1,411.5379	1,411.5379	0.0868		1,413.7082
Worker	0.4745	0.2824	3.8031	0.0106	1.1178	6.9400e-003	1.1247	0.2964	6.3900e-003	0.3028		1,054.6024	1,054.6024	0.0279		1,055.3007
Total	**0.5950**	**4.8555**	**4.6419**	**0.0240**	**1.4380**	**0.0139**	**1.4519**	**0.3887**	**0.0130**	**0.4017**		**2,466.1403**	**2,466.1403**	**0.1147**		**2,469.0089**

3.5 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9412	9.3322	11.6970	0.0179		0.4879	0.4879		0.4500	0.4500		1,709.6892	1,709.6892	0.5419		1,723.2356
Paving	0.4585					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3997**	**9.3322**	**11.6970**	**0.0179**		**0.4879**	**0.4879**		**0.4500**	**0.4500**		**1,709.6892**	**1,709.6892**	**0.5419**		**1,723.2356**

3.5 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2373	0.1412	1.9015	5.2900e-003	0.5589	3.4700e-003	0.5624	0.1482	3.2000e-003	0.1514		527.3012	527.3012	0.0140		527.6503
Total	**0.2373**	**0.1412**	**1.9015**	**5.2900e-003**	**0.5589**	**3.4700e-003**	**0.5624**	**0.1482**	**3.2000e-003**	**0.1514**		**527.3012**	**527.3012**	**0.0140**		**527.6503**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9412	9.3322	11.6970	0.0179		0.4879	0.4879		0.4500	0.4500	0.0000	1,709.6892	1,709.6892	0.5419		1,723.2356
Paving	0.4585					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3997**	**9.3322**	**11.6970**	**0.0179**		**0.4879**	**0.4879**		**0.4500**	**0.4500**	**0.0000**	**1,709.6892**	**1,709.6892**	**0.5419**		**1,723.2356**

3.5 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2373	0.1412	1.9015	5.2900e-003	0.5589	3.4700e-003	0.5624	0.1482	3.2000e-003	0.1514		527.3012	527.3012	0.0140		527.6503
Total	**0.2373**	**0.1412**	**1.9015**	**5.2900e-003**	**0.5589**	**3.4700e-003**	**0.5624**	**0.1482**	**3.2000e-003**	**0.1514**		**527.3012**	**527.3012**	**0.0140**		**527.6503**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.4543					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**40.6588**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0427	0.0254	0.3423	9.5000e-004	0.1006	6.2000e-004	0.1012	0.0267	5.8000e-004	0.0273		94.9142	94.9142	2.5100e-003		94.9771
Total	**0.0427**	**0.0254**	**0.3423**	**9.5000e-004**	**0.1006**	**6.2000e-004**	**0.1012**	**0.0267**	**5.8000e-004**	**0.0273**		**94.9142**	**94.9142**	**2.5100e-003**		**94.9771**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.4543					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**40.6588**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0427	0.0254	0.3423	9.5000e-004	0.1006	6.2000e-004	0.1012	0.0267	5.8000e-004	0.0273		94.9142	94.9142	2.5100e-003		94.9771
Total	**0.0427**	**0.0254**	**0.3423**	**9.5000e-004**	**0.1006**	**6.2000e-004**	**0.1012**	**0.0267**	**5.8000e-004**	**0.0273**		**94.9142**	**94.9142**	**2.5100e-003**		**94.9771**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9260	15.4562	9.9739	0.0672	2.7716	0.0402	2.8118	0.7451	0.0381	0.7831		6,996.8116	6,996.8116	0.3976		7,006.7516
Unmitigated	0.9260	15.4562	9.9739	0.0672	2.7716	0.0402	2.8118	0.7451	0.0381	0.7831		6,996.8116	6,996.8116	0.3976		7,006.7516

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	196.06	196.06	196.06	631,601	631,601
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	147.96	147.96	147.96	634,115	634,115
Total	344.02	344.02	344.02	1,265,716	1,265,716

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
General Office Building	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Parking Lot	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Unrefrigerated Warehouse-No Rail	0.000000	0.000000	0.000000	0.490000	0.000000	0.000000	0.000000	0.510000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	3.6600e-003	0.0333	0.0280	2.0000e-004		2.5300e-003	2.5300e-003		2.5300e-003	2.5300e-003		39.9396	39.9396	7.7000e-004	7.3000e-004	40.1770
NaturalGas Unmitigated	3.6600e-003	0.0333	0.0280	2.0000e-004		2.5300e-003	2.5300e-003		2.5300e-003	2.5300e-003		39.9396	39.9396	7.7000e-004	7.3000e-004	40.1770

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	264.404	2.8500e-003	0.0259	0.0218	1.6000e-004		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003		31.1064	31.1064	6.0000e-004	5.7000e-004	31.2913
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	75.0822	8.1000e-004	7.3600e-003	6.1800e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004		8.8332	8.8332	1.7000e-004	1.6000e-004	8.8857
Total		**3.6600e-003**	**0.0333**	**0.0280**	**2.0000e-004**		**2.5300e-003**	**2.5300e-003**		**2.5300e-003**	**2.5300e-003**		**39.9396**	**39.9396**	**7.7000e-004**	**7.3000e-004**	**40.1770**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.264404	2.8500e-003	0.0259	0.0218	1.6000e-004		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003		31.1064	31.1064	6.0000e-004	5.7000e-004	31.2913
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0.0750822	8.1000e-004	7.3600e-003	6.1800e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004		8.8332	8.8332	1.7000e-004	1.6000e-004	8.8857
Total		**3.6600e-003**	**0.0333**	**0.0280**	**2.0000e-004**		**2.5300e-003**	**2.5300e-003**		**2.5300e-003**	**2.5300e-003**		**39.9396**	**39.9396**	**7.7000e-004**	**7.3000e-004**	**40.1770**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9585	2.2000e-004	0.0241	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0515	0.0515	1.4000e-004		0.0549
Unmitigated	0.9585	2.2000e-004	0.0241	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0515	0.0515	1.4000e-004		0.0549

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.8455					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.2400e-003	2.2000e-004	0.0241	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0515	0.0515	1.4000e-004		0.0549
Total	**0.9585**	**2.2000e-004**	**0.0241**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0515**	**0.0515**	**1.4000e-004**		**0.0549**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.8455					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.2400e-003	2.2000e-004	0.0241	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0515	0.0515	1.4000e-004		0.0549
Total	**0.9585**	**2.2000e-004**	**0.0241**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0515**	**0.0515**	**1.4000e-004**		**0.0549**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
	0.00		0.00	0.00	0
General Office Building	27.81	1000sqft	0.64	27,812.00	0
Unrefrigerated Warehouse-No Rail	13.50	1000sqft	0.31	13,500.00	0
Parking Lot	194.00	Space	1.75	77,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Trips and VMT - Worker count and construction deliveries provided by project engineer

Vehicle Trips - trips per traffic study, 344 total

Construction Off-road Equipment Mitigation -

Fleet Mix - Warehouse: 72 LDT, 76 HDT

Table Name	Column Name	Default Value	New Value
tblFleetMix	HHD	0.06	0.51
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.1010e-003	0.00
tblFleetMix	MCY	5.9030e-003	0.00
tblFleetMix	MDV	0.12	0.49
tblFleetMix	MH	9.4400e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.3570e-003	0.00
tblFleetMix	SBUS	8.0800e-004	0.00
tblFleetMix	UBUS	1.5650e-003	0.00
tblLandUse	LandUseSquareFeet	27,810.00	27,812.00
tblTripsAndVMT	VendorTripNumber	19.00	50.00
tblTripsAndVMT	WorkerTripNumber	13.00	100.00
tblTripsAndVMT	WorkerTripNumber	10.00	100.00
tblTripsAndVMT	WorkerTripNumber	47.00	100.00
tblTripsAndVMT	WorkerTripNumber	15.00	50.00
tblVehicleTrips	ST_TR	2.46	7.05
tblVehicleTrips	ST_TR	1.68	10.96
tblVehicleTrips	SU_TR	1.05	7.05
tblVehicleTrips	SU_TR	1.68	10.96
tblVehicleTrips	WD_TR	11.03	7.05
tblVehicleTrips	WD_TR	1.68	10.96

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2530	2.0463	1.8263	4.5000e-003	0.1525	0.0832	0.2357	0.0460	0.0793	0.1253	0.0000	395.8524	395.8524	0.0511	0.0000	397.1303
2022	0.2742	0.5622	0.5592	1.3800e-003	0.0399	0.0215	0.0614	0.0108	0.0205	0.0313	0.0000	121.1672	121.1672	0.0158	0.0000	121.5614
Maximum	**0.2742**	**2.0463**	**1.8263**	**4.5000e-003**	**0.1525**	**0.0832**	**0.2357**	**0.0460**	**0.0793**	**0.1253**	**0.0000**	**395.8524**	**395.8524**	**0.0511**	**0.0000**	**397.1303**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2530	2.0463	1.8263	4.5000e-003	0.1417	0.0832	0.2249	0.0404	0.0793	0.1198	0.0000	395.8521	395.8521	0.0511	0.0000	397.1301
2022	0.2742	0.5622	0.5592	1.3800e-003	0.0399	0.0215	0.0614	0.0108	0.0205	0.0313	0.0000	121.1671	121.1671	0.0158	0.0000	121.5613
Maximum	**0.2742**	**2.0463**	**1.8263**	**4.5000e-003**	**0.1417**	**0.0832**	**0.2249**	**0.0404**	**0.0793**	**0.1198**	**0.0000**	**395.8521**	**395.8521**	**0.0511**	**0.0000**	**397.1301**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**5.62**	**0.00**	**3.64**	**9.77**	**0.00**	**3.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-1-2021**	**6-30-2021**	0.7163	0.7163
2	**7-1-2021**	**9-30-2021**	0.7835	0.7835
3	**10-1-2021**	**12-31-2021**	0.7827	0.7827
4	**1-1-2022**	**3-31-2022**	0.6640	0.6640
5	**4-1-2022**	**6-30-2022**	0.1806	0.1806
		Highest	0.7835	0.7835

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Energy	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	109.7790	109.7790	4.3900e-003	1.0000e-003	110.1873
Mobile	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229
Waste						0.0000	0.0000		0.0000	0.0000	7.8253	0.0000	7.8253	0.4625	0.0000	19.3869
Water						0.0000	0.0000		0.0000	0.0000	2.5585	44.1823	46.7408	0.2646	6.5800e-003	55.3176
Total	**0.3280**	**2.8601**	**1.6898**	**0.0118**	**0.4953**	**7.8300e-003**	**0.5031**	**0.1334**	**7.4400e-003**	**0.1408**	**10.3838**	**1,265.6111**	**1,275.9949**	**0.7986**	**7.5800e-003**	**1,298.2209**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Energy	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	109.7790	109.7790	4.3900e-003	1.0000e-003	110.1873
Mobile	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229
Waste						0.0000	0.0000		0.0000	0.0000	7.8253	0.0000	7.8253	0.4625	0.0000	19.3869
Water						0.0000	0.0000		0.0000	0.0000	2.5585	44.1823	46.7408	0.2646	6.5800e-003	55.3176
Total	**0.3280**	**2.8601**	**1.6898**	**0.0118**	**0.4953**	**7.8300e-003**	**0.5031**	**0.1334**	**7.4400e-003**	**0.1408**	**10.3838**	**1,265.6111**	**1,275.9949**	**0.7986**	**7.5800e-003**	**1,298.2209**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2021	4/28/2021	5	20	
2	Grading	Grading	5/4/2021	5/11/2021	5	6	
3	Building Construction	Building Construction	5/12/2021	3/15/2022	5	220	
4	Paving	Paving	3/16/2022	3/29/2022	5	10	
5	Architectural Coating	Architectural Coating	3/30/2022	4/12/2022	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 3

Acres of Paving: 1.75

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 61,968; Non-Residential Outdoor: 20,656; Striped Parking Area: 4,656 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	100.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	100.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	100.00	50.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	50.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	9.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060
Total	**0.0199**	**0.1970**	**0.1449**	**2.4000e-004**		**0.0104**	**0.0104**		**9.7100e-003**	**9.7100e-003**	**0.0000**	**21.0713**	**21.0713**	**5.3900e-003**	**0.0000**	**21.2060**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-003	3.4800e-003	0.0356	1.0000e-004	0.0110	7.0000e-005	0.0110	2.9100e-003	7.0000e-005	2.9800e-003	0.0000	9.0990	9.0990	2.5000e-004	0.0000	9.1054
Total	**4.6000e-003**	**3.4800e-003**	**0.0356**	**1.0000e-004**	**0.0110**	**7.0000e-005**	**0.0110**	**2.9100e-003**	**7.0000e-005**	**2.9800e-003**	**0.0000**	**9.0990**	**9.0990**	**2.5000e-004**	**0.0000**	**9.1054**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060
Total	**0.0199**	**0.1970**	**0.1449**	**2.4000e-004**		**0.0104**	**0.0104**		**9.7100e-003**	**9.7100e-003**	**0.0000**	**21.0713**	**21.0713**	**5.3900e-003**	**0.0000**	**21.2060**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-003	3.4800e-003	0.0356	1.0000e-004	0.0110	7.0000e-005	0.0110	2.9100e-003	7.0000e-005	2.9800e-003	0.0000	9.0990	9.0990	2.5000e-004	0.0000	9.1054
Total	**4.6000e-003**	**3.4800e-003**	**0.0356**	**1.0000e-004**	**0.0110**	**7.0000e-005**	**0.0110**	**2.9100e-003**	**7.0000e-005**	**2.9800e-003**	**0.0000**	**9.0990**	**9.0990**	**2.5000e-004**	**0.0000**	**9.1054**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0197	0.0000	0.0197	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**5.4800e-003**	**0.0606**	**0.0293**	**6.0000e-005**	**0.0197**	**2.7500e-003**	**0.0224**	**0.0101**	**2.5300e-003**	**0.0126**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	1.0400e-003	0.0107	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7297	2.7297	8.0000e-005	0.0000	2.7316
Total	**1.3800e-003**	**1.0400e-003**	**0.0107**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7297**	**2.7297**	**8.0000e-005**	**0.0000**	**2.7316**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.8500e-003	0.0000	8.8500e-003	4.5500e-003	0.0000	4.5500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**5.4800e-003**	**0.0606**	**0.0293**	**6.0000e-005**	**8.8500e-003**	**2.7500e-003**	**0.0116**	**4.5500e-003**	**2.5300e-003**	**7.0800e-003**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	1.0400e-003	0.0107	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7297	2.7297	8.0000e-005	0.0000	2.7316
Total	**1.3800e-003**	**1.0400e-003**	**0.0107**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7297**	**2.7297**	**8.0000e-005**	**0.0000**	**2.7316**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1718	1.3463	1.2233	2.1000e-003		0.0687	0.0687		0.0658	0.0658	0.0000	174.4249	174.4249	0.0343	0.0000	175.2828
Total	**0.1718**	**1.3463**	**1.2233**	**2.1000e-003**		**0.0687**	**0.0687**		**0.0658**	**0.0658**	**0.0000**	**174.4249**	**174.4249**	**0.0343**	**0.0000**	**175.2828**

3.4 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0111	0.4086	0.0831	1.1100e-003	0.0265	7.0000e-004	0.0272	7.6400e-003	6.7000e-004	8.3100e-003	0.0000	106.6646	106.6646	7.1900e-003	0.0000	106.8443
Worker	0.0387	0.0292	0.2993	8.5000e-004	0.0921	6.0000e-004	0.0927	0.0245	5.5000e-004	0.0250	0.0000	76.4316	76.4316	2.1400e-003	0.0000	76.4851
Total	**0.0498**	**0.4378**	**0.3824**	**1.9600e-003**	**0.1186**	**1.3000e-003**	**0.1199**	**0.0321**	**1.2200e-003**	**0.0333**	**0.0000**	**183.0962**	**183.0962**	**9.3300e-003**	**0.0000**	**183.3294**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1718	1.3463	1.2233	2.1000e-003		0.0687	0.0687		0.0658	0.0658	0.0000	174.4247	174.4247	0.0343	0.0000	175.2826
Total	**0.1718**	**1.3463**	**1.2233**	**2.1000e-003**		**0.0687**	**0.0687**		**0.0658**	**0.0658**	**0.0000**	**174.4247**	**174.4247**	**0.0343**	**0.0000**	**175.2826**

3.4 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0111	0.4086	0.0831	1.1100e-003	0.0265	7.0000e-004	0.0272	7.6400e-003	6.7000e-004	8.3100e-003	0.0000	106.6646	106.6646	7.1900e-003	0.0000	106.8443
Worker	0.0387	0.0292	0.2993	8.5000e-004	0.0921	6.0000e-004	0.0927	0.0245	5.5000e-004	0.0250	0.0000	76.4316	76.4316	2.1400e-003	0.0000	76.4851
Total	**0.0498**	**0.4378**	**0.3824**	**1.9600e-003**	**0.1186**	**1.3000e-003**	**0.1199**	**0.0321**	**1.2200e-003**	**0.0333**	**0.0000**	**183.0962**	**183.0962**	**9.3300e-003**	**0.0000**	**183.3294**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0482	0.3797	0.3732	6.5000e-004		0.0183	0.0183		0.0175	0.0175	0.0000	53.9968	53.9968	0.0104	0.0000	54.2573
Total	**0.0482**	**0.3797**	**0.3732**	**6.5000e-004**		**0.0183**	**0.0183**		**0.0175**	**0.0175**	**0.0000**	**53.9968**	**53.9968**	**0.0104**	**0.0000**	**54.2573**

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2100e-003	0.1198	0.0238	3.4000e-004	8.2000e-003	1.8000e-004	8.3800e-003	2.3700e-003	1.7000e-004	2.5400e-003	0.0000	32.7463	32.7463	2.1500e-003	0.0000	32.8000
Worker	0.0112	8.1300e-003	0.0850	2.5000e-004	0.0285	1.8000e-004	0.0287	7.5700e-003	1.7000e-004	7.7400e-003	0.0000	22.8050	22.8050	5.9000e-004	0.0000	22.8198
Total	**0.0144**	**0.1279**	**0.1088**	**5.9000e-004**	**0.0367**	**3.6000e-004**	**0.0371**	**9.9400e-003**	**3.4000e-004**	**0.0103**	**0.0000**	**55.5512**	**55.5512**	**2.7400e-003**	**0.0000**	**55.6198**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0482	0.3797	0.3732	6.5000e-004		0.0183	0.0183		0.0175	0.0175	0.0000	53.9968	53.9968	0.0104	0.0000	54.2572
Total	**0.0482**	**0.3797**	**0.3732**	**6.5000e-004**		**0.0183**	**0.0183**		**0.0175**	**0.0175**	**0.0000**	**53.9968**	**53.9968**	**0.0104**	**0.0000**	**54.2572**

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2100e-003	0.1198	0.0238	3.4000e-004	8.2000e-003	1.8000e-004	8.3800e-003	2.3700e-003	1.7000e-004	2.5400e-003	0.0000	32.7463	32.7463	2.1500e-003	0.0000	32.8000
Worker	0.0112	8.1300e-003	0.0850	2.5000e-004	0.0285	1.8000e-004	0.0287	7.5700e-003	1.7000e-004	7.7400e-003	0.0000	22.8050	22.8050	5.9000e-004	0.0000	22.8198
Total	**0.0144**	**0.1279**	**0.1088**	**5.9000e-004**	**0.0367**	**3.6000e-004**	**0.0371**	**9.9400e-003**	**3.4000e-004**	**0.0103**	**0.0000**	**55.5512**	**55.5512**	**2.7400e-003**	**0.0000**	**55.6198**

3.5 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	2.2900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.0000e-003**	**0.0467**	**0.0585**	**9.0000e-005**		**2.4400e-003**	**2.4400e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.7550**	**7.7550**	**2.4600e-003**	**0.0000**	**7.8165**

3.5 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	7.8000e-004	8.1700e-003	2.0000e-005	2.7400e-003	2.0000e-005	2.7600e-003	7.3000e-004	2.0000e-005	7.4000e-004	0.0000	2.1928	2.1928	6.0000e-005	0.0000	2.1942
Total	**1.0800e-003**	**7.8000e-004**	**8.1700e-003**	**2.0000e-005**	**2.7400e-003**	**2.0000e-005**	**2.7600e-003**	**7.3000e-004**	**2.0000e-005**	**7.4000e-004**	**0.0000**	**2.1928**	**2.1928**	**6.0000e-005**	**0.0000**	**2.1942**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	2.2900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.0000e-003**	**0.0467**	**0.0585**	**9.0000e-005**		**2.4400e-003**	**2.4400e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.7550**	**7.7550**	**2.4600e-003**	**0.0000**	**7.8165**

3.5 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	7.8000e-004	8.1700e-003	2.0000e-005	2.7400e-003	2.0000e-005	2.7600e-003	7.3000e-004	2.0000e-005	7.4000e-004	0.0000	2.1928	2.1928	6.0000e-005	0.0000	2.1942
Total	**1.0800e-003**	**7.8000e-004**	**8.1700e-003**	**2.0000e-005**	**2.7400e-003**	**2.0000e-005**	**2.7600e-003**	**7.3000e-004**	**2.0000e-005**	**7.4000e-004**	**0.0000**	**2.1928**	**2.1928**	**6.0000e-005**	**0.0000**	**2.1942**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2023					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	**0.2033**	**7.0400e-003**	**9.0700e-003**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2787**

3.6 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.4000e-004	1.4700e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3947	0.3947	1.0000e-005	0.0000	0.3950
Total	**1.9000e-004**	**1.4000e-004**	**1.4700e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3947**	**0.3947**	**1.0000e-005**	**0.0000**	**0.3950**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2023					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	**0.2033**	**7.0400e-003**	**9.0700e-003**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2787**

3.6 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.4000e-004	1.4700e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3947	0.3947	1.0000e-005	0.0000	0.3950
Total	**1.9000e-004**	**1.4000e-004**	**1.4700e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3947**	**0.3947**	**1.0000e-005**	**0.0000**	**0.3950**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229
Unmitigated	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	196.06	196.06	196.06	631,601	631,601
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	147.96	147.96	147.96	634,115	634,115
Total	344.02	344.02	344.02	1,265,716	1,265,716

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
General Office Building	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Parking Lot	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Unrefrigerated Warehouse-No Rail	0.000000	0.000000	0.000000	0.490000	0.000000	0.000000	0.000000	0.510000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	103.1665	103.1665	4.2600e-003	8.8000e-004	103.5356
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	103.1665	103.1665	4.2600e-003	8.8000e-004	103.5356
NaturalGas Mitigated	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	6.6125	6.6125	1.3000e-004	1.2000e-004	6.6517
NaturalGas Unmitigated	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	6.6125	6.6125	1.3000e-004	1.2000e-004	6.6517

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	96507.6	5.2000e-004	4.7300e-003	3.9700e-003	3.0000e-005		3.6000e-004	3.6000e-004		3.6000e-004	3.6000e-004	0.0000	5.1500	5.1500	1.0000e-004	9.0000e-005	5.1806
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	27405	1.5000e-004	1.3400e-003	1.1300e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4624	1.4624	3.0000e-005	3.0000e-005	1.4711
Total		**6.7000e-004**	**6.0700e-003**	**5.1000e-003**	**4.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**6.6125**	**6.6125**	**1.3000e-004**	**1.2000e-004**	**6.6518**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	96507.6	5.2000e-004	4.7300e-003	3.9700e-003	3.0000e-005		3.6000e-004	3.6000e-004		3.6000e-004	3.6000e-004	0.0000	5.1500	5.1500	1.0000e-004	9.0000e-005	5.1806
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	27405	1.5000e-004	1.3400e-003	1.1300e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4624	1.4624	3.0000e-005	3.0000e-005	1.4711
Total		**6.7000e-004**	**6.0700e-003**	**5.1000e-003**	**4.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**6.6125**	**6.6125**	**1.3000e-004**	**1.2000e-004**	**6.6518**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	264770	84.3615	3.4800e-003	7.2000e-004	84.6633
Parking Lot	27160	8.6538	3.6000e-004	7.0000e-005	8.6847
Unrefrigerated Warehouse-No Rail	31860	10.1513	4.2000e-004	9.0000e-005	10.1876
Total		**103.1665**	**4.2600e-003**	**8.8000e-004**	**103.5356**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	264770	84.3615	3.4800e-003	7.2000e-004	84.6633
Parking Lot	27160	8.6538	3.6000e-004	7.0000e-005	8.6847
Unrefrigerated Warehouse-No Rail	31860	10.1513	4.2000e-004	9.0000e-005	10.1876
Total		**103.1665**	**4.2600e-003**	**8.8000e-004**	**103.5356**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Unmitigated	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0202					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.8000e-004	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Total	**0.1748**	**3.0000e-005**	**3.0100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**5.8400e-003**	**5.8400e-003**	**2.0000e-005**	**0.0000**	**6.2200e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0202					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.8000e-004	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Total	**0.1748**	**3.0000e-005**	**3.0100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**5.8400e-003**	**5.8400e-003**	**2.0000e-005**	**0.0000**	**6.2200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	46.7408	0.2646	6.5800e-003	55.3176
Unmitigated	46.7408	0.2646	6.5800e-003	55.3176

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	4.94278 / 3.02944	32.7984	0.1624	4.0700e-003	38.0700
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.12188 / 0	13.9424	0.1023	2.5100e-003	17.2477
Total		**46.7408**	**0.2646**	**6.5800e-003**	**55.3176**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	4.94278 / 3.02944	32.7984	0.1624	4.0700e-003	38.0700
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.12188 / 0	13.9424	0.1023	2.5100e-003	17.2477
Total		**46.7408**	**0.2646**	**6.5800e-003**	**55.3176**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	7.8253	0.4625	0.0000	19.3869
Unmitigated	7.8253	0.4625	0.0000	19.3869

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	25.86	5.2494	0.3102	0.0000	13.0050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	12.69	2.5760	0.1522	0.0000	6.3818
Total		**7.8253**	**0.4625**	**0.0000**	**19.3869**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	25.86	5.2494	0.3102	0.0000	13.0050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	12.69	2.5760	0.1522	0.0000	6.3818
Total		**7.8253**	**0.4625**	**0.0000**	**19.3869**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX 2

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Bernardino County, California

Local office

Carlsbad Fish And Wildlife Office

☎ (760) 431-9440
📠 (760) 431-5901

2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385

http://www.fws.gov/carlsbad/

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

San Bernardino Merriam's Kangaroo Rat Dipodomys merriami parvus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2060	Endangered
Stephens' Kangaroo Rat Dipodomys stephensi (incl. D. cascus) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3495	Endangered

Birds

NAME	STATUS
Coastal California Gnatcatcher Polioptila californica californica There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8178	Threatened
Least Bell's Vireo Vireo bellii pusillus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher Empidonax traillii extimus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/6749	Endangered

Fishes

NAME	STATUS
Santa Ana Sucker Catostomus santaanae There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3785	Threatened

Insects

NAME	STATUS
Delhi Sands Flower-loving Fly Rhaphiomidas terminatus abdominalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1540	Endangered

Flowering Plants

NAME	STATUS
Gambel's Watercress *Rorippa gambellii* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4201	Endangered
San Diego Ambrosia *Ambrosia pumila* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8287	Endangered
Santa Ana River Woolly-star *Eriastrum densifolium ssp. sanctorum* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6575	Endangered
Slender-horned Spineflower *Dodecahema leptoceras* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4007	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php

- Nationwide conservation measures for birds
http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Burrowing Owl Athene cunicularia This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9737	Breeds Mar 15 to Aug 31
Clark's Grebe Aechmophorus clarkii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Dec 31

Common Yellowthroat Geothlypis trichas sinuosa This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Costa's Hummingbird Calypte costae This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Lawrence's Goldfinch Carduelis lawrencei This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Nuttall's Woodpecker Picoides nuttallii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Rufous Hummingbird selasphorus rufus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Song Sparrow Melospiza melodia This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Feb 20 to Sep 5
Spotted Towhee Pipilo maculatus clementae This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/4243	Breeds Apr 15 to Jul 20
Tricolored Blackbird Agelaius tricolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (🟩)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (🟨)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

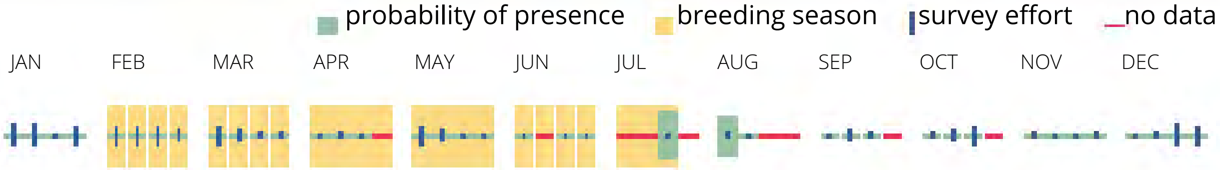
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (_)
A week is marked as having no data if there were no survey events for that week.

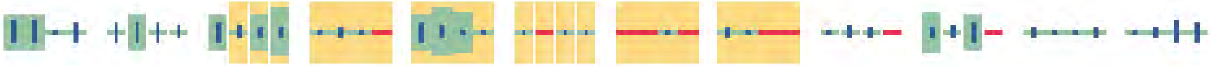
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

SPECIES

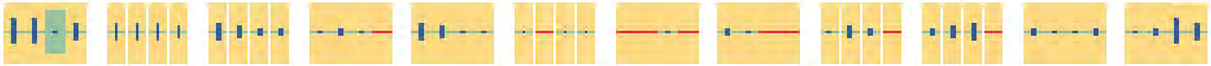
Allen's Hummingbird
BCC Rangewide (CON)
~~(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)~~



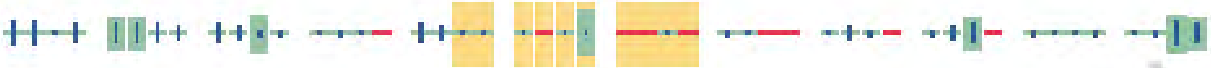
Burrowing Owl
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Clark's Grebe
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

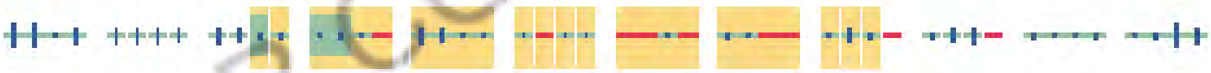


Common Yellowthroat
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

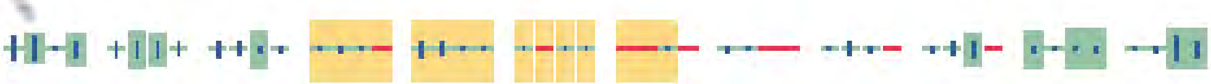


Costa's Hummingbird
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Lawrence's Goldfinch
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

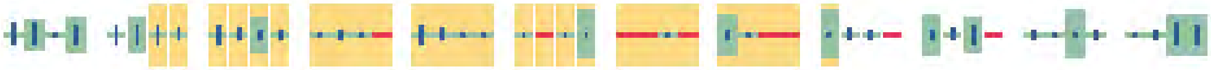


Nuttall's Woodpecker
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

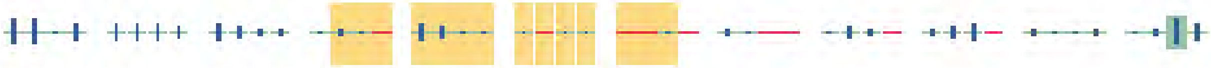


Rufous Hummingbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

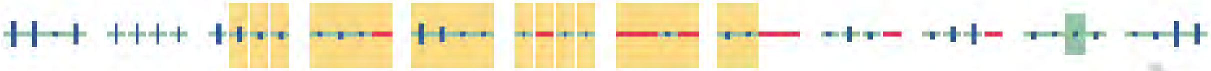
Song Sparrow
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Spotted Towhee
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Tricolored Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (San Bernardino South (3411713))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
Aimophila ruficeps canescens southern California rufous-crowned sparrow	ABPBX91091	None	None	G5T3	S3	WL
Anniella stebbinsi Southern California legless lizard	ARACC01060	None	None	G3	S3	SSC
Arenaria paludicola marsh sandwort	PDCAR040L0	Endangered	Endangered	G1	S1	1B.1
Arizona elegans occidentalis California glossy snake	ARADB01017	None	None	G5T2	S2	SSC
Artemisiospiza belli belli Bell's sage sparrow	ABPBX97021	None	None	G5T2T3	S3	WL
Aspidoscelis hyperythra orange-throated whiptail	ARACJ02060	None	None	G5	S2S3	WL
Aspidoscelis tigris stejnegeri coastal whiptail	ARACJ02143	None	None	G5T5	S3	SSC
Astragalus hornii var. hornii Horn's milk-vetch	PDFAB0F421	None	None	GUT1	S1	1B.1
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Bombus crotchii Crotch bumble bee	IIHYM24480	None	Candidate Endangered	G3G4	S1S2	
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Carex comosa bristly sedge	PMCYP032Y0	None	None	G5	S2	2B.1
Carolella busckana Busck's gallmoth	IILEM2X090	None	None	G1G3	SH	
Catostomus santaanae Santa Ana sucker	AFCJC02190	Threatened	None	G1	S1	
Centromadia pungens ssp. laevis smooth tarplant	PDAST4R0R4	None	None	G3G4T2	S2	1B.1
Chaetodipus fallax fallax northwestern San Diego pocket mouse	AMAFD05031	None	None	G5T3T4	S3S4	SSC
Chloropyron maritimum ssp. maritimum salt marsh bird's-beak	PDSCR0J0C2	Endangered	Endangered	G4?T1	S1	1B.2
Chorizanthe parryi var. parryi Parry's spineflower	PDPGN040J2	None	None	G3T2	S2	1B.1
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Coleonyx variegatus abbotti San Diego banded gecko	ARACD01031	None	None	G5T3T4	S1S2	SSC
Crotalus ruber red-diamond rattlesnake	ARADE02090	None	None	G4	S3	SSC
Cuscuta obtusiflora var. glandulosa Peruvian dodder	PDCUS01111	None	None	G5T4?	SH	2B.2
Dipodomys merriami parvus San Bernardino kangaroo rat	AMAFD03143	Endangered	Candidate Endangered	G5T1	S1	SSC
Dipodomys stephensi Stephens' kangaroo rat	AMAFD03100	Endangered	Threatened	G2	S2	
Dodecahema leptoceras slender-horned spineflower	PDPGN0V010	Endangered	Endangered	G1	S1	1B.1
Eriastrum densifolium ssp. sanctorum Santa Ana River woollystar	PDPLM03035	Endangered	Endangered	G4T1	S1	1B.1
Eumops perotis californicus western mastiff bat	AMACD02011	None	None	G5T4	S3S4	SSC
Euphydryas editha quino quino checkerspot butterfly	IILEPK405L	Endangered	None	G5T1T2	S1S2	
Falco columbarius merlin	ABNKD06030	None	None	G5	S3S4	WL
Galium californicum ssp. primum Alvin Meadow bedstraw	PDRUB0N0E6	None	None	G5T2	S2	1B.2
Gila orcuttii arroyo chub	AFCJB13120	None	None	G2	S2	SSC
Helianthus nuttallii ssp. parishii Los Angeles sunflower	PDAST4N102	None	None	G5TX	SX	1A
Horkelia cuneata var. puberula mesa horkelia	PDROS0W045	None	None	G4T1	S1	1B.1
Lasiurus xanthinus western yellow bat	AMACC05070	None	None	G5	S3	SSC
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lepidium virginicum var. robinsonii Robinson's pepper-grass	PDBRA1M114	None	None	G5T3	S3	4.3
Lepus californicus bennettii San Diego black-tailed jackrabbit	AMAEB03051	None	None	G5T3T4	S3S4	SSC
Lycium parishii Parish's desert-thorn	PDSOL0G0D0	None	None	G4	S1	2B.3
Malacothamnus parishii Parish's bush-mallow	PDMAL0Q0C0	None	None	GXQ	SX	1A
Monardella pringlei Pringle's monardella	PDLAM180J0	None	None	GX	SX	1A

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Nasturtium gambelii Gambel's water cress	PDBRA270V0	Endangered	Threatened	G1	S1	1B.1
Nyctinomops femorosaccus pocketed free-tailed bat	AMACD04010	None	None	G4	S3	SSC
Oncorhynchus mykiss irideus pop. 10 steelhead - southern California DPS	AFCHA0209J	Endangered	None	G5T1Q	S1	
Onychomys torridus ramona southern grasshopper mouse	AMAFF06022	None	None	G5T3	S3	SSC
Perognathus longimembris brevinasus Los Angeles pocket mouse	AMAFD01041	None	None	G5T1T2	S1S2	SSC
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Polioptila californica californica coastal California gnatcatcher	ABPBJ08081	Threatened	None	G4G5T2Q	S2	SSC
Rhaphiomidas terminatus abdominalis Delhi Sands flower-loving fly	IIDIP05021	Endangered	None	G1T1	S1	
Ribes divaricatum var. parishii Parish's gooseberry	PDGRO020F3	None	None	G5TX	SX	1A
Riversidian Alluvial Fan Sage Scrub Riversidian Alluvial Fan Sage Scrub	CTT32720CA	None	None	G1	S1.1	
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
Sidalcea neomexicana salt spring checkerbloom	PDMAL110J0	None	None	G4	S2	2B.2
Southern Cottonwood Willow Riparian Forest Southern Cottonwood Willow Riparian Forest	CTT61330CA	None	None	G3	S3.2	
Southern Riparian Scrub Southern Riparian Scrub	CTT63300CA	None	None	G3	S3.2	
Spea hammondii western spadefoot	AAABF02020	None	None	G3	S3	SSC
Sphenopholis obtusata prairie wedge grass	PMPOA5T030	None	None	G5	S2	2B.2
Symphyotrichum defoliatum San Bernardino aster	PDASTE80C0	None	None	G2	S2	1B.2
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Vireo bellii pusillus least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S2	

Record Count: 60

APPENDIX 3

HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT WATER FACILITIES RELOCATION PROJECT

397 Chandler Place, Assessor's Parcel Number 0141-291-07
City of San Bernardino, San Bernardino County, California

For Submittal to:

Planning Division
City of San Bernardino
290 North D Street
San Bernardino, CA 92401

Prepared for:

Tom Dodson and Associates
2150 North Arrowhead Avenue
San Bernardino, CA 92405

Prepared by:

CRM TECH
1016 East Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

March 15, 2021
CRM TECH Contract No. 3692

Title: Historical/Archaeological Resources Survey Report: San Bernardino Municipal Water Department Water Facilities Relocation Project, 397 Chandler Place, Assessor's Parcel Number 0141-291-07, City of San Bernardino, San Bernardino County, California

Author(s): Bai "Tom" Tang, Principal Investigator
Terri Jacquemain, Historian/Architectural Historian
Nina Gallardo, Archaeologist

Consulting Firm: CRM TECH
1016 East Cooley Drive, Suite A/B
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(909) 824-6400

Date: March 15, 2021

For Submittal to: Planning Division
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San Bernardino, CA 92401
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Prepared for: Kaitlyn Dodson
Tom Dodson and Associates, Inc.
2150 North Arrowhead Avenue
San Bernardino, CA 92405
(909) 882-3612

USGS Quadrangle: San Bernardino South, Calif., 7.5' quadrangle (Rancho San Bernardino land grant; T1S R4W, San Bernardino Baseline and Meridian)

Project Size: Approximately 7.86 acres

Keywords: San Bernardino Valley; Phase I cultural resources survey; former U.S. Post Office fleet maintenance building, circa 1968; San Bernardino Valley Municipal Water District; San Bernardino Municipal Water Department; no "historical resources" under CEQA

MANAGEMENT SUMMARY

Between December 2020 and March 2021, at the request of Tom Dodson and Associates, Inc., CRM TECH performed a cultural resources study on approximately 7.86 acres of developed urban land in the southern portion of the City of San Bernardino, San Bernardino County, California. The subject property of the study, Assessor's Parcel Number 0141-291-07, is located at 397 Chandler Place, on the southeast corner of the intersection with E Street, in a portion of the Rancho San Bernardino land grant lying within Township 1 South Range 4 West, San Bernardino Baseline and Meridian.

The study is part of the environmental review process for the proposed construction of a 27,812-square-foot administrative building and a 13,000-square-foot concrete warehouse with loading docks, and renovations to the existing 26,056-square-foot San Bernardino Municipal Water Department (SBMWD) administration building on the property. The City of San Bernardino, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA). The purpose of the study is to provide the City with the necessary information and analysis to determine the project would cause a substantial adverse change in the significance of a "historical resource," as defined by CEQA.

In order to identify such resources, CRM TECH initiated a historical/archaeological resources records search and a Sacred Lands File search, pursued historical background research, and carried out a systematic field survey of the project area, including inspection of the existing SBMWD administration building and other features currently extant on the property. The results of these research procedures indicate that the SBMWD administration building was originally constructed in 1968 as a U.S. Post Office fleet maintenance facility. Since it meets the 50-year age threshold for consideration as a potential "historical resource," the building was recorded into the California Historical Resources Inventory during this study and designated temporarily as Site 3692-1H, pending assignment of an official site number.

Because it has not been designated a heritage property on national, state, or local levels and does not appear eligible for listing in the California Register of Historical Resources, 3692-1H does not meet the definition of a "historical resource" under CEQA guidelines. No other potential "historical resources" were encountered within or adjacent to the project area. Therefore, CRM TECH recommends to the City of San Bernardino a finding of *No Impact* regarding "historical resources." No further cultural resources investigation is recommended for the project unless development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are discovered during earth-moving operations associated with the project, all work in the immediate area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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INTRODUCTION

Between December 2020 and March 2021, at the request of Tom Dodson and Associates, Inc., CRM TECH performed a cultural resources study on approximately 7.86 acres of developed urban land in the southern portion of the City of San Bernardino, San Bernardino County, California (Fig. 1). The subject property of the study, Assessor's Parcel Number 0141-291-07, is located at 397 Chandler Place, on the southeast corner of the intersection with E Street, in a portion of the Rancho San Bernardino land grant lying within Township 1 South Range 4 West, San Bernardino Baseline and Meridian (Figs. 2, 3).

The study is part of the environmental review process for the proposed construction of a 27,812-square-foot administrative building and a 13,000-square-foot concrete warehouse with loading docks, and renovations to the existing 26,056-square-foot San Bernardino Municipal Water Department (SBMWD) administration building on the property (Figs. 3, 4). The City of San Bernardino, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.). The purpose of the study is to provide the City with the necessary information and analysis to determine the project would cause a substantial adverse change in the significance of a "historical resource," as defined by CEQA.

In order to identify such resources, CRM TECH initiated a historical/archaeological resources records search and a Sacred Lands File search, pursued historical background research, and carried out a systematic field survey of the project area, including inspection of the existing SBMWD administration building and other features currently extant on the property. This report presents a full account of the methods, results, and final conclusion of the study. Qualifications of the participating research personnel are provided in Appendix 1.

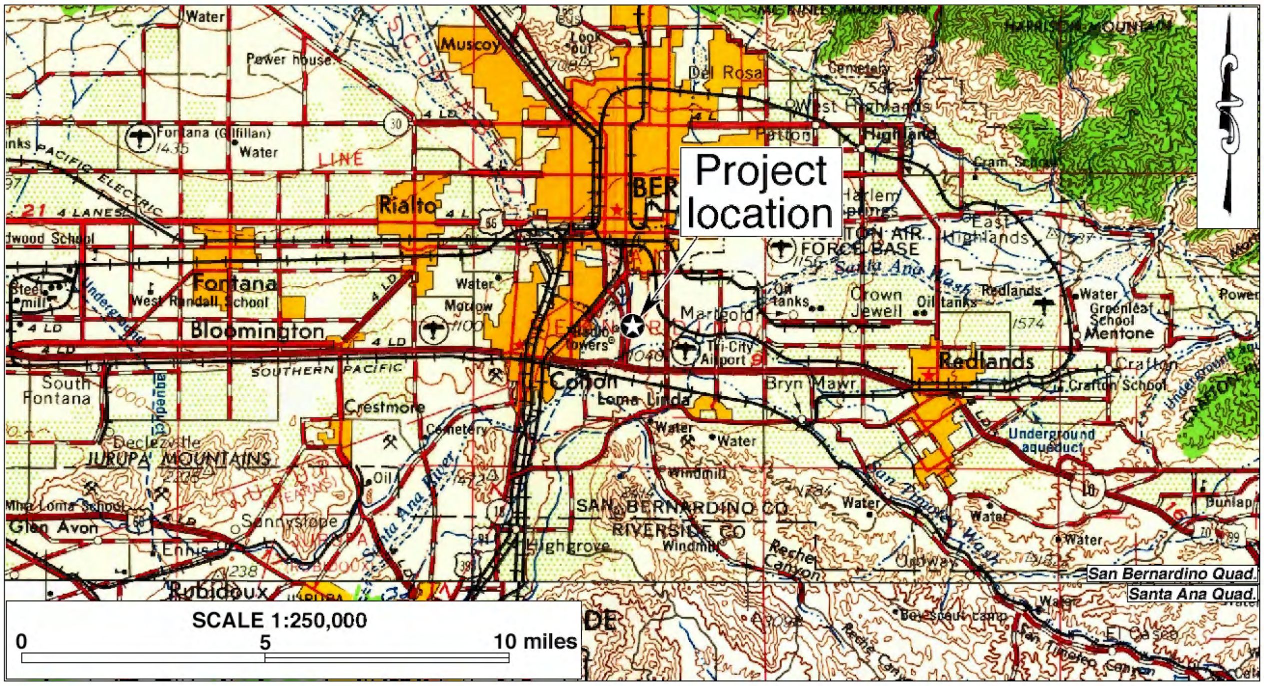

Figure 1. Project vicinity. (Based on USGS San Bernardino and Santa Ana, Calif., 120'x60' quadrangles [USGS 1969, 1979])

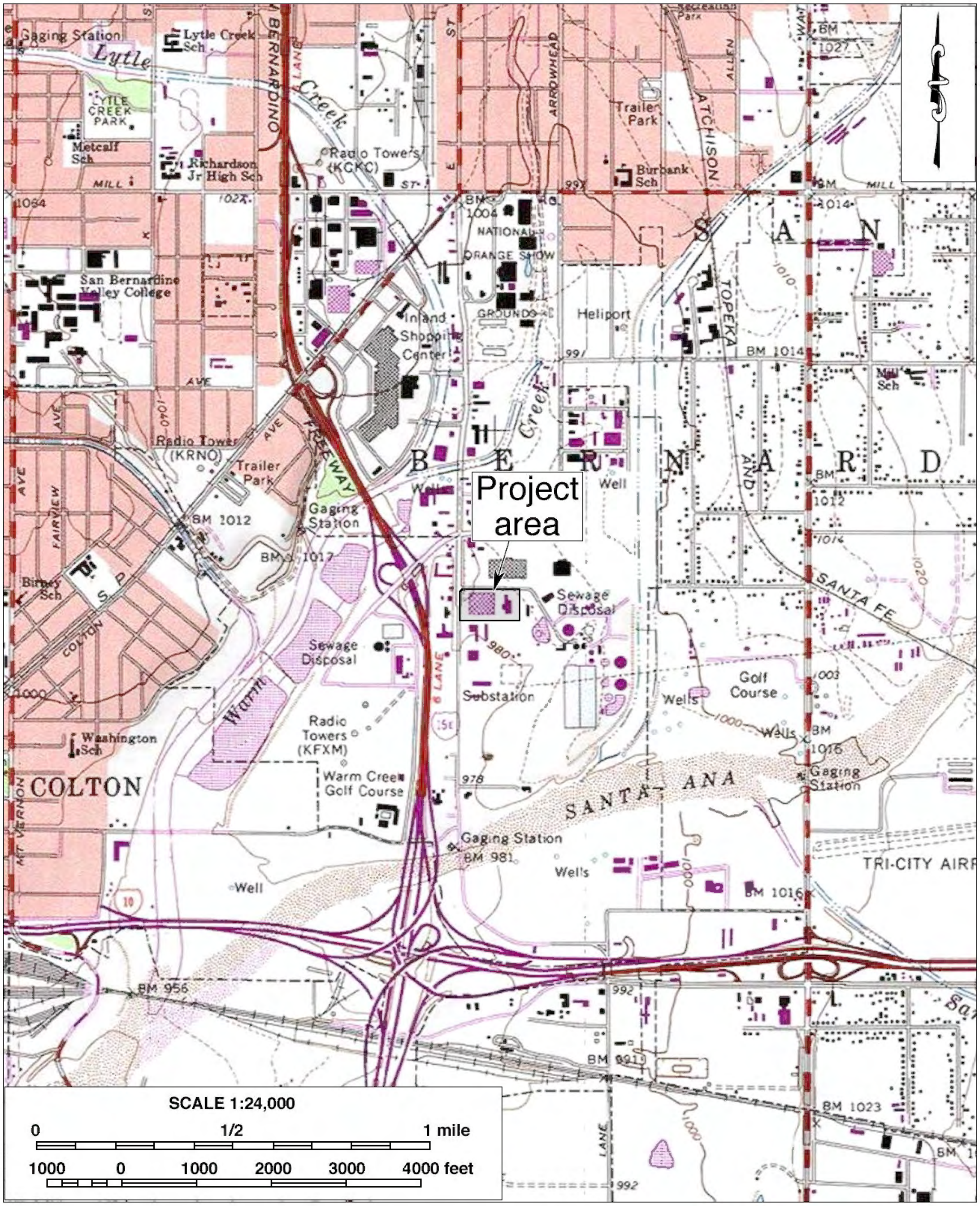

Figure 2. Project area. (Based on USGS San Bernardino South, Calif., 7.5’ quadrangle [USGS 1980])

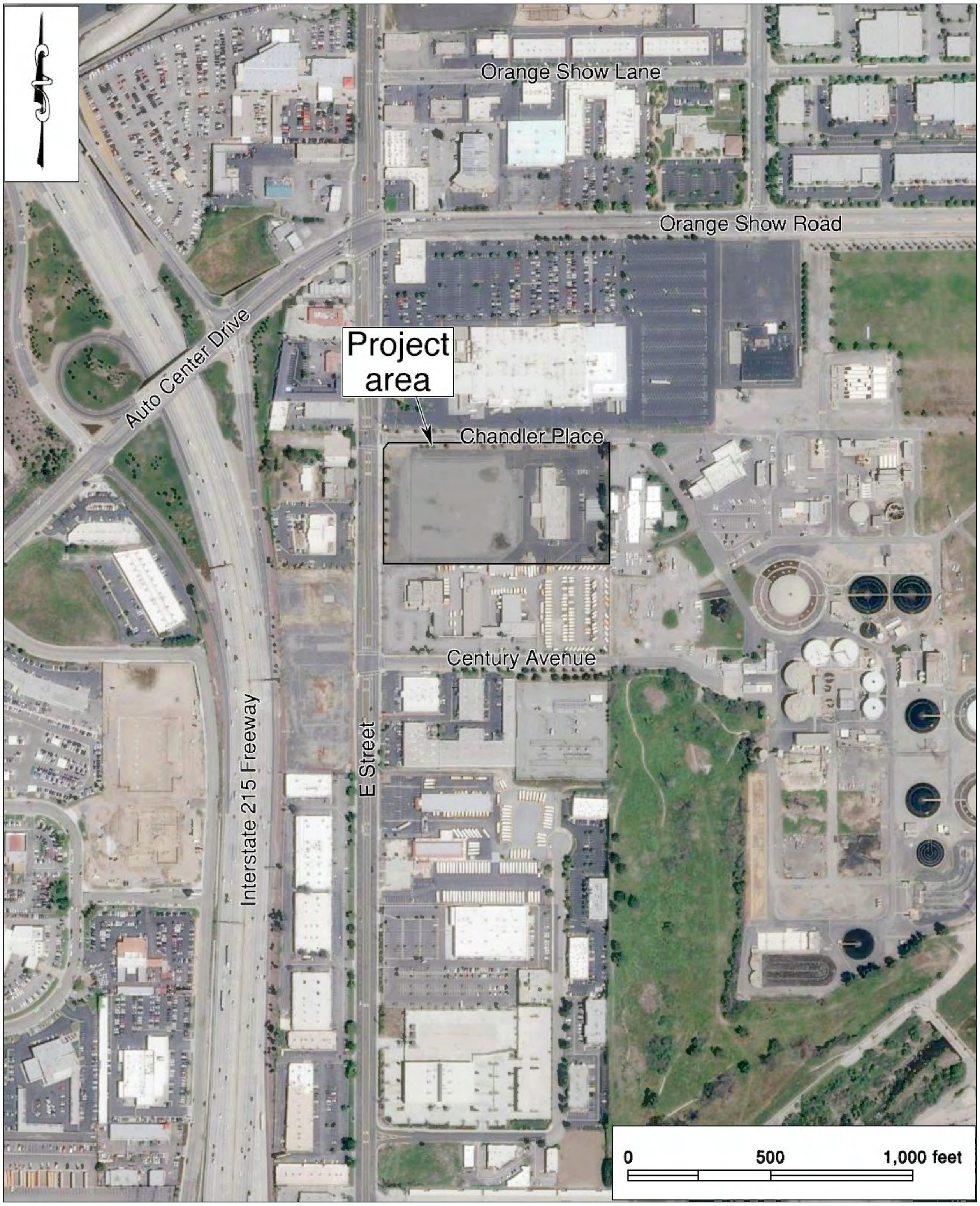

Figure 3. Aerial view of the project area.

Figure 4. Current condition of the project area, view to the northeast. (Photograph taken on February 10, 2021)

SETTING

CURRENT NATURAL SETTING

The City of San Bernardino is situated in the eastern portion of the San Bernardino Valley, a broad inland valley defined by the San Gabriel and San Bernardino Mountain Ranges on the north and a series of low rocky hills on the south. The Mediterranean climate of the San Bernardino Valley is typical of inland southern California, or the Inland Empire, featuring hot and dry summers and mild and rainy winters. The average annual precipitation in the area is approximately 12 inches, most of which occurs between December and March.

The project area lies in an industrial area in the southern portion of the City, adjacent to the county animal control shelter to the east and a bus maintenance yard to the south (Fig. 3). The SBMWD administration building sits in the eastern portion of the project area, next to two modular buildings on the eastern edge of the property and a communications tower in the southeastern corner (Figs. 3, 4). The western portion of the project area was once occupied by a large building (NETR Online 1968-2002; Google Earth 1994-2004), but that building has now been removed, leaving a gravel mound at its former site (Figs. 3, 4).

Virtually the entire project area has been greatly disturbed by past construction, and most of it is now covered by asphalt and gravel. At approximately 981-992 feet above mean sea level, the elevation varies little over relatively level terrain, within the exception of the gravel mound. Native vegetation is limited to scattered small grasses and weeds, mostly along the perimeter.

CULTURAL SETTING

Archaeological Context

The earliest evidence of human occupation in the Inland Empire region was discovered below the surface of an alluvial fan in the northern portion of the Lakeview Mountains, overlooking the San Jacinto Valley, with radiocarbon dates clustering around 9,500 B.P. (Horne and McDougall 2008). Another site found near the shoreline of Lake Elsinore, close to the confluence of Temescal Wash and the San Jacinto River, yielded radiocarbon dates between 8,000 and 9,000 B.P. (Grenda 1997). Additional sites with isolated Archaic dart points, bifaces, and other associated lithic artifacts from the same age range have been found in the nearby Cajon Pass area of the San Bernardino Mountains, typically atop knolls with good viewsheds (Basgall and True 1985; Goodman and McDonald 2001; Goodman 2002; Milburn et al. 2008).

The cultural history of southern California has been summarized into numerous chronologies, including those developed by Chartkoff and Chartkoff (1984), Warren (1984), and others. Specifically, the prehistory of the inland region has been addressed by O'Connell et al. (1974), McDonald et al. (1987), Keller and McCarthy (1989), Grenda (1993), Goldberg (2001), and Horne and McDougall (2008). Although the beginning and ending dates of the recognized cultural horizons vary among different parts of the region, the general framework of the prehistory of the Inland Empire can be broken into three primary periods:

- Paleoindian Period (ca. 18,000-9,000 B.P.): Native peoples of this period created fluted spearhead bases designed to be hafted to wooden shafts. The distinctive method of thinning bifaces and spearhead preforms by removing long, linear flakes leaves diagnostic Paleoindian markers at tool-making sites. Other artifacts associated with the Paleoindian toolkit include choppers, cutting tools, retouched flakes, and perforators. Sites from this period are very sparse across the landscape and most are deeply buried.
- Archaic Period (ca. 9,000-1,500 B.P.): Archaic sites are characterized by abundant lithic scatters of considerable size with many biface thinning flakes, bifacial preforms broken during manufacture, and well-made groundstone bowls and basin metates. As a consequence of making dart points, many biface thinning waste flakes were generated at individual production stations, which is a diagnostic feature of Archaic sites.
- Late Prehistoric Period (ca. 1,500 B.P.-contact): Sites from this period typically contain small lithic scatters from the manufacture of small arrow points, expedient groundstone tools such as tabular metates and unshaped manos, wooden mortars with stone pestles, acorn or mesquite bean granaries, ceramic vessels, shell beads suggestive of extensive trading networks, and steatite implements such as pipes and arrow shaft straighteners.

Ethnohistoric Context

The present-day San Bernardino area is generally recognized as a part of the homeland of the Serrano people, although other Native groups, such as the Gabrielino of the Los Angeles Basin, also claim the area as a part of their cultural influence. Together with that of the Vanyume people, linguistically a subgroup, the traditional territory of the Serrano also includes the San Bernardino Mountains, part of the San Gabriel Mountains, and the Mojave River Valley in the southern portion of the Mojave Desert, reaching as far east as the Cady, Bullion, Sheep Hole, and Coxcomb Mountains. The name "Serrano" was derived from a Spanish term meaning "mountaineer" or "highlander." The basic written sources on Serrano culture are Kroeber (1925), Strong (1929), and Bean and Smith (1978). The following ethnographic discussion of the Serrano people is based mainly on these sources.

Prior to European contact, the Serrano were primarily hunter-gatherers and occasionally fishers, and settled mostly on elevated terraces, hills, and finger ridges near where flowing water emerged from the mountains. They were loosely organized into exogamous clans, which were led by hereditary heads, and the clans in turn were affiliated with one of two exogamous moieties. The clans were patrilineal, but their exact structure, function, and number are unknown, except that the clans were the largest autonomous political and landholding units. There was no pan-tribal political union among the clans, but they shared strong trade, ceremonial, and marital connections that sometimes also extended to other surrounding nations, such as the Kitanemuk, the Tataviam, and the Cahuilla.

Although contact with Europeans may have occurred as early as 1771 or 1772, Spanish influence on Serrano lifeways was minimal until the 1810s, when a mission *asistencia* was established on the southern edge of Serrano territory. Between then and the end of the mission era in 1834, most of the Serrano in the western portion of their traditional territory were removed to the nearby missions. In the eastern portion, a series of punitive expeditions in 1866-1870 resulted in the death or displacement of almost all remaining Serrano population in the San Bernardino Mountains. Today, most Serrano descendants are affiliated with the San Manuel Band of Mission Indians, the Morongo Band of Mission Indians, or the Serrano Nation of Indians.

Historic Context

The San Bernardino Valley, along with the rest of Alta California, was claimed by Spain in the late 18th century, and the first European explorers traveled through the area as early as 1772, three years after the beginning of Spanish colonization (Beck and Haase 1974:15). For nearly four decades afterwards, however, the arid inland valley received little attention from the European colonizers, who concentrated their efforts along the Pacific coast. Following the establishment of Mission San Gabriel in 1771, the San Bernardino Valley became a part of the vast landholdings of that mission. The name "San Bernardino" was bestowed on the region in the 1810s, when the *asistencia* and an associated mission rancho, both bearing that name, were established in present-day Loma Linda (Lerch and Haenszel 1981).

After gaining independence from Spain in 1821, the Mexican authorities in Alta California began secularization of the mission system in 1834. During the next 12 years, mission lands throughout Alta California were surrendered to the Mexican government and subsequently granted to various prominent citizens of the province. In 1842, the former mission rancho of San Bernardino was granted to the Lugos, a prominent Los Angeles family, who were engaged in cattle-raising on the more than 35,000-acre domain (Schuiling 1984:34). After the American annexation of Alta California in 1848, the Lugos sold their land in 1851 to a group of Mormon settlers sent by church leaders in Utah, who promptly established a fortified settlement and named it Fort San Bernardino (*ibid.*:45).

The early growth of the Mormon colony was promising. It became county seat of the newly created San Bernardino County in 1853 and incorporated as a city the next year (Schuiling 1984:48-49). In 1857, however, half of the population was recalled to Utah by Mormon leaders, and the budding town was disincorporated (*ibid.*:50). In the 1880s, spurred by the selection of San Bernardino as the regional headquarters of the newly completed Atchison, Topeka and Santa Fe Railway, the rise of the profitable citrus industry, and a general land boom that swept through much of southern California, San Bernardino gradually recovered, reincorporated in 1886, and embarked on a period of steady growth.

During World War II, the growth of San Bernardino was further boosted when the U.S. Army Air Corps established a pilot training base in the southeastern portion of the city in 1941 (Richards 1966). Renamed Norton Air Force Base in 1950, this military installation proved to be an important driving force in the local economy for the next 45 years. In 1994, the base was officially closed, and its 2,400-acre site was transferred to local civilian authorities for redevelopment in 1999, ultimately becoming today's San Bernardino International Airport.

The original townsite of San Bernardino, as recorded in 1854, was bounded by present-day Tenth Street, Sierra Way, Rialto Avenue, and I Street (Donaldson 1991). By 1907, the urbanized area of the city had expanded to 16th Street on the north, Waterman Avenue on the east, Mill Street on the south, and beyond Mount Vernon Avenue on the west (*ibid.*). The project area lies approximately 0.8 mile south of Mill Street, well outside the original townsite, and was a much later addition to the city's urban core. Largely undeveloped prior to WWII, the area began to take on its present-day industrial/commercial character during the mid-20th century, as discussed further below.

RESEARCH METHODS

HISTORICAL/ARCHAEOLOGICAL RESOURCES RECORDS SEARCH

The historical/archaeological resources records search for this study was completed by staff members of the South Central Coastal Information Center (SCCIC) on February 5, 2021. Located on the campus of California State University, Fullerton, the SCCIC is the State of California's official cultural resource records repository for the County of San Bernardino. Due to facility closure during the COVID-19 pandemic, records that had not been previously digitized were unavailable to SCCIC staff, and the results of recent studies have not been processed. Therefore, the SCCIC cautions that the records search results "may or may not be complete."

SACRED LANDS RECORDS SEARCH

On December 17, 2020, a written request was submitted to the State of California Native American Heritage Commission (NAHC) for a records search in the commission's Sacred Lands File. The NAHC is the State of California's trustee agency for the protection of "tribal cultural resources," as defined by California Public Resources Code §21074, and is tasked with identifying and cataloging properties of Native American cultural value, including places of special religious, spiritual, or social significance and known graves and cemeteries throughout the state. The response from the NAHC is summarized below and attached to this report in Appendix 2.

HISTORICAL RESEARCH

Historical background research for this study was conducted by CRM TECH historian/architectural historian Terri Jacquemain. Sources consulted during the research included published literature in local and regional history, documents on file at the SBMWD, U.S. Geological Survey (USGS) topographic maps dated 1901-1980, and aerial photographs of the project vicinity and aerial photographs taken in 1938-2020. The historic maps are available at the USGS website, and the aerial photographs are available at the Nationwide Environmental Title Research (NETR) Online website and through the Google Earth software.

FIELD SURVEY

On February 10, 2021, CRM TECH archaeologist Nina Gallardo carried out the field survey of the project area. Since the ground surface within the project boundaries is mostly covered by gravel, asphalt, buildings, and other structures, the survey was conducted by meandering over the property and opportunistically inspecting wherever ground surface was exposed, which was mostly limited to around the perimeter. Considering the extensive ground disturbance from past development, the survey procedures were deemed to be adequate for this study.

After the completion of the archaeological survey, Gallardo completed a field inspection of all buildings and structures now extant in the project area and performed recordation procedures on the existing SBMWD administration building, which was known to be more than 50 years of age. To facilitate proper recordation of the building, Gallardo made detailed notations and preliminary photo-documentation of its characteristics and current conditions. The resulting data were compiled into standard record forms for submittal to the California Historical Resources Inventory upon resumption of regular operations at the SCCIC (see App. 3).

RESULTS AND FINDINGS

HISTORICAL/ARCHAEOLOGICAL RESOURCES RECORDS SEARCH

According to records on file at the SCCIC, the project area had not been surveyed systematically for cultural resources prior to this study, and no cultural resources had been recorded within or adjacent to the project boundaries. Within a half-mile radius of the project location, SCCIC records show17 previous studies on various tracts of land and linear features, the closest among them being a linear survey along a segment of Orange Show Road/Auto Center Road, some 700 feet to the north.

As a result of these past studies, six historical/archaeological sites have been identified within the half-mile radius, all of them dating to the historic period. As listed in Table 1, they included a monument of the surmised entrance point to Fort San Bernardino, the San Bernardino Golf Club, two residential buildings, a road, and a water channel. None of these sites were found in the immediate vicinity of the project area. Therefore, they require no further consideration during this study.

Table 1. Previously Identified Cultural Resources within the Scope of the Records Search

Site Number	Description
36-025232	Politana village site and monument established in 1910
36-031402	Single-family residence at 141 E. Dumas Street
36-031403	Single-family residence at 145 E. Dumas Street
36-031404	San Bernardino Golf Club
36-031405	South Washington Avenue
36-033260	Twin/Warm Creek Channel

SACRED LANDS RECORDS SEARCH

In response to CRM TECH's request, the NAHC states in a letter dated January 5, 2020, that the Sacred Lands File identified unspecified Native American cultural resources in the project vicinity and referred further inquiry to the San Manuel Band of Mission Indians. In the meantime, the NAHC provided a referral list of six other local Native American groups who may have knowledge of cultural resources in the vicinity. A copy of the NAHC's reply is attached to this report in Appendix 3 for reference by the City of San Bernardino in future government-to-government consultations with these tribal groups.

HISTORICAL RESEARCH

Historical maps indicate that although the forerunner of present-day E Street was established at least by the 1890s, the project vicinity was sparsely populated at the time, and the project area itself was vacant (Fig. 5). By 1938, a building had appeared on the western edge of the project area while a narrow dirt road ran along the northern project boundary, much as does present-day Chandler Place (Fig. 6; NETR Online 1938). Two decades later, the building was no longer extant (Fig. 7). The rest of the project area remained undeveloped until 1968, when two large buildings, including the present-day SBMWD administration building, were constructed on the property, along with a paved parking lot (Figs. 7, 8; NETR Online 1938-1968; Converse Consultants 2012).

Archival records identify the two buildings in the project area as a U.S. Post Office warehouse and a fleet maintenance building to its east, which now houses the SBMWD administrative offices (Miller and Associates 2002). The fleet maintenance building underwent significant remodeling in 2002, around the time when the San Bernardino Valley Municipal Water District acquired the property (*ibid*.; Huang 2021). The improvements implemented at that time included creating an upper floor in the interior for additional office space; constructing restrooms, stairs, and an elevator; ADA-compliance upgrades; and modifying the main entrance on the western side (*ibid*.).

On July 3, 2012, the property was transferred from the San Bernardino Valley Municipal Water District to the San Bernardino Municipal Water Department (First American Title Company 2012). Prior to that, the 80,000-square-foot warehouse occupying most of the property was demolished in 2005 (Google Earth 2004; 2005). Meanwhile, the modular buildings and the communications tower on the property today were all constructed after 1994 (Google Earth 1994-2020). No other notable changes have occurred on the property in recent decades (*ibid.*; NETR Online 1994-2016).

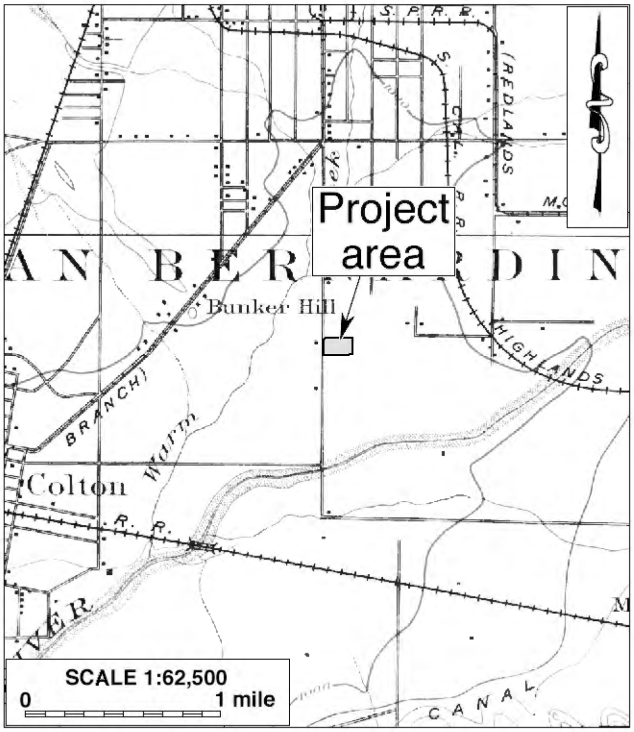

Figure 5. The project area and vicinity in 1893-1894.
(Source: USGS 1901)

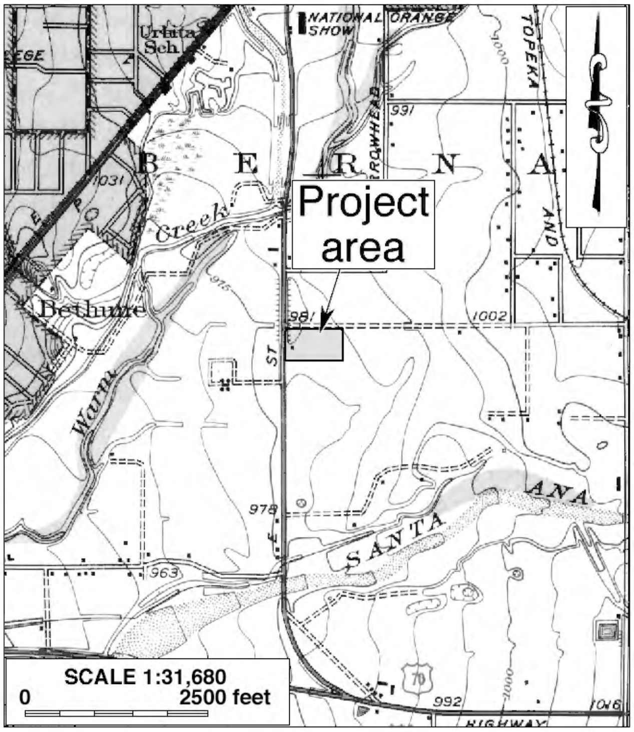

Figure 6. The project area and vicinity in 1936-1938.
(Source: USGS 1943)

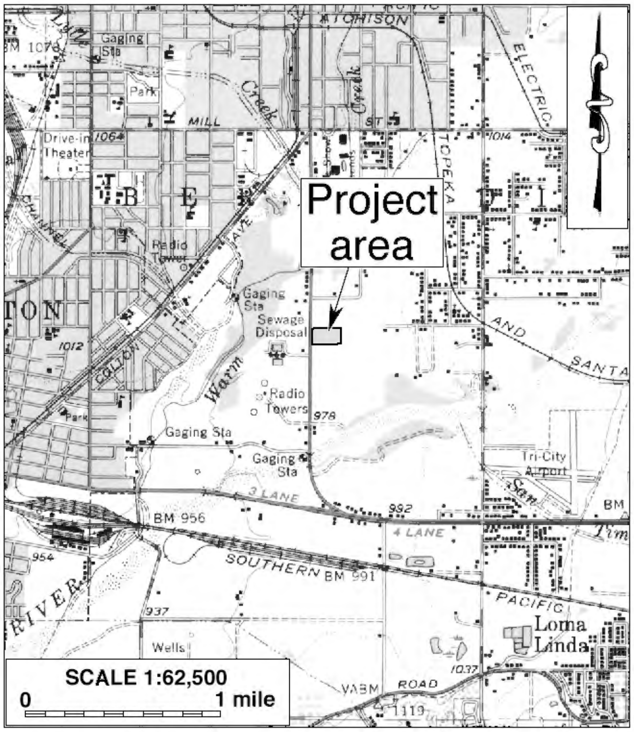

Figure 7. The project area and vicinity in 1952-1954.
(Source: USGS 1954)

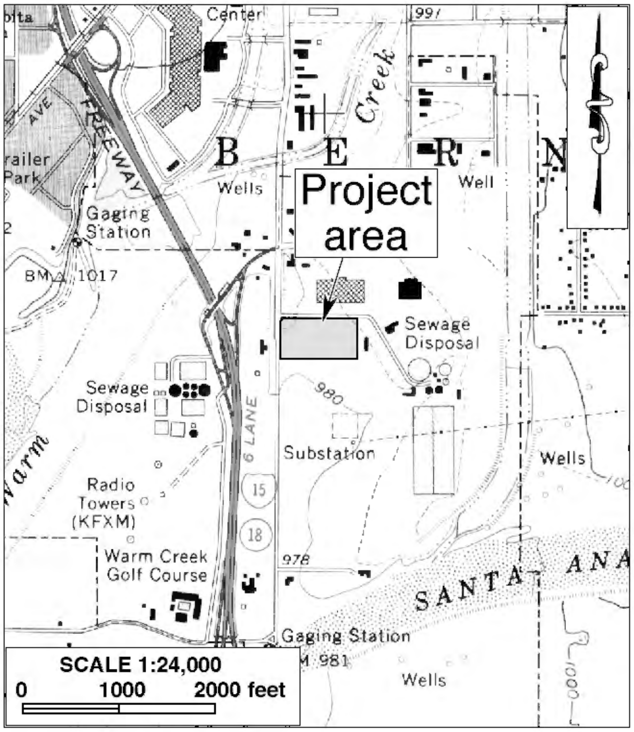

Figure 8. The project area and vicinity in 1966-1967.
(Source: USGS 1967)

FIELD SURVEY

The field survey encountered no archaeological sites, features, or artifact deposits in the project area, either prehistoric or historical in origin. Therefore, the SBMWD administration building was the only potential "historical resource" identified within the project area. This stucco-clad concrete block building is irregular in shape and rests on a concrete slab foundation that generally traces an overall footprint of two offset rectangles, with a rectangular canopy projecting to the west over an entry vestibule, supported by two metal poles (Fig. 9). A flat roof surmounts the one-and-one-half-story structure, with the low upper floor currently used for storage.

The eastern and western façades feature a total of seven man doors, most of them in metal-framed commercial entry assemblages, scattered across the length of the building, along with 15 roll-up mechanic doors and shallow full-width canopies embedded with can lights. Fenestration on the eastern façade consists of three metal-framed, floor-level windows with fixed sashes set at the northern end, near the main office entrance. On the western façade, 21 metal-framed plateglass windows are clustered around the vestibule, with 12 set on the upper level and 9 on the lower level. The northern and southern sides of the building are windowless. A single man door opens to the south under a small canopy, while the northern wall, facing Chandler Place, is entirely blind but bears lettering identifying the address and the occupant of the building.

Overall, the building is a rather modest example of the Mid-Century Modern architectural style as applied to a utilitarian building. It has been significantly altered over the past 20 years for adaptive

Figure 9. Existing SBMWD administration building. *Clockwise from upper left*: western façade; southern and eastern façades; northern façade; entry vestibule on the western side. (Photographs taken on February 10, 2021)

use as an office building from the original function as a fleet maintenance facility and sports much modern materials on the exterior today, such as many of the doors and all of the windows. Nevertheless, the building retains sufficient historical characteristics to appear compatible to its 1960s origin. In light of its age, the building was recorded into the California Historical Resources Inventory and designated temporarily as Site CRM TECH 3692-1H, pending the assignment of an official site number by the SCCIC (see App. 3).

DISCUSSION

The primary objective of this study is to assist City of San Bernardino in identifying any "historical resource," as defined by CEQA, that may be present in the project area. According to PRC §5020.1(j), "'historical resource' includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California."

More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the lead agency (Title 14 CCR §15064.5(a)(1)-(3)). Past case law established by the court system further specify that buildings, structures, sites, or districts that belong to one or more of the following three categories are to be considered "historical resources" for the purposes of CEQA compliance (160 Cal. App. 4th 1051):

(1) Mandatory historical resources: properties that are listed in or formally determined to be eligible for listing in the California Register of Historical Resources;
(2) Presumptive historical resources: properties that are designated in an officially established local register, recognized by local ordinance, resolution, or general plan, or identified in a local survey prepared in accordance with PRC §5024.1(g), unless determined not to be historically or culturally significant by the lead agency upon a preponderance of the evidence;
(3) Discretionary historical resources: properties that are determined to be historically significant in the lead agency's discretion, independent of any decision to list or designate them in a national, state, or local register of historical resources.

Regarding the proper criteria for significance evaluation in the lead agency's discretionary actions, CEQA guidelines provide that "generally, a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
(2) Is associated with the lives of persons important in our past;
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values;

(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

In summary of the research results outlined above, the only potential "historical resource" identified in the project area is the SBMWD administration building at 397 Chandler Place. The building has not been listed in the California Register of Historical Resources or formally determined eligible for listing, nor has it been designated in any local register of historic sites or identified as being historically significant in a local survey. Consequently, it does not fall within the categories of "mandatory historical resource" or "presumptive historical resource." As such, it was evaluated against the California Register criteria as a potential "discretionary historical resource," and the results are presented below.

Over its 53-year history, the SBMWD administration building has served three civic agencies, but no persons or specific events of recognized significance has been identified in association with it, nor does it demonstrate a unique, remarkable, or particularly close association with any pattern of events as a historical theme. In terms of architectural, structural, or engineering merits, the building does not represent an important example of any style, property type, period, region, and method of construction, nor is it known to embody the work or accomplishment of any prominent architect, designer, or builder.

As a late-historic-period expression of common construction practice, the building holds little promise for important historical or archaeological data. Furthermore, the historic integrity of the building has been significantly compromised by the remodeling in 2002 and the incorporation of modern materials on the exterior. Based on these findings, the SBMWD administrative building at 397 Chandler Place does not appear to meet the criteria for listing in the California Register of Historical Resources, and thus does not qualify as a "historical resource" for CEQA-compliance purposes.

CONCLUSION AND RECOMMENDATIONS

CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired." As stated above, the existing SBMWD administrative building in the project area was found to be historical in origin and recorded into the California Historical Resources Inventory during this study, but it does not appear to meet CEQA's definition of a "historical resource." No other potential "historical resources" were encountered within or adjacent to the project area. Therefore, CRM TECH presents the following recommendations to the City of San Bernardino:

- No "historical resources" exist within or adjacent to the project area, and thus the project as currently proposed will not cause a substantial adverse change to any known "historical resources."
- No further cultural resources investigation will be necessary for the project unless development plans undergo such changes as to include areas not covered by this study.

- If buried cultural materials are discovered during future earth-moving operations associated with the project, all work in the immediate area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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1954 Map: San Bernardino, Calif. (15’, 1:62,500); aerial photos taken in 1952, field-checked in 1953-1954.
1967 Map: San Bernardino South, Calif. (7.5’, 1:24,000); aerial photos taken in 1966, field-checked in 1967.
1969 Map: San Bernardino, Calif. (120’x60’, 1:250,000); 1958 edition revised.
1979 Map: Santa Ana, Calif. (120’x60’, 1:250,000); 1959 edition revised.
1980 Map: San Bernardino South, Calif. (7.5’, 1:24,000); 1967 edition photorevised in 1979.

APPENDIX 1
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR/HISTORIAN/ARCHITECTURAL HISTORIAN
Bai “Tom” Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, University of California, Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi’an, China.

2000	“Introduction to Section 106 Review,” presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	“Assessing the Significance of Historic Archaeological Sites,” presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1993-2002	Project Historian/Architectural Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, University of California, Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, University of California, Riverside.
1988-1993	Research Assistant, American Social History, University of California, Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi’an Foreign Languages Institute, Xi’an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California’s Cultural Resources Inventory System (with Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

PRINCIPAL INVESTIGATOR/ARCHAEOLOGIST
Michael Hogan, Ph.D., RPA (Registered Professional Archaeologist)

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside; with honors.
1980-1981	Education Abroad Program, Lima, Peru.

2002	"Section 106—National Historic Preservation Act: Federal Law at the Local Level," UCLA Extension Course #888.
2002	"Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
2002	"Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1999-2002	Project Archaeologist/Field Director, CRM TECH, Riverside, California.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands, California.
1992-1998	Assistant Research Anthropologist, University of California, Riverside.
1992-1995	Project Director, Archaeological Research Unit, U.C. Riverside.
1993-1994	Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
1991-1992	Crew Chief, Archaeological Research Unit, U.C. Riverside.
1984-1998	Project Director, Field Director, Crew Chief, and Archaeological Technician for various southern California cultural resources management firms.

Research Interests

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

Cultural Resources Management Reports

Principal investigator for, author or co-author of, and contributor to numerous cultural resources management study reports since 1986.

Memberships

Society for American Archaeology; Society for California Archaeology; Pacific Coast Archaeological Society; Coachella Valley Archaeological Society.

PROJECT HISTORIAN/ARCHITECTURAL HISTORIAN
Terri Jacquemain, M.A.

Education

2004	M.A., Public History and Historic Resource Management, University of California, Riverside.
2002	B.S., Anthropology, University of California, Riverside.

Professional Experience

2003-	Historian/Report Writer, CRM TECH, Riverside/Colton, California.
2002-2003	Teaching Assistant, Religious Studies Department, University of California, Riverside.
1997-1999	Reporter, *Inland Valley Daily Bulletin*, Ontario, California.
1991-1997	Reporter, *The Press-Enterprise*, Riverside, California.

Memberships

California Council for the Promotion of History.

PROJECT ARCHAEOLOGIST
Nina Gallardo, B.A.

Education

2004	B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2004-	Project Archaeologist, CRM TECH, Riverside/Colton, California.

Cultural Resources Management Reports

Co-author of and contributor to numerous cultural resources management reports since 2004.

APPENDIX 2

SACRED LANDS FILE SEARCH RESULTS

STATE OF CALIFORNIA Gavin Newsom, *Governor*

NATIVE AMERICAN HERITAGE COMMISSION

January 5, 2021

Nina Gallardo
CRM TECH

Via Email to: ngallardo@crmtech.us

Re: Proposed SBMWD Water Facilities Relocation Project, San Bernardino County

Dear Ms. Gallardo:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive. Please contact the San Manuel Band of Mission Indians on the attached list for more information. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

Native American Heritage Commission
Native American Contact List
San Bernardino County
1/5/2021

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive
Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive
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Palm Springs, CA, 92264
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Road
Cahuilla
Banning, CA, 92220
Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

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Fax: (951) 922-8146
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Quechan Tribe of the Fort Yuma Reservation
Jill McCormick, Historic Preservation Officer
P.O. Box 1899
Quechan
Yuma, AZ, 85366
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historicpreservation@quechantribe.com

Quechan Tribe of the Fort Yuma Reservation
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899
Quechan
Yuma, AZ, 85366
Phone: (928) 750 - 2516
scottmanfred@yahoo.com

San Manuel Band of Mission Indians
Jessica Mauck, Director of Cultural Resources
26569 Community Center Drive
Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
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Santa Rosa Band of Cahuilla Indians
Lovina Redner, Tribal Chair
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Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
lsaul@santarosa-nsn.gov

Serrano Nation of Mission Indians
Mark Cochrane, Co-Chairperson
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This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Proposed SBMWD Water Facilities Relocation Project, San Bernardino County.

Native American Heritage Commission
Native American Contact List
San Bernardino County
1/5/2021

Soboba Band of Luiseno Indians
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Cahuilla
Luiseno

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Luiseno

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

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APPENDIX 3

CALIFORNIA HISTORICAL RESOURCES INVENTORY RECORD FORMS

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # (Pending)
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings
Review Code **Reviewer** **Date**

***Resource Name or #** (Assigned by recorder) CRM TECH 3692-1H

P1. Other Identifier: San Bernardino Municipal Water Department Administration Building

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** San Bernardino
and (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** San Bernardino South, Calif. **Date** 1980
T1S; **R**4W; S.B. **B.M.** (within the Rancho San Bernardino land grant)
c. Address 397 Chandler Place **City** San Bernardino **Zip** 92408
d. UTM: (Give more than one for large and/or linear resources) **Zone** 11 ; 473,059 **mE**/ 3,770,722 **mN**
UTM Derivation: ☐ USGS Quad ☐ GIS ☒ Google Earth
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate) Assessor's Parcel Number 0141-291-07; near the southeast corner of Chandler Place and E Street

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) This stucco-clad concrete block office building is irregular in shape and rests on a concrete slab foundation that generally traces an overall footprint of two offset rectangles, with a rectangular canopy projecting to the west over an entry vestibule, supported by two metal poles. A flat roof surmounts the one-and-one-half-story structure, with the low upper floor currently used for storage.

The eastern and western façades feature a total of seven man doors, most of them in metal-framed commercial entry assemblages, scattered across

(*Continued on p. 4*)

***P3b. Resource Attributes:** (List attributes and codes) HP14: Government building

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

P5b. Description of Photo (view, date, accession number): Photo taken on February 10, 2021; view to the east.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
Circa 1968

***P7. Owner and Address:** San Bernardino Municipal Water Department, 1350 South E Street, San Bernardino, CA 92408

***P8. Recorded by** (Name, affiliation, & address): Nina Gallardo and Terri Jacquemain, CRM TECH, 1016 East Cooley Drive, Suite A/B, Colton, CA 92324

***P9. Date Recorded:** February 10, 2021

***P10. Survey Type** (describe): Intensive-level survey for CEQA-compliance purposes

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Bai "Tom" Tang, Terri Jacquemain, and Nina Gallardo (2021): Historical/Archaeological Resources Survey Report: San Bernardino Municipal Water Department Water Facilities Relocation Project, 397 Chandler Place, Assessor's Parcel Number 0141-291-07, City of San Bernardino, San Bernardino County California

***Attachments:** ☐None ☒Location Map ☐Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Resource Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐Other (List):

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

BUILDING, STRUCTURE, AND OBJECT RECORD

Primary #
HRI #

***NRHP Status Code** 6Z
***Resource Name or #** (Assigned by recorder) CRM TECH 3643-1H

B1. Historic Name:
B2. Common Name:
B3. Original Use: USPS fleet maintenance
B4. Present Use: Office
***B5. Architectural Style:** Modern
***B6. Construction History:** (Construction date, alterations, and date of alterations) This building was constructed in 1968 to serve as a fleet maintenance facility for a U.S. Postal Office warehouse. It received extensive remodeling in 2002, around the time the San Bernardino Valley Municipal Water District acquired the property. The improvements implemented at that time included creating the upper floor in the interior for additional office space; constructing restrooms, stairs, and an elevator; ADA-compliance upgrades; and modifying the main entrance on the western side. The property was transferred in July 2012 to the San Bernardino Municipal Water Department.
***B7. Moved?** √ No __Yes __Unknown **Date:** **Original Location:**
***B8. Related Features:** See Item P3a.
B9a. Architect: Unknown
b. Builder: Unknown
***B10. Significance: Theme** Mid-20 century Modernist architecture
Area San Bernardino
Period of Significance 1968-
Property Type Public building
Applicable Criteria N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.) The building has served three civic agencies since its construction in 1968, but no persons or specific events of recognized significance has been identified in association with it, nor does it demonstrate a unique, remarkable, or particularly close association with any pattern of events as a historical theme. In terms of architectural, (*Continued on p. 4*)

B11. Additional Resource Attributes: (List attributes and codes)
***B12. References:** Title Transfer between San Bernardino Valley Municipal Water District and San Bernardino Municipal Water Department (2012); Converse Consultants screening report, 2012; Miller and Associates as-built plans for 2002 remodeling (all documents on file at the San Bernardino Municipal Water Department)
B13. Remarks:
***B14. Evaluator:** Terri Jacquemain
***Date of Evaluation:** February 2021

(This space reserved for official comments.)

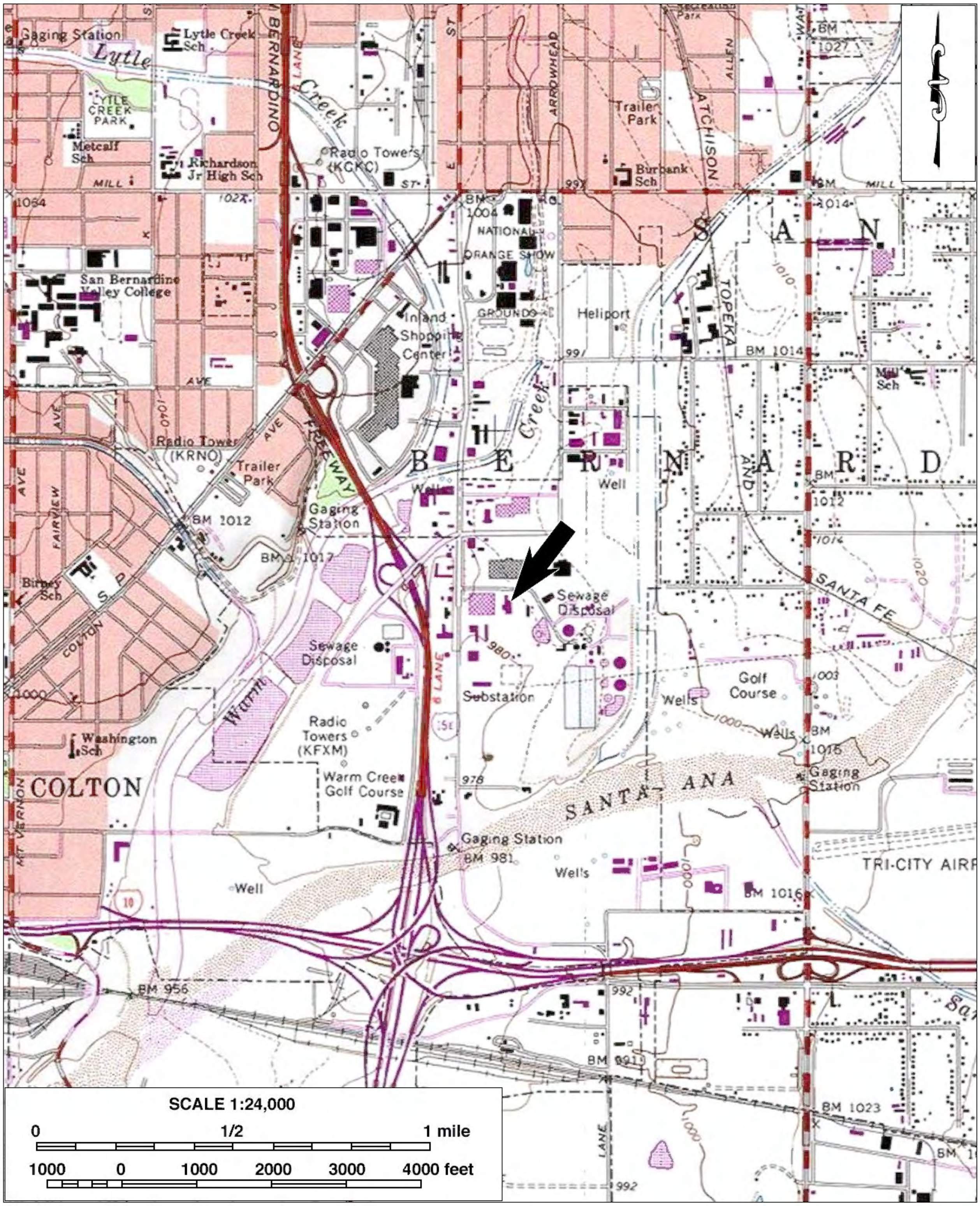
(Sketch Map with north arrow required.)

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI #
Trinomial

Page 3 **of** 4 ***Resource Name or #** (Assigned by recorder) CRM TECH 3692-1H

***Map Name:** San Bernardino South, Calif.
***Scale:** 1:24,000 ***Date of Map:** 1980



DPR 523J (Rev. 1/1995) (Word 9/2013) *** Required information**

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #
HRI #
Trinomial

Page 4 **of** 4 **Resource name or #** (Assigned by recorder) CRM TECH 3692-1H

Recorded by: Nina Gallardo and Terri Jacquemain
***Date:** February 2021 √ Continuation ___ Update

***P3a.** **Description** (continued): the length of the building, along with 15 roll-up mechanic doors and shallow full-width canopies embedded with can lights. Fenestration on the eastern façade consists of three metal-framed, floor-level windows with fixed sashes set at the northern end, near the main office entrance. On the western façade, 21 metal-framed plateglass windows are clustered around the vestibule, with 12 set on the upper level and 9 on the lower level. The northern and southern sides of the building are windowless. A single man door opens to the south under a small canopy, while the northern wall, facing Chandler Place, is entirely blind but bears lettering identifying the address and the occupant of the building.

***B10.** **Significance** (continued): structural, or engineering merits, the building does not represent an important example of any style, property type, period, region, and method of construction, nor is it known to embody the work or accomplishment of any prominent architect, designer, or builder. As a late-historic-period expression of common construction practice, the building holds little promise for important historical or archaeological data. Furthermore, the historic integrity of the building has been significantly compromised by the remodeling in 2002 and the incorporation of modern materials on the exterior. Based on these findings, the San Bernardino Municipal Water Department administrative building at 397 Chandler Place does not appear to meet the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources.

APPENDIX 4

San Bernardino Municipal Water Department Water Facilities Relocation Project

ENERGY ANALYSIS

CITY OF SAN BERNARDINO

Prepared by:

William Maddux
bmaddux@urbanxroads.com
(619) 778-1971

JULY 1, 2021

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LIST OF ABBREVIATED TERMS

%	Percent
(1)	Reference
APN	Assessor’s Parcel Number
AQIA	San Bernardino Municipal Water Department Water Facilities Relocation Project Air Quality Analysis
BACM	best available control measures
BTU	British Thermal Unit, 7
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CEQA Guidelines	California Environmental Quality Act Guidelines
City	City of San Bernardino
CPEP	Clean Power and Electrification Pathway
CPUC	California Public Utilities Commission
CTA	core transport agents
DMV	Department of Motor Vehicles
EIA	Energy Information Administration
EMFAC	EMissions FACtor
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
GT&S	Gas Transmission and Storage
IEPR	Integrated Energy Policy Report
ISO	California Independent Service Operator
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
LDA	light-duty-auto vehicles
LDT1	light-duty-trucks
LDT2	light-duty-trucks
MHDT	medium-heavy duty trucks
MMcfd	million cubic feet per day
MPOs	Metropolitan Planning Organizations
PG&E	Pacific Gas and Electric
Project	San Bernardino Municipal Water Department Water

	Facilities Relocation Project
RPS	Renewable Portfolio Standard
SB	Senate Bill
SB 350	Clean Energy and Pollution Reduction Act of 2015
SBMWD	San Bernardino Municipal Water Department Water Department
SCAB	South California Air Basin
SCE	Southern California Edison
SDAB	San Diego Air Basin
SDG&E	San Diego Gas & Electric
sf	square foot
SoCalGas	Southern California Gas
SONGS	San Onofre Nuclear Generating Station
TEA-21	The Transportation Equity Act for the 21st Century
U.S.	United States
VMT	vehicle miles traveled

EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *San Bernardino Municipal Water Department Water Facilities Relocation Project Energy Analysis* is summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the 2019 California Environmental Quality Act (CEQA) Statute and Guidelines (*CEQA Guidelines*) (1). Table ES-1 shows the findings of significance for potential energy impacts under CEQA.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Energy Impact #1: Would the Project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	5.0	*Less Than Significant*	*n/a*
Energy Impact #2: Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	5.0	*Less Than Significant*	*n/a*
Energy Impact #3: Would the project conflict with the goals of: • *Decreasing overall per capita energy consumption.* • *Decreasing reliance on fossil fuels such as coal, natural gas and oil.* • *Increasing reliance on renewable energy sources.*	5.0	*Less Thank Significant*	*n/a*

ES.2 PROJECT REQUIREMENTS

The Project would be required to comply with regulations imposed by the federal and state agencies that regulate energy use and consumption through various means and programs. Those that are directly and indirectly applicable to the Project and that would assist in the reduction of energy usage include:

- Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
- The Transportation Equity Act for the 21st Century (TEA-21)
- Integrated Energy Policy Report (IEPR)
- State of California Energy Plan
- California Code Title 24, Part 6, Energy Efficiency Standards

- AB 1493 Pavley Regulations and Fuel Efficiency Standards
- California's Renewable Portfolio Standard (RPS)
- Clean Energy and Pollution Reduction Act of 2015 (SB 350)

Consistency with the above regulations are discussed in detail in section 3 of this energy study.

1 INTRODUCTION

This report presents the results of the energy analysis prepared by Urban Crossroads, Inc., for the proposed San Bernardino Municipal Water Department Water Facilities Relocation Project (Project). The purpose of this report is to ensure that energy implication is considered by the City of San Bernardino (City), as the lead agency, and to quantify anticipated energy usage associated with construction and operation of the proposed Project, determine if the usage amounts are efficient, typical, or wasteful for the land use type, and to emphasize avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

1.1 SITE LOCATION

San Bernardino Municipal Water Department Water Department (SBMWD) is proposing to relocate its facilities. The Project site is located at 397 Chandler Place, San Bernardino, California. Refer to Exhibit 1-A for the regional location. The Norton Air Force Base is located approximately 2.1 miles northeast of the Project site. The nearest residential land uses are located approximately 0.5 miles to the north west of the Project site in the City of San Bernardino.

1.2 PROJECT DESCRIPTION

The proposed Project consists of development within a 7.86-acre or 342,426.48 square foot (sf) site designated for Industrial use by the City of San Bernardino General Plan. The project consists of a single parcel: Assessor's Parcel Number (APN): 141-291-07. Refer to the site plan provided Exhibit 1-A.

The project proposes a new administrative building, that will incorporate sustainable, energy efficient building systems and features. The project proposes a one-story structural steel administrative office building. The new administrative building will include the following amenities and features:

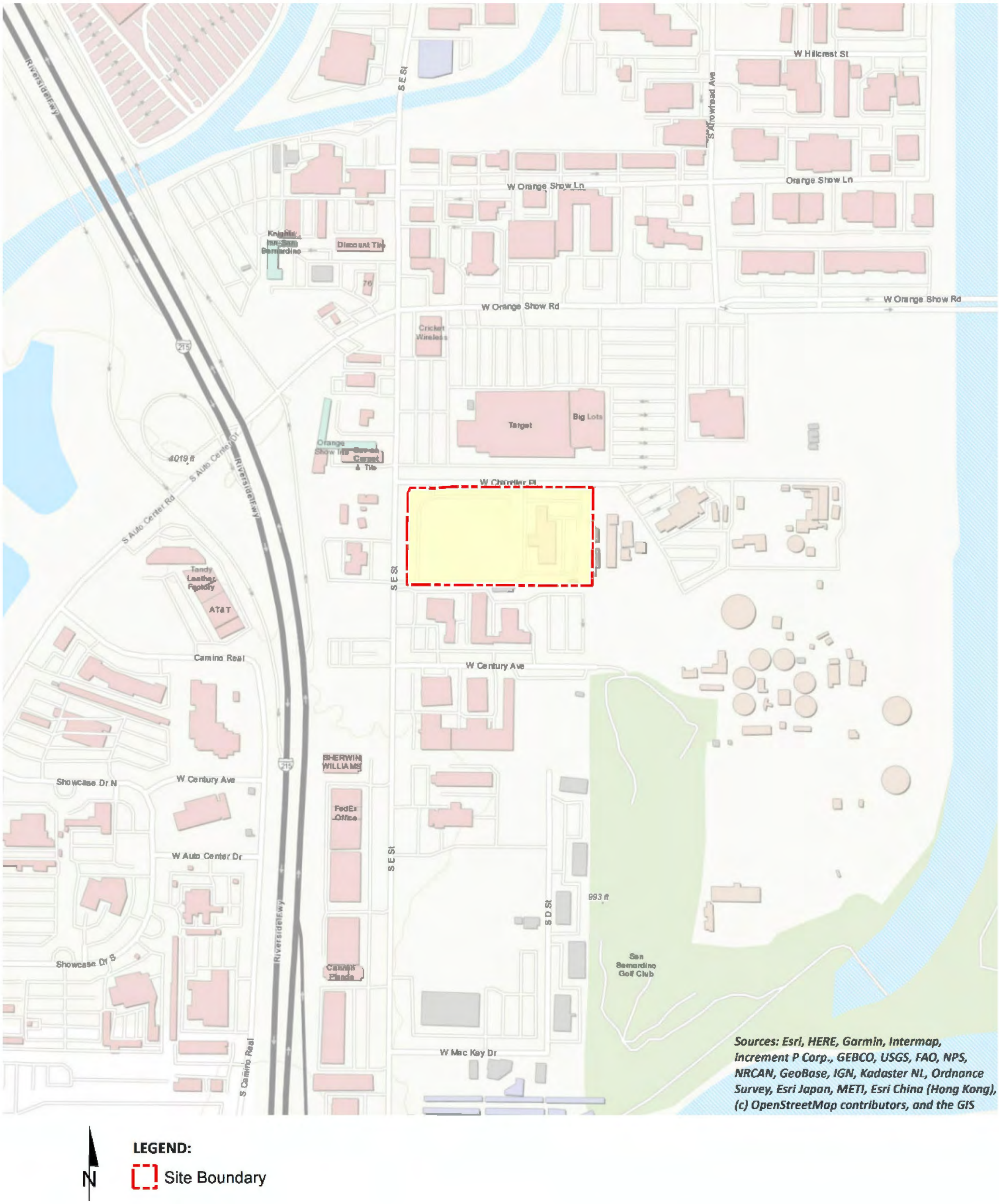
- Board meeting room
- Class A office space
- Common area, conference room(s) that would be large enough to accommodate up to 20 or more people for larger events, and that can be transformed into a training room with network access for laptops or work stations
- Hard-walled office spaces with doors for executive management with small conference areas
- Hard-walled office spaces with doors for managers and supervisors
- Cubicle spaces for staff with various sizes and configurations suited to the roles the spaces will serve
- Outside employee covered patio and break area
- Break room and kitchen area(s) centrally located to employee offices
- Automated building systems including climate control, security, energy efficiency management, a solar photovoltaic (PV) system, and other features
- LED lighting
- Incorporation of natural light into building design

Consistent with *San Bernardino Municipal Water Department Water Facilities Relocation Project Air Quality Analysis* (*AQIA*) (2), the following land use mix is assumed:

- 27,810 square feet of General Office land use
- 13,500 square feet of Non-Refrigerated Warehouse land use
- 194 space parking space (77,6000 square feet)

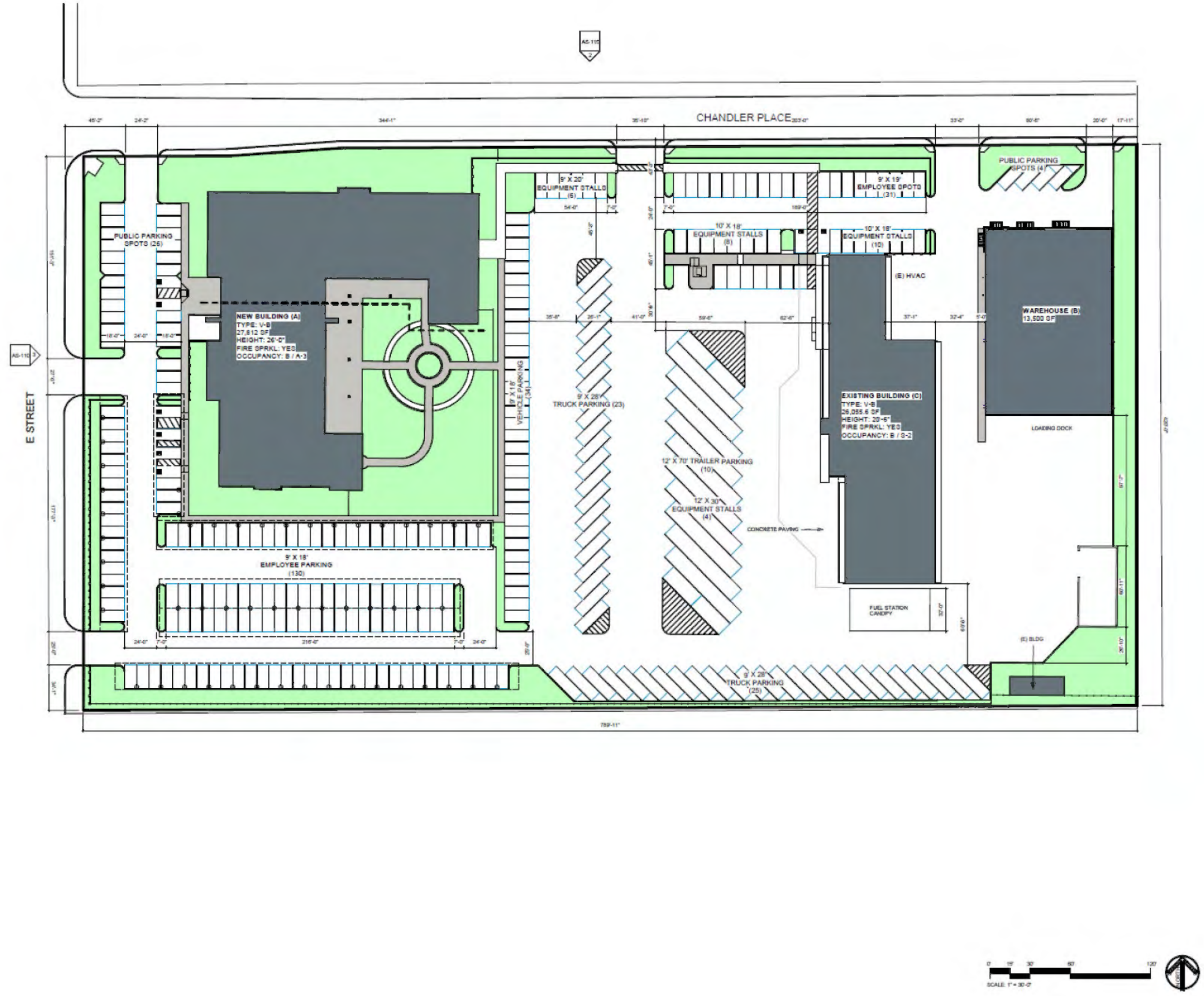
The anticipated Project opening year is 2022. This analysis is intended to describe energy usage associated with the construction and expected operational activities at the Project site.

EXHIBIT 1-A: LOCATION MAP



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS

EXHIBIT 1-B: SITE PLAN



2 EXISTING CONDITIONS

This section provides an overview of the existing energy conditions in the Project region.

2.1 OVERVIEW

The most recent data for California's estimated total energy consumption is from 2018, released by the United States (U.S.) Energy Information Administration's (EIA) California State Profile and Energy Estimates included:

- Approximately 7,900 trillion British Thermal Unit (BTU) of energy was consumed;
- Approximately 3,444 trillion BTU of petroleum;
- Approximately 2,210 trillion BTU of natural gas;
- Approximately 33.3 trillion BTU coal (3)

The California Energy Commission's (CEC) Transportation Energy Demand Forecast 2018-2030 was released in order to support the 2017 Integrated Energy Policy Report. The Transportation energy Demand Forecast 2018-2030 lays out graphs and data supporting their projections of California's future transportation energy demand. The projected inputs consider expected variable changes in fuel prices, income, population, and other variables. Predictions regarding fuel demand included:

- Gasoline demand in the transportation sector is expected to decline from approximately 15.8 billion gallons in 2017 to between 12.3 billion and 12.7 billion gallons in 2030 (4)
- Diesel demand in the transportation sector is expected to rise, increasing from approximately 3.7 billion diesel gallons in 2015 to approximately 4.7 billion in 2030 (4)
    - Data from the Department of Energy states that approximately 3.9 billion gallons of diesel fuel were consumed in 2017 (5)

The most recent data provided by the EIA for energy use in California by demand sector is from 2018 and is reported as follows:

- Approximately 39.1% transportation;
- Approximately 23.5% industrial;
- Approximately 18.3% residential; and
- Approximately 19.2% commercial (6)

In 2020, total system electric generation for California was 277,704 gigawatt hours (GWh). California's massive electricity in-state generation system generated approximately 200,475 GWh which accounted for approximately 72.2% of the electricity it uses; the rest was imported from the Pacific Northwest (8.6%) and the U.S. Southwest (19.2%) (7). Natural gas is the main source for electricity generation at 34.23% of the total in-state electric generation system power as shown in Table 2-1. Renewables account for 31.7% of the total electrical system power.

TABLE 2-1: TOTAL ELECTRICITY SYSTEM POWER (CALIFORNIA 2020)

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	Total California Energy Mix (GWh)	Total California Power Mix
Coal	248	0.12%	219	7,765	8,233	2.96%
Natural Gas	86,136	42.97%	62	8,859	95,057	34.23%
Oil	36	0.02%	0	0	36	0.01%
Other	411	0.20%	0	11	422	0.15%
Nuclear	16,163	8.06%	39	8,743	24,945	8.98%
Large Hydro	33,145	16.53%	6,387	1,071	40,603	14.62%
Unspecified	0	0.00%	6,609	13,767	20,376	7.34%
Non-Renewables and Unspecified Totals	136,139	67.91%	13,315	40,218	189,672	68.30%
Biomass	5,851	2.92%	903	33	6,787	2.44%
Geothermal	10,943	5.46%	99	2,218	13,260	4.77%
Small Hydro	5,349	2.67%	292	4	5,646	2.03%
Solar	28,513	14.22%	282	5,295	34,090	12.28%
Wind	13,680	6.82%	9,038	5,531	28,249	10.17%
Renewables Totals	64,336	32.09%	10,615	13,081	88,032	31.70%
Total	200,475	100.00%	23,930	53,299	277,704	100.00%

Source: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

An updated summary of, and context for energy consumption and energy demands within the State is presented in “U.S. Energy Information Administration, California State Profile and Energy Estimates, Quick Facts” excerpted below:

- California was the seventh-largest producer of crude oil among the 50 states in 2018, and, as of January 2019, it ranked third in oil refining capacity.
- California is the largest consumer of jet fuel among the 50 states and accounted for one-fifth of the nation’s jet fuel consumption in 2018. (8)
- California's total energy consumption is second highest in the nation, but, in 2018, the state's per capita energy consumption was the fourth-lowest, due in part to its mild climate and its energy efficiency programs. (9)
- In 2018, California ranked first in the nation as a producer of electricity from solar, geothermal, and biomass resources and fourth in the nation in conventional hydroelectric power generation.
- In 2018, large- and small-scale solar photovoltaic (PV) and solar thermal installations provided 19% of California’s net electricity generation (10).

As indicated above, California is one of the nation’s leading energy-producing states, and California’s per capita energy use is among the nation’s most efficient. Given the nature of the

Project, the remainder of this discussion will focus on the three sources of energy that are most relevant to the project—namely, electricity, natural gas, and transportation fuel for vehicle trips associated with the uses planned for the Project.

2.2 ELECTRICITY

The usage associated with electricity use were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2. The Southern California region's electricity reliability has been of concern for the past several years due to the planned retirement of aging facilities that depend upon once-through cooling technologies, as well as the June 2013 retirement of the San Onofre Nuclear Generating Station (SONGS). While the once-through cooling phase-out has been ongoing since the May 2010 adoption of the State Water Resources Control Board's once-through cooling policy, the retirement of San Onofre complicated the situation. California ISO studies revealed the extent to which the South California Air Basin (SCAB) and the San Diego Air Basin (SDAB) region were vulnerable to low-voltage and post-transient voltage instability concerns. A preliminary plan to address these issues was detailed in the 2013 Integrative Energy Policy Report (IEPR) after a collaborative process with other energy agencies, utilities, and air districts (11). Similarly, the subsequent 2018 and 2019 IEPR's identify broad strategies that are aimed at maintaining electricity system reliability.

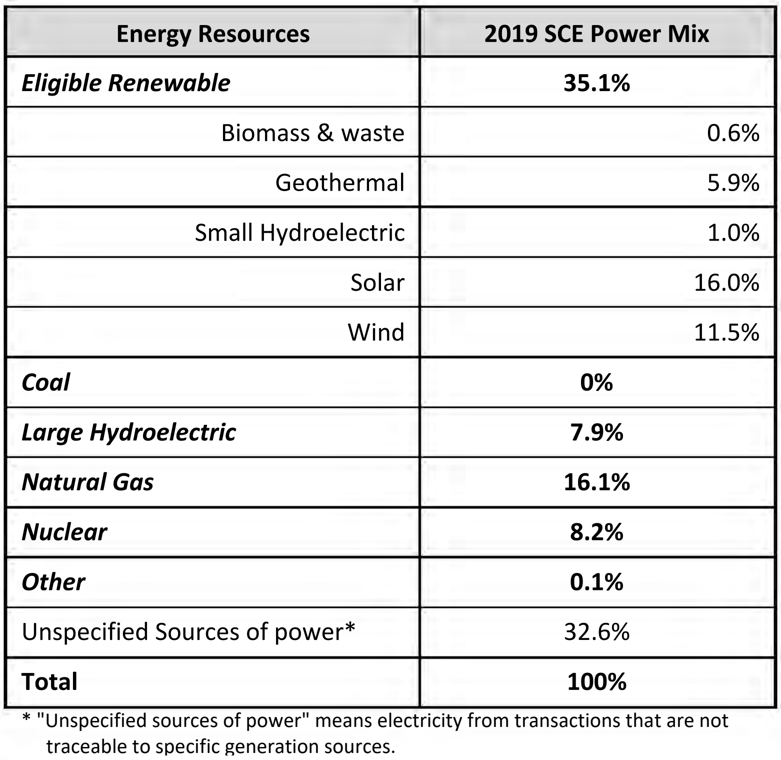
Electricity is provided to the Project by Southern California Edison (SCE). SCE provides electric power to more than 15 million persons in 15 counties and in 180 incorporated cities, within a service area encompassing approximately 50,000 square miles. Based on SCE's 2018 Power Content Label Mix, SCE derives electricity from varied energy resources including: fossil fuels, hydroelectric generators, nuclear power plants, geothermal power plants, solar power generation, and wind farms. SCE also purchases from independent power producers and utilities, including out-of-state suppliers (12).

California's electricity industry is an organization of traditional utilities, private generating companies, and state agencies, each with a variety of roles and responsibilities to ensure that electrical power is provided to consumers. The California Independent Service Operator (ISO) is a nonprofit public benefit corporation and is the impartial operator of the State's wholesale power grid and is charged with maintaining grid reliability, and to direct uninterrupted electrical energy supplies to California's homes and communities. While utilities [such as SCE] still own transmission assets, the ISO routes electrical power along these assets, maximizing the use of the transmission system and its power generation resources. The ISO matches buyers and sellers of electricity to ensure that enough power is available to meet demand. To these ends, every five minutes the ISO forecasts electrical demands, accounts for operating reserves, and assigns the lowest cost power plant unit to meet demands while ensuring adequate system transmission capacities and capabilities (13).

Part of the ISO's charge is to plan and coordinate grid enhancements to ensure that electrical power is provided to California consumers. To this end, transmission owners (investor-owned utilities such as SCE) file annual transmission expansion/modification plans to accommodate the State's growing electrical needs. The ISO reviews and either approves or denies the proposed additions. In addition, and perhaps most importantly, the ISO works with other areas in the western United States electrical grid to ensure that adequate power supplies are available to the State. In this manner, continuing reliable and affordable electrical power is assured to existing and new consumers throughout the State.

Table 2-2 identifies SCE’s specific proportional shares of electricity sources in 2019. As indicated in Table 2-2, the 2019 SCE Power Mix has renewable energy at 35.1% of the overall energy resources. Geothermal resources are at 5.9%, wind power is at 11.5%, large hydroelectric sources are at 7.9%, solar energy is at 16%, and coal is at 0%. (14).

TABLE 2-2: SCE 2019 POWER CONTENT MIX



Energy Resources	2019 SCE Power Mix
Eligible Renewable	**35.1%**
Biomass & waste	0.6%
Geothermal	5.9%
Small Hydroelectric	1.0%
Solar	16.0%
Wind	11.5%
Coal	**0%**
Large Hydroelectric	**7.9%**
Natural Gas	**16.1%**
Nuclear	**8.2%**
Other	**0.1%**
Unspecified Sources of power*	32.6%
Total	**100%**

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

2.3 NATURAL GAS

The usage associated with natural gas use were calculated using the CalEEMod Version 2016.3.2. The following summary of natural gas customers & volumes, supplies, delivery of supplies, storage, service options, and operations is excerpted from information provided by the California Public Utilities Commission (CPUC).

> *“The CPUC regulates natural gas utility service for approximately 10.8 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller natural gas utilities. The CPUC also regulates independent storage operators: Lodi Gas Storage, Wild Goose Storage, Central Valley Storage and Gill Ranch Storage.*
>
> *California's natural gas utilities provide service to over 11 million gas meters. SoCalGas and PG&E provide service to about 5.9 million and 4.3 million customers, respectively,*

while SDG&E provides service to over 800, 000 customers. In 2018, California gas utilities forecasted that they would deliver about 4740 million cubic feet per day (MMcfd) of gas to their customers, on average, under normal weather conditions.

The overwhelming majority of natural gas utility customers in California are residential and small commercials customers, referred to as "core" customers. Larger volume gas customers, like electric generators and industrial customers, are called "noncore" customers. Although very small in number relative to core customers, noncore customers consume about 65% of the natural gas delivered by the state's natural gas utilities, while core customers consume about 35%.

A significant amount of gas (about 19%, or 1131 MMcfd, of the total forecasted California consumption in 2018) is also directly delivered to some California large volume consumers, without being transported over the regulated utility pipeline system. Those customers, referred to as "bypass" customers, take service directly from interstate pipelines or directly from California producers.

SDG&E and Southwest Gas' southern division are wholesale customers of SoCalGas, i.e., they receive deliveries of gas from SoCalGas and in turn deliver that gas to their own customers. (Southwest Gas also provides natural gas distribution service in the Lake Tahoe area.) Similarly, West Coast Gas, a small gas utility, is a wholesale customer of PG&E. Some other wholesale customers are municipalities like the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC.

Natural gas from out-of-state production basins is delivered into California via the interstate natural gas pipeline system. The major interstate pipelines that deliver out-of-state natural gas to California gas utilities are Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Mojave Pipeline, and Tuscarora. Another pipeline, the North Baja - Baja Norte Pipeline takes gas off the El Paso Pipeline at the California/Arizona border, and delivers that gas through California into Mexico. While the Federal Energy Regulatory Commission (FERC) regulates the transportation of natural gas on the interstate pipelines, and authorizes rates for that service, the California Public Utilities Commission may participate in FERC regulatory proceedings to represent the interests of California natural gas consumers.

The gas transported to California gas utilities via the interstate pipelines, as well as some of the California-produced gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipelines systems (commonly referred to as California's "backbone" pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered to the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large volume noncore customers take natural gas delivery directly off the high-pressure backbone and local transmission pipeline systems, while core customers and other noncore customers take delivery off the utilities' distribution pipeline systems. The state's natural gas utilities operate over 100,000 miles of transmission and distribution pipelines, and thousands more miles of service lines.

Bypass customers take most of their deliveries directly off the Kern/Mojave pipeline system, but they also take a significant amount of gas from California production.

PG&E and SoCalGas own and operate several natural gas storage fields that are located within their service territories in northern and southern California, respectively. These storage fields, and four independently owned storage utilities - Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage - help meet peak seasonal and daily natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently. PG&E is a 25% owner of the Gill Ranch Storage field. These storage fields provide a significant amount of infrastructure capacity to help meet California's natural gas requirements, and without these storage fields, California would need much more pipeline capacity in order to meet peak gas requirements.

Prior to the late 1980s, California regulated utilities provided virtually all natural gas services to all their customers. Since then, the Commission has gradually restructured the California gas industry in order to give customers more options while assuring regulatory protections for those customers that wish to, or are required to, continue receiving utility-provided services.

The option to purchase natural gas from independent suppliers is one of the results of this restructuring process. Although the regulated utilities procure natural gas supplies for most core customers, core customers have the option to purchase natural gas from independent natural gas marketers, called "core transport agents" (CTA). Contact information for core transport agents can be found on the utilities' web sites. Noncore customers, on the other hand, make natural gas supply arrangements directly with producers or with marketers.

Another option resulting from the restructuring process occurred in 1993, when the Commission removed the utilities' storage service responsibility for noncore customers, along with the cost of this service from noncore customers' transportation rates. The Commission also encouraged the development of independent storage fields, and in subsequent years, all the independent storage fields in California were established. Noncore customers and marketers may now take storage service from the utility or from an independent storage provider (if available), and pay for that service, or may opt to take no storage service at all. For core customers, the Commission assures that the utility has adequate storage capacity set aside to meet core requirements, and core customers pay for that service.

In a 1997 decision, the Commission adopted PG&E's "Gas Accord", which unbundled PG&E's backbone transmission costs from noncore transportation rates. This decision gave customers and marketers the opportunity to obtain pipeline capacity rights on PG&E's backbone transmission pipeline system, if desired, and pay for that service at rates authorized by the Commission. The Gas Accord also required PG&E to set aside a certain amount of backbone transmission capacity in order to deliver gas to its core customers. Subsequent Commission decisions modified and extended the initial terms of the Gas Accord. The "Gas Accord" framework is still in place today for PG&E's backbone

> *and storage rates and services and is now simply referred to as PG&E Gas Transmission and Storage (GT&S).*
>
> *In a 2006 decision, the Commission adopted a similar gas transmission framework for Southern California, called the "firm access rights" system. SoCalGas and SDG&E implemented the firm access rights system in 2008, and it is now referred to as the backbone transmission system framework. As under the PG&E backbone transmission system, SoCalGas backbone transmission costs are unbundled from noncore transportation rates. Noncore customers and marketers may obtain, and pay for, firm backbone transmission capacity at various receipt points on the SoCalGas system. A certain amount of backbone transmission capacity is obtained for core customers to assure meeting their requirements.*
>
> *Many if not most noncore customers now use a marketer to provide for several of the services formerly provided by the utility. That is, a noncore customer may simply arrange for a marketer to procure its supplies, and obtain any needed storage and backbone transmission capacity, in order to assure that it will receive its needed deliveries of natural gas supplies. Core customers still mainly rely on the utilities for procurement service, but they have the option to take procurement service from a CTA. Backbone transmission and storage capacity is either set aside or obtained for core customers in amounts to assure very high levels of service.*
>
> *In order properly operate their natural gas transmission pipeline and storage systems, PG&E and SoCalGas must balance the amount of gas received into the pipeline system and delivered to customers or to storage fields. Some of these utilities' storage capacity is dedicated to this service, and under most circumstances, customers do not need to precisely match their deliveries with their consumption. However, when too much or too little gas is expected to be delivered into the utilities' systems, relative to the amount being consumed, the utilities require customers to more precisely match up their deliveries with their consumption. And, if customers do not meet certain delivery requirements, they could face financial penalties. The utilities do not profit from these financial penalties - the amounts are then returned to customers as a whole. If the utilities find that they are unable to deliver all the gas that is expected to be consumed, they may even call for a curtailment of some gas deliveries. These curtailments are typically required for just the largest, noncore customers. It has been many years since there has been a significant curtailment of core customers in California."* (15)

As indicated in the preceding discussions, natural gas is available from a variety of in-state and out-of-state sources and is provided throughout the state in response to market supply and demand. Complementing available natural gas resources, biogas may soon be available via existing delivery systems, thereby increasing the availability and reliability of resources in total. The CPUC oversees utility purchases and transmission of natural gas to ensure reliable and affordable natural gas deliveries to existing and new consumers throughout the State.

2.4 TRANSPORTATION ENERGY RESOURCES

The Project would generate additional vehicle trips with resulting consumption of energy resources, predominantly gasoline and diesel fuel. In March 2019, the Department of Motor Vehicles (DMV) identified 36.4 million registered vehicles in California (16), and those vehicles consume an estimated 17.8 billion gallons of fuel each year[1]. Gasoline (and other vehicle fuels) are commercially provided commodities and would be available to the Project patrons and employees via commercial outlets.

California's on-road transportation system includes 394,383 land miles, more than 27.5 million passenger vehicles and light trucks, and almost 8.1 million medium- and heavy-duty vehicles (16). While gasoline consumption has been declining since 2008 it is still by far the dominant fuel. Petroleum comprises about 91% of all transportation energy use, excluding fuel consumed for aviation and most marine vessels (17). Nearly 17.8 billion gallons of on-highway fuel are burned each year, including 14.6 billion gallons of gasoline (including ethanol) and 3.2 billion gallons of diesel fuel (including biodiesel and renewable diesel). In 2019, Californians also used 194 million cubic feet of natural gas as a transportation fuel (18), or the equivalent of 183 billion gallons of gasoline.

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[1] Fuel consumptions estimated utilizing information from EMFAC2017.

3 REGULATORY BACKGROUND

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation, the United States Department of Energy, and the United States (U.S.) Environmental Protection Agency (EPA) are three federal agencies with substantial influence over energy policies and programs. On the state level, the CPUC and the CEC are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below.

3.1 FEDERAL REGULATIONS

3.1.1 INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991 (ISTEA)

The ISTEA promoted the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs) were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions.

3.1.2 THE TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY (TEA-21)

The TEA-21 was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety.

3.2 CALIFORNIA REGULATIONS

3.2.1 INTEGRATED ENERGY POLICY REPORT (IEPR)

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code § 25301a]). The Energy Commission prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The 2019 IEPR was adopted January 31, 2020, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2019 IEPR focuses on a variety of topics such as including the environmental performance of the electricity generation system, landscape-scale planning, the response to the gas leak at the Aliso Canyon natural gas storage facility, transportation fuel supply reliability issues, updates on Southern California electricity reliability, methane leakage, climate adaptation activities for the energy sector, climate and sea level rise scenarios, and the California Energy Demand Forecast (19). The 2020 IEPR Update is currently in progress but is not anticipated to be adopted until February 2021.

3.2.2 STATE OF CALIFORNIA ENERGY PLAN

The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies several strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled (VMT) and accommodate pedestrian and bicycle access.

3.2.3 CALIFORNIA CODE TITLE 24, PART 6, ENERGY EFFICIENCY STANDARDS

California Code of Regulations (CCR) Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas (GHG) emissions. The 2019 version of Title 24 was adopted by the CEC and became effective on January 1, 2020. The 2019 Title 24 Standards are applicable to building permit applications submitted on or after January 1, 2020. The 2019 Title 24 standards require solar PV systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, and update indoor and outdoor lighting standards for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7% less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar PV systems, homes built under the 2019 standards will about 53% less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30% less energy due to lighting upgrades compared to the prior code (20).

3.2.4 AB 1493 PAVLEY REGULATIONS AND FUEL EFFICIENCY STANDARDS

California AB 1493, enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Under this legislation, CARB adopted regulations to reduce GHG emissions from non-commercial passenger vehicles (cars and light-duty trucks). Although aimed at reducing GHG emissions, specifically, a co-benefit of the Pavley standards is an improvement in fuel efficiency and consequently a reduction in fuel consumption.

3.2.5 CALIFORNIA'S RENEWABLE PORTFOLIO STANDARD (RPS)

First established in 2002 under Senate Bill (SB) 1078, California's Renewable Portfolio Standards (RPS) requires retail sellers of electric services to increase procurement from eligible renewable resources to 33 percent (%) of total retail sales by 2020 (21).

3.2.6 CLEAN ENERGY AND POLLUTION REDUCTION ACT OF 2015 (SB 350)

In October 2015, the legislature approved, and the Governor signed SB 350, which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the RPS, higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33% to 50% by 2030, with interim targets of 40% by 2024, and 25% by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the CPUC, the CEC, and local publicly owned utilities.
- Reorganize the ISO to develop more regional electrify transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States (California Leginfo 2015).

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4 PROJECT ENERGY DEMANDS AND ENERGY EFFICIENCY MEASURES

4.1 EVALUATION CRITERIA

In compliance with Appendix G of the *State CEQA Guidelines* (1)*,* this report analyzes the project's anticipated energy use during construction and operations to determine if the Project would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.2 METHODOLOGY

Appendix F of the *State CEQA Guidelines* (22)*,* provides some guidance for assessing these criteria, which implies that the means of achieving the goal of energy conservation includes decreasing overall per capita energy consumption; decreasing reliance on fossil fuels such as coal, natural gas, and oil; and increasing reliance on renewable energy sources. Additionally, the CEQA Guidelines state "[a] lead agency may consider the extent to which an energy source serving the project has already undergone environmental review that adequately analyzed and mitigated the effects of energy production." Therefore, this evaluation considers the effects of statewide plans such as the State's renewable portfolio standards, building code energy efficiency standards, and fuel efficiency standards.

Information from the CalEEMod Version 2016.3.2 outputs for AQIA (23) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands.

4.2.1 CALEEMOD

On October 17, 2017, the SCAQMD, in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the CalEEMod Version 2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutants and GHG emissions from direct and indirect sources as well as energy usage. (24). Accordingly, the latest version of CalEEMod has been used to determine the proposed Project's anticipated transportation and facility energy demands. Output from the annual construction model runs are provided in Appendix 4.1 and Appendices 4.2 through 4.3 for annual operational emissions.

4.2.2 LAND USES MODELED IN CALEEMOD

For purposes of analysis, the following land uses were modeled based on consultation with the Project Applicant and information provided in the site plan. The following land uses represents a conservative estimate of emissions that would occur from potential future SBMWD staff and visitors:

- 27,810 square feet of General Office land use
- 13,500 square feet of Non-Refrigerated Warehouse land use

- 194 space parking space (77,6000 square feet)

4.2.3 EMISSION FACTORS MODEL

On August 19, 2019, the EPA approved the 2017 version of the EMissions FACtor model (EMFAC) web database for use in State Implementation Plan and transportation conformity analyses. EMFAC2017 is a mathematical model that was developed to calculate emission rates, fuel consumption, VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the CARB to project changes in future emissions from on-road mobile sources (25). This energy study utilizes the different fuel types for each vehicle class from the annual EMFAC2017 emission inventory in order to derive the average vehicle fuel economy which is then used to determine the estimated annual fuel consumption associated with vehicle usage during Project construction and operational activities. For purposes of analysis, the 2021 through 2022 analysis years were utilized to determine the average vehicle fuel economy used throughout the duration of the Project.

4.2.4 CONSTRUCTION DURATION

The construction schedule utilized in the analysis, shown in Table 4-1, represents a "worst-case" analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as time passes and the analysis year increases due to emission regulations becoming more stringent[2]. Thse duration of construction activity and associated equipment represents a reasonable approximation of the expected construction fleet as required per *CEQA Guidelines*.

TABLE 4-1: CONSTRUCTION DURATION

Phase Name	Start Date	End Date	Days
Demolition	4/1/2021	4/28/2021	20
Grading	5/4/2021	5/11/2021	6
Building Construction	5/12/2021	3/15/2021	220
Paving	3/16/2022	3/29/2021	10
Architectural Coating	3/30/2022	4/12/2022	10

4.2.5 CONSTRUCTION EQUIPMENT

A detailed summary of construction equipment assumptions by phase is provided at Table 4-2. Please refer to specific detailed modeling inputs/outputs contained in Appendix 4.1 of this energy study.

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[2] As shown in the CalEEMod User's Guide Version 2016.3.2, Section 4.3 "OFFROAD Equipment" as the analysis year increases, emission factors for the same equipment pieces decrease due to the natural turnover of older equipment being replaced by newer less polluting equipment and new regulatory requirements.

TABLE 4-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS

Activity/Duration	Equipment	Quantity	Usage Hours
Demolition	Concrete Industrial Saws	1	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	3	8
Grading	Graders	1	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	2	7
Building Construction	Cranes	1	8
	Forklifts	2	7
	Generator Sets	1	8
	Tractors/Loaders/Backhoes	1	6
	Welders	3	8
Paving	Cement and Mortar Mixers	1	8
	Pavers	1	8
	Paving Equipment	1	8
	Rollers	2	8
	Tractors/Loaders/Backhoes	1	8
Architectural Coating	Air Compressors	1	6

Source: CalEEMod 2016.3.2 Appendix 4.1.

4.3 CONSTRUCTION ENERGY DEMANDS

4.3.1 CONSTRUCTION EQUIPMENT ELECTRICITY USAGE ESTIMATES

The focus within this section is the energy implications of the construction process, specifically the power cost from on-site electricity consumption during construction of the proposed Project. Based on the *2020 National Construction Estimator*, Richard Pray (2020) (26), the typical power cost per 1,000 square feet of construction per month is estimated to be $2.38. The proposed Project includes the development of 27,180 sf of General Office use and 13,500 sf of non-refrigerated warehouse use as well as a 194- space parking lot (approximately 77,600 sf). Based on information provided in the AQIA, facility construction activities would occur over a 12-month period (23). Based on Table 4-3, the total power cost of the on-site electricity usage during the construction of the Project is estimated to be approximately $$3,396.07.

TABLE 4-3: CONSTRUCTION POWER COST

Land Use	Power Cost (per 1,000 SF of building per month of construction)	Total Building Size (1,000 SF)	Construction Duration (months)	Total Project Construction Power Cost
General Office	$2.38	27.810	12	$794.25
Parking Lot	$2.38	77.600	12	$2,216.26
Unrefrigerated Warehouse No Rail	$2.38	13.500	12	$385.56
			TOTAL PROJECT CONSTRUCTION COST	***$3,396.07***

The SCE's general service rate schedule were used to determine the Project's electrical usage. As of January 1, 2021, SCE's general service rate is $0.11 per kilowatt hours (kWh) of electricity for industrial services (27). As shown on Table 4-4, the total electricity usage from on-site Project construction related activities is estimated to be approximately 61,095kWh.

TABLE 4-4: CONSTRUCTION ELECTRICITY USAGE

Land Use	Cost per kWh	Total Project Construction Electricity Usage (kWh)
General Office	$0.11	7,220
Parking Lot	$0.11	20,148
Unrefrigerated Warehouse No Rail	$0.11	3,505
TOTAL PROJECT CONSTRUCTION ELECTRICTY USAGE (kWh)		***30,873***

4.3.2 CONSTRUCTION EQUIPMENT FUEL ESTIMATES

Fuel consumed by construction equipment would be the primary energy resource expended over the course of Project construction. Project construction activity timeline estimates, construction equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates are presented in Table 4-5. Eight-hour daily use of all equipment is assumed. The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower hour per gallon (hp-hr-gal.), obtained from CARB 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (28).

For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the City and region[3]. As presented in Table 4-5, Project construction activities would consume an estimated 27,637 gallons of diesel fuel. Project construction would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

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[3] Based on Appendix A of the CalEEMod User's Guide, Construction consists of several types of off-road equipment. Since the majority of the off-road construction equipment used for construction projects are diesel fueled, CalEEMod assumes all of the equipment operates on diesel fuel.

TABLE 4-5: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Activity/Duration	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Demolition	20	Concrete Industrial Saws	81	1	8	0.73	473	511
		Rubber Tired Dozers	247	1	8	0.40	790	854
		Tractors/Loaders/Backhoes	97	3	8	0.37	861	931
Grading	6	Graders	187	1	8	0.41	613	199
		Rubber Tired Dozers	247	1	8	0.40	790	256
		Tractors/Loaders/Backhoes	97	2	7	0.37	502	163
Building Construction	220	Cranes	231	1	8	0.29	536	6,373
		Forklifts	89	2	7	0.20	249	2,963
		Generator Sets	84	1	8	0.74	497	5,914
		Tractors/Loaders/Backhoes	97	1	6	0.37	215	2,561
		Welders	46	3	8	0.45	497	5,908
Paving	10	Cement and Mortar Mixers	9	1	8	0.56	40	22
		Pavers	130	1	8	0.42	437	236
		Paving Equipment	132	1	8	0.36	380	205
		Rollers	80	2	8	0.38	486	263
		Tractors/Loaders/Backhoes	97	1	8	0.37	287	155
Architectural Coatings	10	Air Compressors	78	1	6	0.48	225	121
CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***27,637***

4.3.3 CONSTRUCTION TRIPS AND VMT

Based on the CalEEMod, the Trip and VMT are the number and length (in terms VMT[4]) of on-road vehicle trips for workers, vendors, and hauling for each construction phase. The trips identified in Table 4-6 are based on the CalEEMod default parameters, with the exception of trips during demolition which have been adjusted based on information provided by the Project Applicant.

TABLE 4-6: CONSTRUCTION TRIPS AND VMT

Phase Name	Worker Trips / Day	Vendor Trips / Day	Hauling Trips / Day	Worker Trip Length	Vendor Trip Length	Hauling Trip Length
Demolition	5	0	0	14.7	6.9	20
Grading	4	0	0	14.7	6.9	20
Building Construction	8	50	0	14.7	6.9	20
Paving	6	0	0	14.7	6.9	20
Architectural Coatings	1	0	0	14.7	6.9	20

Source: CalEEMod 2016.3.2

4.3.4 CONSTRUCTION WORKER FUEL ESTIMATES

With respect to estimated VMT for the Project, the construction worker trips would generate an estimated 24,624 VMT during the 12 months days of construction (2). Based on the data for San Bernardino County and included in the 2017 version of the Emission Factor (EMFAC2017) model developed by CARB, it is estimated that 71% of all vendor trips are from light-duty-auto vehicles (LDA), 7% are from light-duty-trucks (LDT1[5]), and 22% are from light-duty-trucks (LDT2[6]). Data regarding Project related construction worker trips were based on EMFAC2017 defaults for the San Bernardino annual emission inventory.

Vehicle fuel efficiencies for LDA, LDT1, and LDT2 were estimated using information generated within EMFAC2017. EMFAC2017 is a mathematical model that was developed to calculate emission rates, fuel consumption, and VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the CARB to project changes in future emissions from on-road mobile sources (25). EMFAC2017 was run for the LDA, LDT1, and LDT2 vehicle class within the California sub-area for the 2021 and 2022 calendar years. The year 2021 data was used for construction estimates and the year 2022 data was used for operational fuel consumption estimates. Data from EMFAC2017 is shown in Appendix 4.2.

As generated by EMFAC2017, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 31.01 miles per gallon (mpg). Table 4-7 provides an estimated annual fuel consumption resulting from LDAs related to the Project

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[4] For purposes of analysis, VMT is calculated by multiplying to number of trips by the trip length.

[5] Vehicles under the LDT1 category have a gross vehicle weight rating (GVWR) of less than 6,000 lbs. and equivalent test weight (ETW) of less than or equal to 3,750 lbs.

[6] Vehicles under the LDT2 category have a GVWR of less than 6,000 lbs. and ETW between 3,751 lbs. and 5,750 lbs.

construction worker trips. Based on Table 4-7, it is estimated that 515 gallons of fuel will be consumed related to construction worker trips during full construction of the Project.

TABLE 4-7: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDA

Construction Activity	Duration (Days)	Worker LDA Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Demolition	20	4	10.8	864	31.01	28
Grading	6	3	10.8	194	31.01	6
Building Construction	220	6	10.8	14,256	31.01	460
Paving	10	5	10.8	540	31.01	17
Architectural Coating	10	1	10.8	108	31.01	3
TOTAL CONSTRUCTION WORKER (LDA) FUEL CONSUMPTION						***515***

The EMFAC2017 aggregated fuel economy of LDT1s ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 26.03. Table 4-8 provides an estimated annual fuel consumption resulting from LDT1s related to the Project construction worker trips. Based on Table 4-8, it is estimated that 119 gallons of fuel will be consumed related to construction worker trips during full construction of the Project.

TABLE 4-8: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDT1

Construction Activity	Duration (Days)	Worker LDT1 Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Demolition	20	1	10.8	432	26.03	17
Grading	6	1	10.8	65	26.03	2
Building Construction	220	1	10.8	2,376	26.03	91
Paving	10	1	10.8	108	26.03	4
Architectural Coating	10	1	10.8	108	26.03	4
TOTAL CONSTRUCTION WORKER (LDT2) FUEL CONSUMPTION						***119***

The EMFAC2017 aggregated fuel economy of LDT2s ranging from model year 1974 to model year 2021 is estimated to have a fuel efficiency of 25.15 mpg. Table 4-9 provides an estimated annual fuel consumption resulting from LDT2s related to the Project construction worker trips. Based on Table 4-9, it is estimated that 222 gallons of fuel will be consumed related to construction worker trips during full construction of the Project.

TABLE 4-9: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDT2

Construction Activity	Duration (Days)	Worker LDT2 Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Demolition	20	2	10.8	432	25.15	17
Grading	6	1	10.8	65	25.15	3
Building Construction	220	2	10.8	4,752	25.15	189
Paving	10	2	10.8	216	25.15	9
Architectural Coating	10	1	10.8	108	25.15	4
TOTAL CONSTRUCTION WORKER (LDT1) FUEL CONSUMPTION						***222***

It should be noted that construction worker trips would represent a "single-event" gasoline fuel demand and would not require on-going or permanent commitment of fuel resources for this purpose.

4.3.5 CONSTRUCTION VENDOR FUEL ESTIMATES

With respect to estimated VMT, the construction vendor trips (vehicles that deliver materials to the site during construction) would generate an estimated 81,906 VMT along area roadways for the Project over the duration of construction activity (23). It is assumed that 49.9% of all vendor trips are from medium-heavy duty trucks (MHDT) and 50.1% are from heavy-heavy duty trucks (HHDT). These assumptions are consistent with the CalEEMod defaults utilized within the within the AQIA (23). Vehicle fuel efficiencies for MHDTs and HHDTs were estimated using information generated within EMFAC2017. EMFAC2017 was run for the MHDT and HHDT vehicle classes within the California sub-area for the 2021 calendar year. Data from EMFAC2017 is shown in Appendix 4.2.

As generated by EMFAC2017, an aggregated fuel economy of MHDTs ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 9.76 mpg. Based on Table 4-10, it is estimated that 4,113 gallons of fuel will be consumed related to construction vendor trips (MHDTs) during full construction of the Project.

TABLE 4-10: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES – MHDT

Construction Activity	Duration (Days)	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction	220	25	7.3	40,150	9.76	4,113
TOTAL CONSTRUCTION VENDOR (MHDT) FUEL CONSUMPTION						***4,113***

Tables 4-11 shows the estimated fuel economy of HHDTs accessing the Project site. As generated by EMFAC2017, an aggregated fuel economy of HHDTs ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 6.16 mpg, respectively Based on Tables 4-11 and 4-12, fuel consumption from construction vendor trips (HHDTs) will total approximately 6,782 gallons.

TABLE 4-11: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES – HHDT

Construction Activity	Duration (Days)	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction	220	26	7.3	41,756	6.16	6,782
TOTAL CONSTRUCTION VENDOR (HHDT) FUEL CONSUMPTION						***6,782***

It should be noted that Project construction vendor trips would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

4.3.6 CONSTRUCTION ENERGY EFFICIENCY/CONSERVATION MEASURES

Starting in 2014, CARB adopted the nation's first regulation aimed at cleaning up off-road construction equipment such as bulldozers, graders, and backhoes. These requirements ensure fleets gradually turnover the oldest and dirtiest equipment to newer, cleaner models and prevent fleets from adding older, dirtier equipment. As such, the equipment used for Project construction would conform to CARB regulations and California emissions standards. It should also be noted that there are no unusual Project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities; or equipment that would not conform to current emissions standards (and related fuel efficiencies). Equipment employed in construction of the Project would therefore not result in inefficient wasteful, or unnecessary consumption of fuel.

Construction contractors would be required to comply with applicable CARB regulations regarding retrofitting, repowering, or replacement of diesel off-road construction equipment. Additionally, CARB has adopted the Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other Toxic Air Contaminants. Compliance with anti-idling and emissions regulations would result in a more efficient use of construction-related energy and the minimization or elimination of wasteful or unnecessary consumption of energy. Idling restrictions and the use of newer engines and equipment would result in less fuel combustion and energy consumption.

Additional construction-source energy efficiencies would occur due to required California regulations and best available control measures (BACM). For example, CCR Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than five minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. Section 2449(d)(3) requires that "grading plans shall reference the requirement that a sign shall be posted on-site stating that construction workers need to shut off engines at or before five minutes of idling." In this manner, construction equipment operators are required to be informed that engines are to be turned off at or prior to five minutes of idling. Enforcement of idling limitations is realized through periodic site inspections conducted by City building officials, and/or in response to citizen complaints.

In general, the construction processes promote conservation and efficient use of energy by reducing raw materials demands, with related reduction in energy demands associated with raw materials extraction, transportation, processing and refinement. Use of materials in bulk reduces energy demands associated with preparation and transport of construction materials as well as the transport and disposal of construction waste and solid waste in general, with corollary reduced demands on area landfill capacities and energy consumed by waste transport and landfill operations.

4.4 OPERATIONAL ENERGY DEMANDS

Energy consumption in support of or related to Project operations would include transportation energy demands (energy consumed by passenger car and truck vehicles accessing the Project site) and facilities energy demands (energy consumed by building operations and site maintenance activities).

4.4.1 TRANSPORTATION ENERGY DEMANDS

Energy that would be consumed by Project-generated traffic is a function of total VMT and estimated vehicle fuel economies of vehicles accessing the Project site. As shown in Table 4-13, the Project will result in 1,265,716 annual VMT and an estimated annual fuel consumption of 57,968 gallons of fuel. These calculations are conservative and do not include any measures to reduce VMT from vehicles.

TABLE 4-12: TOTAL PROJECT-GENERATED TRAFFIC ANNUAL FUEL CONSUMPTION (ALL VEHICLES)

Vehicle Type	Annual Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
LDA	700,084	31.9	21,925
LDT1	46,082	26.8	1,720
LDT2	228,191	25.1	9,075
MDV	147,247	20.4	7,232
LHD1	20,460	13.7	1,488
LHD2	6,456	13.9	465
MHD	23,059	10.1	2,288
HHD	80,749	6.3	12,757
OBUS	1,718	6.4	269
UBUS	1,981	9.1	218
MCY	7,472	37.2	201
SBUS	1,023	8.1	127
MH	1,195	5.9	201
Total (All Vehicles)	1,265,716	NA	**57,968**

4.4.2 FACILITY ENERGY DEMANDS

Project building operations and Project site maintenance activities would result in the consumption of natural gas and electricity. Natural gas would be supplied to the Project by SoCalGas; electricity would be supplied to the Project by SCE. As previously stated, the analysis herein assumes compliance with the 2019 Title 24 Standards. As such, the CalEEMod defaults for Title 24 – Electricity and Lighting Energy were reduced by 30% in order to reflect consistency with the 2019 Title 24 standard. While the Project includes a solar PV system, the system has not been designed and thus is not accounted for in the energy estimates. Annual natural gas and electricity demands of the Project are summarized in Table 4-13 and provided in Appendices 4.1.

TABLE 4-13: PROJECT ANNUAL OPERATIONAL ENERGY DEMAND SUMMARY

Natural Gas Demand	kBTU/year
General Office	96,508
Parking Lot	0
Unrefrigerated Warehouse No Rail	27,405
TOTAL PROJECT NATURAL GAS DEMAND	***123,913***

Electricity Demand	kWh/year
General Office	264,771
Parking Lot	27,160
Unrefrigerated Warehouse No Rail	31,860
TOTAL PROJECT ELECTRICITY DEMAND	***323,791***

kBTU – kilo-British Thermal Units

4.4.3 OPERATIONAL ENERGY EFFICIENCY/CONSERVATION MEASURES

Energy efficiency/energy conservation attributes of the Project would be complemented by increasingly stringent state and federal regulatory actions addressing vehicle fuel economies and vehicle emissions standards; and enhanced building/utilities energy efficiencies mandated under California building codes (e.g., Title24, California Green Building Standards Code).

ENHANCED VEHICLE FUEL EFFICIENCIES

Project annual fuel consumption estimates presented previously in Table 4-16 represent likely potential maximums that would occur for the Project. Under subsequent future conditions, average fuel economies of vehicles accessing the Project site can be expected to improve as older, less fuel-efficient vehicles are removed from circulation, and in response to fuel economy and emissions standards imposed on newer vehicles entering the circulation system.

Enhanced fuel economies realized pursuant to federal and state regulatory actions, and related transition of vehicles to alternative energy sources (e.g., electricity, natural gas, biofuels, hydrogen cells) would likely decrease future gasoline fuel demands per VMT. Location of the Project proximate to regional and local roadway systems tends to reduce VMT within the region, acting to reduce regional vehicle energy demands.

The SBMWD would comply with the City's Transportation Demand Management Ordinance, which includes the provision of on-site bicycle storage facilities and sidewalks and paved pathways from the external pedestrian circulation system to each building.

4.5 SUMMARY

4.5.1 CONSTRUCTION ENERGY DEMANDS

The estimated power cost of on-site electricity usage during the construction of the Project is assumed to be approximately $3,396.07. Additionally, based on the assumed power cost, it is estimated that the total electricity usage during construction, after full Project build-out, is calculated to be approximately 30,873 kWh.

Construction equipment used by the Project would result in single event consumption of approximately 27,637 gallons of diesel fuel. Construction equipment use of fuel would not be atypical for the type of construction proposed because there are no aspects of the Project's proposed construction process that are unusual or energy-intensive, and Project construction equipment would conform to the applicable CARB emissions standards, acting to promote equipment fuel efficiencies.

CCR Title 13, Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than 5 minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. BACMs inform construction equipment operators of this requirement. Enforcement of idling limitations is realized through periodic site inspections conducted by City building officials, and/or in response to citizen complaints.

Construction worker trips for full construction of the Project would result in the estimated fuel consumption of 863 gallons of fuel. Additionally, fuel consumption from construction vendor trips (MHDTs and HHDTs) will total approximately 10,895 gallons. Diesel fuel would be supplied by City and regional commercial vendors. Indirectly, construction energy efficiencies and energy conservation would be achieved using bulk purchases, transport and use of construction materials. The 2019 IEPR released by the CEC has shown that fuel efficiencies are getting better within on and off-road vehicle engines due to more stringent government requirements (19). As supported by the preceding discussions, Project construction energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

4.5.2 OPERATIONAL ENERGY DEMANDS

TRANSPORTATION ENERGY DEMANDS

As shown in Table 4-12 annual vehicular trips and related VMT generated by the operation of the Project would result in an estimated 21,925 gallons of fuel consumption per year for LDAs, 1,720 gallons of fuel of LDT1s, 9,075 gallons of fuel for LDT2s, 7,232 gallons for fuel for MDVs, 1,488 gallons of fuel for LHDT1s, 2,288 gallons of fuel for MHDTs, and 12,757 gallons for fuel for HHDTs. The total estimated annual fuel consumption from Project generated VMT would result in a fuel demand 57,968 gallons of fuel.

Fuel would be provided by current and future commercial vendors. Trip generation and VMT generated by the Project are consistent with other industrial uses of similar scale and configuration, as reflected respectively in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Ed., 2017); and CalEEMod. As such, Project operations would not inherently result in excessive and wasteful vehicle trips and VMT, nor excess and wasteful vehicle energy consumption compared to other industrial land uses.

Enhanced fuel economies realized pursuant to federal and state regulatory actions, and related transition of vehicles to alternative energy sources (e.g., electricity, natural gas, biofuels, hydrogen cells) would likely decrease future gasoline fuel demands per VMT. Location of the Project proximate to regional and local roadway systems tends to reduce VMT within the region, acting to reduce regional vehicle energy demands. The Project would implement sidewalks, facilitating and encouraging pedestrian access. Facilitating pedestrian and bicycle access would reduce VMT and associated energy consumption. In compliance with the California Green Building Standards Code and City requirements, the Project would promote the use of bicycles as an alternative mean of transportation by providing short-term and/or long-term bicycle parking accommodations. As supported by the preceding discussions, Project transportation energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

FACILITY ENERGY DEMANDS

Project facility operational energy demands are estimated at: 123,913 kBTU/year of natural gas; and 323,791 kWh/year of electricity. Natural gas would be supplied to the Project by SoCalGas; electricity would be supplied by SCE. The Project proposes conventional industrial uses reflecting contemporary energy efficient/energy conserving designs and operational programs including a solar PV system. The Project does not propose uses that are inherently energy intensive and the energy demands in total would be comparable to other industrial land use projects of similar scale and configuration.

Lastly, the Project will comply with the applicable Title 24 standards. Compliance itself with applicable Title 24 standards will ensure that the Project energy demands would not be inefficient, wasteful, or otherwise unnecessary.

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5 CONCLUSIONS

5.1 ENERGY IMPACT 1

Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

As supported by the preceding analyses, Project construction and operations would not result in the inefficient, wasteful or unnecessary consumption of energy. The Project would therefore not cause or result in the need for additional energy producing or transmission facilities. The Project would not engage in wasteful or inefficient uses of energy and aims to achieve energy conservations goals within the State.

5.2 ENERGY IMPACT 2

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

The Project's consistency with the applicable state and local plans is discussed below.

CONSISTENCY WITH ISTEA

Transportation and access to the Project site is provided by the local and regional roadway systems. The Project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be realized pursuant to the ISTEA because SCAG is not planning for intermodal facilities on or through the Project site.

CONSISTENCY WITH TEA-21

The Project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the Project facilitates access, acts to reduce vehicle miles traveled, takes advantage of existing infrastructure systems, and promotes land use compatibilities through collocation of similar uses. The Project supports the strong planning processes emphasized under TEA-21. The Project is therefore consistent with, and would not otherwise interfere with, nor obstruct implementation of TEA-21.

CONSISTENCY WITH IEPR

Electricity would be provided to the Project by SCE and natural gas is provided by SoCalGas. SCE's Clean Power and Electrification Pathway (CPEP) white paper and SoCalGas 2018 Corporate Sustainability Report builds on existing state programs and policies. As such, the Project is consistent with, and would not otherwise interfere with, nor obstruct implementation the goals presented in the 2019 IEPR.

CONSISTENCY WITH STATE OF CALIFORNIA ENERGY PLAN

The Project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the Project facilitates access, takes advantage of existing infrastructure systems, and promotes land use compatibilities through the colocation of SBMWD facilities. The Project therefore supports urban design and planning processes identified under the State of California Energy Plan, is consistent with, and would not otherwise interfere with, nor obstruct implementation of the State of California Energy Plan.

CONSISTENCY WITH CALIFORNIA CODE TITLE 24, PART 6, ENERGY EFFICIENCY STANDARDS

The 2019 version of Title 24 was adopted by the CEC and became effective on January 1, 2020. It should be noted that the analysis herein assumes compliance with the 2019 Title 24 Standards. It should be noted that the CEC anticipates that nonresidential buildings will use approximately 30% less energy compared to the prior code (20). As such, the new buildings would be more efficient and the existing building would be retrofitted to increase energy efficiency to Title 24 standards.

CONSISTENCY WITH AB 1493

AB 1493 is not applicable to the Project as it is a statewide measure establishing vehicle emissions standards. No feature of the Project would interfere with implementation of the requirements under AB 1493.

CONSISTENCY WITH RPS

California's Renewable Portfolio Standard is not applicable to the Project as it is a statewide measure that establishes a renewable energy mix. No feature of the Project would interfere with implementation of the requirements under RPS.

CONSISTENCY WITH SB 350

The proposed Project would use energy from SCE, which has committed to diversify its portfolio of energy sources by increasing energy from wind and solar sources. The Project would also contribute to this by the inclusion of solar PV system. No feature of the Project would interfere with implementation of SB 350. Additionally, the Project would be designed and constructed to implement the energy efficiency measures and would include several measures designed to reduce energy consumption.

As shown above, the Project would not conflict with any of the state or local plans. As such, a less than significant impact is expected.

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7 CERTIFICATIONS

The contents of this energy analysis report represent an accurate depiction of the environmental impacts associated with the proposed San Bernardino Municipal Water Department Water Facilities Relocation Project. The information contained in this energy analysis report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (619) 778-1971.

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EDUCATION

Bachelor of Science in Urban and Regional Planning
California Polytechnic State University, Pomona • June 2000

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
APA – American Planning Association
AWMA – Air and Waste Management Association

PROFESSIONAL CERTIFICATIONS

HARP Model Training – Bluescape Environmental • 2004
Air Dispersion Modeling – Lakes Environmental • 2008

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APPENDIX 4.1:

CALEEMOD PROJECT ANNUAL EMISSIONS MODEL OUTPUTS

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SAN BERNARDINO MUNICIPAL WATER DEPARTMENT

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
	0.00		0.00	0.00	0
General Office Building	27.81	1000sqft	0.64	27,812.00	0
Unrefrigerated Warehouse-No Rail	13.50	1000sqft	0.31	13,500.00	0
Parking Lot	194.00	Space	1.75	77,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Trips and VMT - Worker count and construction deliveries provided by project engineer

Vehicle Trips - trips per traffic study, 344 total

Construction Off-road Equipment Mitigation -

Fleet Mix - Warehouse: 72 LDT, 76 HDT

Table Name	Column Name	Default Value	New Value
tblFleetMix	HHD	0.06	0.51
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.1010e-003	0.00
tblFleetMix	MCY	5.9030e-003	0.00
tblFleetMix	MDV	0.12	0.49
tblFleetMix	MH	9.4400e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.3570e-003	0.00
tblFleetMix	SBUS	8.0800e-004	0.00
tblFleetMix	UBUS	1.5650e-003	0.00
tblLandUse	LandUseSquareFeet	27,810.00	27,812.00
tblTripsAndVMT	VendorTripNumber	19.00	50.00
tblTripsAndVMT	WorkerTripNumber	13.00	100.00
tblTripsAndVMT	WorkerTripNumber	10.00	100.00
tblTripsAndVMT	WorkerTripNumber	47.00	100.00
tblTripsAndVMT	WorkerTripNumber	15.00	50.00
tblVehicleTrips	ST_TR	2.46	7.05
tblVehicleTrips	ST_TR	1.68	10.96
tblVehicleTrips	SU_TR	1.05	7.05
tblVehicleTrips	SU_TR	1.68	10.96
tblVehicleTrips	WD_TR	11.03	7.05
tblVehicleTrips	WD_TR	1.68	10.96

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2530	2.0463	1.8263	4.5000e-003	0.1525	0.0832	0.2357	0.0460	0.0793	0.1253	0.0000	395.8524	395.8524	0.0511	0.0000	397.1303
2022	0.2742	0.5622	0.5592	1.3800e-003	0.0399	0.0215	0.0614	0.0108	0.0205	0.0313	0.0000	121.1672	121.1672	0.0158	0.0000	121.5614
Maximum	**0.2742**	**2.0463**	**1.8263**	**4.5000e-003**	**0.1525**	**0.0832**	**0.2357**	**0.0460**	**0.0793**	**0.1253**	**0.0000**	**395.8524**	**395.8524**	**0.0511**	**0.0000**	**397.1303**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2530	2.0463	1.8263	4.5000e-003	0.1417	0.0832	0.2249	0.0404	0.0793	0.1198	0.0000	395.8521	395.8521	0.0511	0.0000	397.1301
2022	0.2742	0.5622	0.5592	1.3800e-003	0.0399	0.0215	0.0614	0.0108	0.0205	0.0313	0.0000	121.1671	121.1671	0.0158	0.0000	121.5613
Maximum	**0.2742**	**2.0463**	**1.8263**	**4.5000e-003**	**0.1417**	**0.0832**	**0.2249**	**0.0404**	**0.0793**	**0.1198**	**0.0000**	**395.8521**	**395.8521**	**0.0511**	**0.0000**	**397.1301**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**5.62**	**0.00**	**3.64**	**9.77**	**0.00**	**3.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-1-2021**	**6-30-2021**	0.7163	0.7163
2	**7-1-2021**	**9-30-2021**	0.7835	0.7835
3	**10-1-2021**	**12-31-2021**	0.7827	0.7827
4	**1-1-2022**	**3-31-2022**	0.6640	0.6640
5	**4-1-2022**	**6-30-2022**	0.1806	0.1806
		Highest	0.7835	0.7835

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Energy	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	109.7790	109.7790	4.3900e-003	1.0000e-003	110.1873
Mobile	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229
Waste						0.0000	0.0000		0.0000	0.0000	7.8253	0.0000	7.8253	0.4625	0.0000	19.3869
Water						0.0000	0.0000		0.0000	0.0000	2.5585	44.1823	46.7408	0.2646	6.5800e-003	55.3176
Total	**0.3280**	**2.8601**	**1.6898**	**0.0118**	**0.4953**	**7.8300e-003**	**0.5031**	**0.1334**	**7.4400e-003**	**0.1408**	**10.3838**	**1,265.6111**	**1,275.9949**	**0.7986**	**7.5800e-003**	**1,298.2209**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Energy	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	109.7790	109.7790	4.3900e-003	1.0000e-003	110.1873
Mobile	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229
Waste						0.0000	0.0000		0.0000	0.0000	7.8253	0.0000	7.8253	0.4625	0.0000	19.3869
Water						0.0000	0.0000		0.0000	0.0000	2.5585	44.1823	46.7408	0.2646	6.5800e-003	55.3176
Total	**0.3280**	**2.8601**	**1.6898**	**0.0118**	**0.4953**	**7.8300e-003**	**0.5031**	**0.1334**	**7.4400e-003**	**0.1408**	**10.3838**	**1,265.6111**	**1,275.9949**	**0.7986**	**7.5800e-003**	**1,298.2209**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2021	4/28/2021	5	20	
2	Grading	Grading	5/4/2021	5/11/2021	5	6	
3	Building Construction	Building Construction	5/12/2021	3/15/2022	5	220	
4	Paving	Paving	3/16/2022	3/29/2022	5	10	
5	Architectural Coating	Architectural Coating	3/30/2022	4/12/2022	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 3

Acres of Paving: 1.75

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 61,968; Non-Residential Outdoor: 20,656; Striped Parking Area: 4,656 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	100.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	100.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	100.00	50.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	50.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	9.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060
Total	**0.0199**	**0.1970**	**0.1449**	**2.4000e-004**		**0.0104**	**0.0104**		**9.7100e-003**	**9.7100e-003**	**0.0000**	**21.0713**	**21.0713**	**5.3900e-003**	**0.0000**	**21.2060**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-003	3.4800e-003	0.0356	1.0000e-004	0.0110	7.0000e-005	0.0110	2.9100e-003	7.0000e-005	2.9800e-003	0.0000	9.0990	9.0990	2.5000e-004	0.0000	9.1054
Total	**4.6000e-003**	**3.4800e-003**	**0.0356**	**1.0000e-004**	**0.0110**	**7.0000e-005**	**0.0110**	**2.9100e-003**	**7.0000e-005**	**2.9800e-003**	**0.0000**	**9.0990**	**9.0990**	**2.5000e-004**	**0.0000**	**9.1054**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060
Total	**0.0199**	**0.1970**	**0.1449**	**2.4000e-004**		**0.0104**	**0.0104**		**9.7100e-003**	**9.7100e-003**	**0.0000**	**21.0713**	**21.0713**	**5.3900e-003**	**0.0000**	**21.2060**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-003	3.4800e-003	0.0356	1.0000e-004	0.0110	7.0000e-005	0.0110	2.9100e-003	7.0000e-005	2.9800e-003	0.0000	9.0990	9.0990	2.5000e-004	0.0000	9.1054
Total	**4.6000e-003**	**3.4800e-003**	**0.0356**	**1.0000e-004**	**0.0110**	**7.0000e-005**	**0.0110**	**2.9100e-003**	**7.0000e-005**	**2.9800e-003**	**0.0000**	**9.0990**	**9.0990**	**2.5000e-004**	**0.0000**	**9.1054**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0197	0.0000	0.0197	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**5.4800e-003**	**0.0606**	**0.0293**	**6.0000e-005**	**0.0197**	**2.7500e-003**	**0.0224**	**0.0101**	**2.5300e-003**	**0.0126**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	1.0400e-003	0.0107	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7297	2.7297	8.0000e-005	0.0000	2.7316
Total	**1.3800e-003**	**1.0400e-003**	**0.0107**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7297**	**2.7297**	**8.0000e-005**	**0.0000**	**2.7316**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.8500e-003	0.0000	8.8500e-003	4.5500e-003	0.0000	4.5500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**5.4800e-003**	**0.0606**	**0.0293**	**6.0000e-005**	**8.8500e-003**	**2.7500e-003**	**0.0116**	**4.5500e-003**	**2.5300e-003**	**7.0800e-003**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	1.0400e-003	0.0107	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7297	2.7297	8.0000e-005	0.0000	2.7316
Total	**1.3800e-003**	**1.0400e-003**	**0.0107**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7297**	**2.7297**	**8.0000e-005**	**0.0000**	**2.7316**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1718	1.3463	1.2233	2.1000e-003		0.0687	0.0687		0.0658	0.0658	0.0000	174.4249	174.4249	0.0343	0.0000	175.2828
Total	**0.1718**	**1.3463**	**1.2233**	**2.1000e-003**		**0.0687**	**0.0687**		**0.0658**	**0.0658**	**0.0000**	**174.4249**	**174.4249**	**0.0343**	**0.0000**	**175.2828**

3.4 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0111	0.4086	0.0831	1.1100e-003	0.0265	7.0000e-004	0.0272	7.6400e-003	6.7000e-004	8.3100e-003	0.0000	106.6646	106.6646	7.1900e-003	0.0000	106.8443
Worker	0.0387	0.0292	0.2993	8.5000e-004	0.0921	6.0000e-004	0.0927	0.0245	5.5000e-004	0.0250	0.0000	76.4316	76.4316	2.1400e-003	0.0000	76.4851
Total	**0.0498**	**0.4378**	**0.3824**	**1.9600e-003**	**0.1186**	**1.3000e-003**	**0.1199**	**0.0321**	**1.2200e-003**	**0.0333**	**0.0000**	**183.0962**	**183.0962**	**9.3300e-003**	**0.0000**	**183.3294**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1718	1.3463	1.2233	2.1000e-003		0.0687	0.0687		0.0658	0.0658	0.0000	174.4247	174.4247	0.0343	0.0000	175.2826
Total	**0.1718**	**1.3463**	**1.2233**	**2.1000e-003**		**0.0687**	**0.0687**		**0.0658**	**0.0658**	**0.0000**	**174.4247**	**174.4247**	**0.0343**	**0.0000**	**175.2826**

3.4 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0111	0.4086	0.0831	1.1100e-003	0.0265	7.0000e-004	0.0272	7.6400e-003	6.7000e-004	8.3100e-003	0.0000	106.6646	106.6646	7.1900e-003	0.0000	106.8443
Worker	0.0387	0.0292	0.2993	8.5000e-004	0.0921	6.0000e-004	0.0927	0.0245	5.5000e-004	0.0250	0.0000	76.4316	76.4316	2.1400e-003	0.0000	76.4851
Total	**0.0498**	**0.4378**	**0.3824**	**1.9600e-003**	**0.1186**	**1.3000e-003**	**0.1199**	**0.0321**	**1.2200e-003**	**0.0333**	**0.0000**	**183.0962**	**183.0962**	**9.3300e-003**	**0.0000**	**183.3294**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0482	0.3797	0.3732	6.5000e-004		0.0183	0.0183		0.0175	0.0175	0.0000	53.9968	53.9968	0.0104	0.0000	54.2573
Total	**0.0482**	**0.3797**	**0.3732**	**6.5000e-004**		**0.0183**	**0.0183**		**0.0175**	**0.0175**	**0.0000**	**53.9968**	**53.9968**	**0.0104**	**0.0000**	**54.2573**

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2100e-003	0.1198	0.0238	3.4000e-004	8.2000e-003	1.8000e-004	8.3800e-003	2.3700e-003	1.7000e-004	2.5400e-003	0.0000	32.7463	32.7463	2.1500e-003	0.0000	32.8000
Worker	0.0112	8.1300e-003	0.0850	2.5000e-004	0.0285	1.8000e-004	0.0287	7.5700e-003	1.7000e-004	7.7400e-003	0.0000	22.8050	22.8050	5.9000e-004	0.0000	22.8198
Total	**0.0144**	**0.1279**	**0.1088**	**5.9000e-004**	**0.0367**	**3.6000e-004**	**0.0371**	**9.9400e-003**	**3.4000e-004**	**0.0103**	**0.0000**	**55.5512**	**55.5512**	**2.7400e-003**	**0.0000**	**55.6198**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0482	0.3797	0.3732	6.5000e-004		0.0183	0.0183		0.0175	0.0175	0.0000	53.9968	53.9968	0.0104	0.0000	54.2572
Total	**0.0482**	**0.3797**	**0.3732**	**6.5000e-004**		**0.0183**	**0.0183**		**0.0175**	**0.0175**	**0.0000**	**53.9968**	**53.9968**	**0.0104**	**0.0000**	**54.2572**

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2100e-003	0.1198	0.0238	3.4000e-004	8.2000e-003	1.8000e-004	8.3800e-003	2.3700e-003	1.7000e-004	2.5400e-003	0.0000	32.7463	32.7463	2.1500e-003	0.0000	32.8000
Worker	0.0112	8.1300e-003	0.0850	2.5000e-004	0.0285	1.8000e-004	0.0287	7.5700e-003	1.7000e-004	7.7400e-003	0.0000	22.8050	22.8050	5.9000e-004	0.0000	22.8198
Total	**0.0144**	**0.1279**	**0.1088**	**5.9000e-004**	**0.0367**	**3.6000e-004**	**0.0371**	**9.9400e-003**	**3.4000e-004**	**0.0103**	**0.0000**	**55.5512**	**55.5512**	**2.7400e-003**	**0.0000**	**55.6198**

3.5 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	2.2900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.0000e-003**	**0.0467**	**0.0585**	**9.0000e-005**		**2.4400e-003**	**2.4400e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.7550**	**7.7550**	**2.4600e-003**	**0.0000**	**7.8165**

3.5 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	7.8000e-004	8.1700e-003	2.0000e-005	2.7400e-003	2.0000e-005	2.7600e-003	7.3000e-004	2.0000e-005	7.4000e-004	0.0000	2.1928	2.1928	6.0000e-005	0.0000	2.1942
Total	**1.0800e-003**	**7.8000e-004**	**8.1700e-003**	**2.0000e-005**	**2.7400e-003**	**2.0000e-005**	**2.7600e-003**	**7.3000e-004**	**2.0000e-005**	**7.4000e-004**	**0.0000**	**2.1928**	**2.1928**	**6.0000e-005**	**0.0000**	**2.1942**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	2.2900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.0000e-003**	**0.0467**	**0.0585**	**9.0000e-005**		**2.4400e-003**	**2.4400e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.7550**	**7.7550**	**2.4600e-003**	**0.0000**	**7.8165**

3.5 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	7.8000e-004	8.1700e-003	2.0000e-005	2.7400e-003	2.0000e-005	2.7600e-003	7.3000e-004	2.0000e-005	7.4000e-004	0.0000	2.1928	2.1928	6.0000e-005	0.0000	2.1942
Total	**1.0800e-003**	**7.8000e-004**	**8.1700e-003**	**2.0000e-005**	**2.7400e-003**	**2.0000e-005**	**2.7600e-003**	**7.3000e-004**	**2.0000e-005**	**7.4000e-004**	**0.0000**	**2.1928**	**2.1928**	**6.0000e-005**	**0.0000**	**2.1942**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2023					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	**0.2033**	**7.0400e-003**	**9.0700e-003**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2787**

3.6 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.4000e-004	1.4700e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3947	0.3947	1.0000e-005	0.0000	0.3950
Total	**1.9000e-004**	**1.4000e-004**	**1.4700e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3947**	**0.3947**	**1.0000e-005**	**0.0000**	**0.3950**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2023					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	**0.2033**	**7.0400e-003**	**9.0700e-003**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2787**

3.6 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.4000e-004	1.4700e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3947	0.3947	1.0000e-005	0.0000	0.3950
Total	**1.9000e-004**	**1.4000e-004**	**1.4700e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3947**	**0.3947**	**1.0000e-005**	**0.0000**	**0.3950**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229
Unmitigated	0.1526	2.8540	1.6817	0.0118	0.4953	7.3600e-003	0.5026	0.1334	6.9700e-003	0.1403	0.0000	1,111.6440	1,111.6440	0.0672	0.0000	1,113.3229

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	196.06	196.06	196.06	631,601	631,601
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	147.96	147.96	147.96	634,115	634,115
Total	344.02	344.02	344.02	1,265,716	1,265,716

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
General Office Building	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Parking Lot	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Unrefrigerated Warehouse-No Rail	0.000000	0.000000	0.000000	0.490000	0.000000	0.000000	0.000000	0.510000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	103.1665	103.1665	4.2600e-003	8.8000e-004	103.5356
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	103.1665	103.1665	4.2600e-003	8.8000e-004	103.5356
NaturalGas Mitigated	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	6.6125	6.6125	1.3000e-004	1.2000e-004	6.6517
NaturalGas Unmitigated	6.7000e-004	6.0700e-003	5.1000e-003	4.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	6.6125	6.6125	1.3000e-004	1.2000e-004	6.6517

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	96507.6	5.2000e-004	4.7300e-003	3.9700e-003	3.0000e-005		3.6000e-004	3.6000e-004		3.6000e-004	3.6000e-004	0.0000	5.1500	5.1500	1.0000e-004	9.0000e-005	5.1806
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	27405	1.5000e-004	1.3400e-003	1.1300e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4624	1.4624	3.0000e-005	3.0000e-005	1.4711
Total		**6.7000e-004**	**6.0700e-003**	**5.1000e-003**	**4.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**6.6125**	**6.6125**	**1.3000e-004**	**1.2000e-004**	**6.6518**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	96507.6	5.2000e-004	4.7300e-003	3.9700e-003	3.0000e-005		3.6000e-004	3.6000e-004		3.6000e-004	3.6000e-004	0.0000	5.1500	5.1500	1.0000e-004	9.0000e-005	5.1806
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	27405	1.5000e-004	1.3400e-003	1.1300e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4624	1.4624	3.0000e-005	3.0000e-005	1.4711
Total		**6.7000e-004**	**6.0700e-003**	**5.1000e-003**	**4.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**6.6125**	**6.6125**	**1.3000e-004**	**1.2000e-004**	**6.6518**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	264770	84.3615	3.4800e-003	7.2000e-004	84.6633
Parking Lot	27160	8.6538	3.6000e-004	7.0000e-005	8.6847
Unrefrigerated Warehouse-No Rail	31860	10.1513	4.2000e-004	9.0000e-005	10.1876
Total		**103.1665**	**4.2600e-003**	**8.8000e-004**	**103.5356**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	264770	84.3615	3.4800e-003	7.2000e-004	84.6633
Parking Lot	27160	8.6538	3.6000e-004	7.0000e-005	8.6847
Unrefrigerated Warehouse-No Rail	31860	10.1513	4.2000e-004	9.0000e-005	10.1876
Total		**103.1665**	**4.2600e-003**	**8.8000e-004**	**103.5356**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Unmitigated	0.1748	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0202					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.8000e-004	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Total	**0.1748**	**3.0000e-005**	**3.0100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**5.8400e-003**	**5.8400e-003**	**2.0000e-005**	**0.0000**	**6.2200e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0202					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.8000e-004	3.0000e-005	3.0100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	5.8400e-003	5.8400e-003	2.0000e-005	0.0000	6.2200e-003
Total	**0.1748**	**3.0000e-005**	**3.0100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**5.8400e-003**	**5.8400e-003**	**2.0000e-005**	**0.0000**	**6.2200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	46.7408	0.2646	6.5800e-003	55.3176
Unmitigated	46.7408	0.2646	6.5800e-003	55.3176

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	4.94278 / 3.02944	32.7984	0.1624	4.0700e-003	38.0700
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.12188 / 0	13.9424	0.1023	2.5100e-003	17.2477
Total		**46.7408**	**0.2646**	**6.5800e-003**	**55.3176**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	4.94278 / 3.02944	32.7984	0.1624	4.0700e-003	38.0700
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.12188 / 0	13.9424	0.1023	2.5100e-003	17.2477
Total		**46.7408**	**0.2646**	**6.5800e-003**	**55.3176**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	7.8253	0.4625	0.0000	19.3869
Unmitigated	7.8253	0.4625	0.0000	19.3869

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	25.86	5.2494	0.3102	0.0000	13.0050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	12.69	2.5760	0.1522	0.0000	6.3818
Total		**7.8253**	**0.4625**	**0.0000**	**19.3869**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	25.86	5.2494	0.3102	0.0000	13.0050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	12.69	2.5760	0.1522	0.0000	6.3818
Total		**7.8253**	**0.4625**	**0.0000**	**19.3869**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX 4.2:

EMFAC2017

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Source: EMFAC2017 (v1.0.3) Emissions Inventory
Region Type: Sub-Area
Region: San Bernardino (SC)
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumptior

Region	Calenc	Vehicle Ca	Model Year	Speed	Fuel	Population	VMT	Trips	Fuel_Consumption	Total Fuel	VMT	Total VMT	Miles per Gallon	Vehicle Class
San Bernardino (SC)	2021	HHDT	Aggregate	Aggregate	Gasol	6.267730564	456.4383219	125.4048	111.327431	291915.5912	456.4383219	1797343.082	6.16	HHDT
San Bernardino (SC)	2021	HHDT	Aggregate	Aggregate	Diese	14609.69545	1750601.476	149055.5	270144.9624		1750601.476			
San Bernardino (SC)	2021	HHDT	Aggregate	Aggregate	Natur	1134.840306	46285.16752	4425.877	21659.30132		46285.16752			
San Bernardino (SC)	2021	LDA	Aggregate	Aggregate	Gasol	532075.3759	22828245.75	2507425	747304.3661	750949.1379	22828245.75	23287359.86	31.01	LDA
San Bernardino (SC)	2021	LDA	Aggregate	Aggregate	Diese	3935.252177	182431.1272	18919.14	3644.771758		182431.1272			
San Bernardino (SC)	2021	LDA	Aggregate	Aggregate	Electr	6845.69282	276682.9796	34477.82	0		276682.9796			
San Bernardino (SC)	2021	LDT1	Aggregate	Aggregate	Gasol	54966.81713	1984927.282	248504.7	76603.56769	76629.1524	1984927.282	1994410.121	26.03	LDT1
San Bernardino (SC)	2021	LDT1	Aggregate	Aggregate	Diese	32.85227819	619.2960178	108.5688	25.58470608		619.2960178			
San Bernardino (SC)	2021	LDT1	Aggregate	Aggregate	Electr	212.150622	8863.54281	1078.818	0		8863.54281			
San Bernardino (SC)	2021	LDT2	Aggregate	Aggregate	Gasol	169049.8885	6439024.718	786945.9	267804.2814	268810.9574	6439024.718	6513540.723	24.23	LDT2
San Bernardino (SC)	2021	LDT2	Aggregate	Aggregate	Diese	830.8340023	37079.36685	4123.68	1006.675986		37079.36685			
San Bernardino (SC)	2021	LDT2	Aggregate	Aggregate	Electr	1129.79365	37436.63844	5740.069	0		37436.63844			
San Bernardino (SC)	2021	LHDT1	Aggregate	Aggregate	Gasol	14611.26773	494487.9568	217686.1	47414.52021	67993.58496	494487.9568	921151.9409	13.55	LHDT1
San Bernardino (SC)	2021	LHDT1	Aggregate	Aggregate	Diese	11635.58812	426663.9841	146361.1	20579.06474		426663.9841			
San Bernardino (SC)	2021	LHDT2	Aggregate	Aggregate	Gasol	2597.418836	86917.15935	38697.67	9583.243662	18095.55544	86917.15935	246975.3752	13.65	LHDT2
San Bernardino (SC)	2021	LHDT2	Aggregate	Aggregate	Diese	4361.281704	160058.2159	54859.44	8512.311782		160058.2159			
San Bernardino (SC)	2021	MCY	Aggregate	Aggregate	Gasol	23598.29419	155183.6193	47196.59	4164.951211	4164.951211	155183.6193	155183.6193	37.26	MCY
San Bernardino (SC)	2021	MDV	Aggregate	Aggregate	Gasol	141997.0551	5213170.107	648026.7	267180.3766	271101.3248	5213170.107	5338733.755	19.69	MDV
San Bernardino (SC)	2021	MDV	Aggregate	Aggregate	Diese	2403.788841	107898.3469	11766.47	3920.948159		107898.3469			
San Bernardino (SC)	2021	MDV	Aggregate	Aggregate	Electr	518.5911582	17665.30162	2657.584	0		17665.30162			
San Bernardino (SC)	2021	MH	Aggregate	Aggregate	Gasol	3744.064613	31646.26624	374.5562	6273.462423	7399.304329	31646.26624	43357.16271	5.86	MH
San Bernardino (SC)	2021	MH	Aggregate	Aggregate	Diese	1317.114019	11710.89647	131.7114	1125.841906		11710.89647			
San Bernardino (SC)	2021	MHDT	Aggregate	Aggregate	Gasol	1417.166829	77624.61365	28354.67	15274.27206	105270.492	77624.61365	1027601.468	9.76	MHDT
San Bernardino (SC)	2021	MHDT	Aggregate	Aggregate	Diese	14359.016	949976.8547	144022.9	89996.21998		949976.8547			
San Bernardino (SC)	2021	OBUS	Aggregate	Aggregate	Gasol	412.1438526	18853.24741	8246.174	3741.2403	5785.34831	18853.24741	36069.11574	6.23	OBUS
San Bernardino (SC)	2021	OBUS	Aggregate	Aggregate	Diese	234.0613911	17215.86834	2273.382	2044.10801		17215.86834			
San Bernardino (SC)	2021	SBUS	Aggregate	Aggregate	Gasol	228.6354628	10088.17245	914.5419	1124.726845	4266.779462	10088.17245	33994.51729	7.97	SBUS
San Bernardino (SC)	2021	SBUS	Aggregate	Aggregate	Diese	753.7377576	23906.34483	8698.029	3142.052617		23906.34483			
San Bernardino (SC)	2021	UBUS	Aggregate	Aggregate	Gasol	114.14327	12981.30659	456.5731	1426.109308	8702.036295	12981.30659	41022.48532	4.71	UBUS
San Bernardino (SC)	2021	UBUS	Aggregate	Aggregate	Diese	2.896720367	238.2836669	11.58688	31.68228493		238.2836669			
San Bernardino (SC)	2021	UBUS	Aggregate	Aggregate	Electr	0.058469431	1.251702935	0.233878	0		1.251702935			
San Bernardino (SC)	2021	UBUS	Aggregate	Aggregate	Natur	208.0080836	27801.64336	832.0323	7244.244702		27801.64336			

Source: EMFAC2017 (v1.0.3) Emissions Inventory
Region Type: Sub-Area
Region: San Bernardino (SC)
Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calenc	Vehicle Ca	Model Year	Speed	Fuel	Population	VMT	Trips	Fuel_Consumption	Total Fuel	VMT	Total VMT	Miles per Gallon	Vehicle Class
San Bernardino (SC)	2022	HHDT	Aggregate	Aggregate	Gasol	5.738390567	475.6178858	114.8137	112.3834031	290203.3429	475.6178858	1836855.091	6.33	HHDT
San Bernardino (SC)	2022	HHDT	Aggregate	Aggregate	Diese	14883.97368	1789151.452	152272.4	268190.7848		1789151.452			
San Bernardino (SC)	2022	HHDT	Aggregate	Aggregate	Natur	1157.767624	47228.02172	4515.294	21900.17462		47228.02172			
San Bernardino (SC)	2022	LDA	Aggregate	Aggregate	Gasol	543957.3772	23065957.3	2563744	735758.4163	739612.8822	23065957.3	23615949.6	31.93	LDA
San Bernardino (SC)	2022	LDA	Aggregate	Aggregate	Diese	4325.601093	197774.636	20802.16	3854.465902		197774.636			
San Bernardino (SC)	2022	LDA	Aggregate	Aggregate	Electr	8565.692529	352217.6714	43034.91	0		352217.6714			
San Bernardino (SC)	2022	LDT1	Aggregate	Aggregate	Gasol	56195.86841	2019926.608	254845	75915.57909	75938.79873	2019926.608	2034372.961	26.79	LDT1
San Bernardino (SC)	2022	LDT1	Aggregate	Aggregate	Diese	30.18816941	569.3508455	99.609	23.21963925		569.3508455			
San Bernardino (SC)	2022	LDT1	Aggregate	Aggregate	Electr	324.4928921	13877.00183	1649.842	0		13877.00183			
San Bernardino (SC)	2022	LDT2	Aggregate	Aggregate	Gasol	172388.4413	6504289.119	803134.5	261212.0947	262301.5224	6504289.119	6595584.808	25.15	LDT2
San Bernardino (SC)	2022	LDT2	Aggregate	Aggregate	Diese	945.5703737	41265.88695	4678.034	1089.427653		41265.88695			
San Bernardino (SC)	2022	LDT2	Aggregate	Aggregate	Electr	1538.819096	50029.80218	7798.615	0		50029.80218			
San Bernardino (SC)	2022	LHDT1	Aggregate	Aggregate	Gasol	14369.52529	483946.4297	214084.5	45954.60177	66338.08762	483946.4297	911984.1949	13.75	LHDT1
San Bernardino (SC)	2022	LHDT1	Aggregate	Aggregate	Diese	11813.96292	428037.7653	148604.8	20383.48585		428037.7653			
San Bernardino (SC)	2022	LHDT2	Aggregate	Aggregate	Gasol	2566.416218	84834.80397	38235.78	9275.102025	17759.38097	84834.80397	246397.2785	13.87	LHDT2
San Bernardino (SC)	2022	LHDT2	Aggregate	Aggregate	Diese	4468.655223	161562.4745	56210.06	8484.278943		161562.4745			
San Bernardino (SC)	2022	MCY	Aggregate	Aggregate	Gasol	23940.89968	154635.86	47881.8	4153.326569	4153.326569	154635.86	154635.86	37.23	MCY
San Bernardino (SC)	2022	MDV	Aggregate	Aggregate	Gasol	141538.2102	5144209.705	645868	255613.6238	259695.0211	5144209.705	5287468.043	20.36	MDV
San Bernardino (SC)	2022	MDV	Aggregate	Aggregate	Diese	2634.747756	115566.3521	12857	4081.397273		115566.3521			
San Bernardino (SC)	2022	MDV	Aggregate	Aggregate	Electr	829.5186217	27691.98636	4239.476	0		27691.98636			
San Bernardino (SC)	2022	MH	Aggregate	Aggregate	Gasol	3599.155888	30327.10079	360.0596	5946.31971	7047.71226	30327.10079	41882.48855	5.94	MH
San Bernardino (SC)	2022	MH	Aggregate	Aggregate	Diese	1326.593838	11555.38776	132.6594	1101.39255		11555.38776			
San Bernardino (SC)	2022	MHDT	Aggregate	Aggregate	Gasol	1426.666165	78373.2467	28544.74	15192.67393	104293.6617	78373.2467	1051136.413	10.08	MHDT
San Bernardino (SC)	2022	MHDT	Aggregate	Aggregate	Diese	14492.29473	972763.1661	145806.4	89100.98778		972763.1661			
San Bernardino (SC)	2022	OBUS	Aggregate	Aggregate	Gasol	409.5822199	18358.32454	8194.921	3596.414899	5628.514468	18358.32454	35953.61331	6.39	OBUS
San Bernardino (SC)	2022	OBUS	Aggregate	Aggregate	Diese	235.5339692	17595.28877	2280.101	2032.09957		17595.28877			
San Bernardino (SC)	2022	SBUS	Aggregate	Aggregate	Gasol	236.4064257	10313.05593	945.6257	1141.902256	4281.325881	10313.05593	34494.49484	8.06	SBUS
San Bernardino (SC)	2022	SBUS	Aggregate	Aggregate	Diese	761.8554538	24181.43891	8791.706	3139.423625		24181.43891			
San Bernardino (SC)	2022	UBUS	Aggregate	Aggregate	Gasol	114.8207422	13058.35426	459.283	1433.837711	1465.519996	13058.35426	13297.88963	9.07	UBUS
San Bernardino (SC)	2022	UBUS	Aggregate	Aggregate	Diese	2.896720367	238.2836669	11.58688	31.68228493		238.2836669			
San Bernardino (SC)	2022	UBUS	Aggregate	Aggregate	Electr	0.058469431	1.251702935	0.233878	0		1.251702935			
San Bernardino (SC)	2022	UBUS	Aggregate	Aggregate	Natur	209.2602095	27968.07558	837.0408						

APPENDIX 5a

John R. Byerly
INCORPORATED

SOILS INVESTIGATION

NEW ADMINISTRATION AND WAREHOUSE BUILDINGS FOR CITY OF SAN BERNARDINO MUNICIPAL WATER DEPARTMENT (SBMWD)

SAN BERNARDINO, CALIFORNIA

MILLER ARCHITECTURE CORPRATION

GEOTECHNICAL ENGINEERS • TESTING AND INSPECTION
2257 South Lilac Ave., Bloomington, CA 92316-2903
Bloomington (909) 877-1324 Riverside (909) 783-1910 Fax (909) 877-5210

John R. Byerly
INCORPORATED

SOILS INVESTIGATION

APRIL 23, 2020

NEW ADMINISTRATION AND WAREHOUSE BUILDINGS FOR CITY OF SAN BERNARDINO MUNICIPAL WATER DEPARTMENT (SBMWD)

SOUTHEAST CORNER OF CHANDLER PLACE AND SOUTH E STREET

SAN BERNARDINO, CALIFORNIA

CLIENT:

MILLER ARCHITECTURE CORPRATION

1177 IDAHO STREET, SUITE 200

REDLANDS, CALIFORNIA 92374

ATTENTION: RAYMOND BYUN

RPT. NO.: 6392
FILE NO.: S-14163

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(1) Plot Plan

(2) Test Boring Logs

(3) Maximum Density Determination

(4) Direct Shear Test Results

(5) Subgrade Soil Tests

(6) Specifications for Aggregate Base

(7) San Bernardino Valley Municipal Water District (SBVMWD) Letter

(8) Liquefaction and Dynamic Settlement Analysis

(9) Ground Motion Seismic Analysis Report

INTRODUCTION

During March and April of 2020, an investigation of the soil conditions underlying the new administration and warehouse buildings at the existing City of San Bernardino Municipal Water Department (SBMWD) site was conducted by this firm. The purpose of our investigation was to evaluate the surface and subsurface conditions at the site with respect to safe and economical foundation types, vertical and lateral bearing values, liquefaction and seismic settlement potential, support of concrete slabs-on-grade, and site preparation. Included in the recommendations are the seismic design parameters as required by the 2019 California Building Code and the ASCE Standard 7-16. Recommendations are also provided for the design of asphalt concrete and portland cement concrete pavement for vehicle drive and parking areas, and for portland cement concrete pavement to receive only pedestrian traffic. A site-specific ground motion analysis was conducted by our consulting geologist and geophysicist, Terra Geosciences, to determine the new code required seismic design parameters. The site-specific ground motion analysis is presented as "Appendix B" in the ground-motion seismic analysis report by Terra Geosciences, Enclosure 9. A seismic shear-wave velocity survey of the subsurface material within the western portion of the site was performed by our consulting geophysicist, Terra Geosciences, to support the site specific ground motion analysis. The shear-wave velocity survey is presented as "Appendix A" in the ground-motion seismic analysis report by Terra Geosciences, Enclosure 9. Our soils investigation, together with our conclusions and recommendations, is discussed in detail in the following report.

This report has been prepared for the exclusive use of Miller Architecture Corporation and their design consultants for specific application to the project described herein. Should the project be modified, the conclusions and recommendations presented in this report should be reviewed by the geotechnical engineer. Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, express or implied.

PROJECT DESCRIPTION

For the preparation of this report, we reviewed the conceptual site plan prepared by Miller Architecture Corporation. We understand that planned improvements to the existing SBMWD site will consist of the construction of a single-story administration building that will have a footprint area of about 27,812 square feet. The new administration building will be of steel-frame construction and incorporate a concrete slab-on-grade floor. We also understand that proposed construction will include a new warehouse building with a footprint area of about 13,500 square feet. The new warehouse building will be of concrete tilt-up construction and incorporate a concrete slab-on-grade floor. It is anticipated that the buildings will exert moderate to heavy foundation loads on the underlying soils. Drive and parking areas will be paved with asphalt concrete or portland cement pavement. The site for the new administration and warehouse buildings appear to be at the approximate desired grade, and no significant additional cuts and fills seem likely. The site configuration and proposed development are illustrated on Enclosure 1.

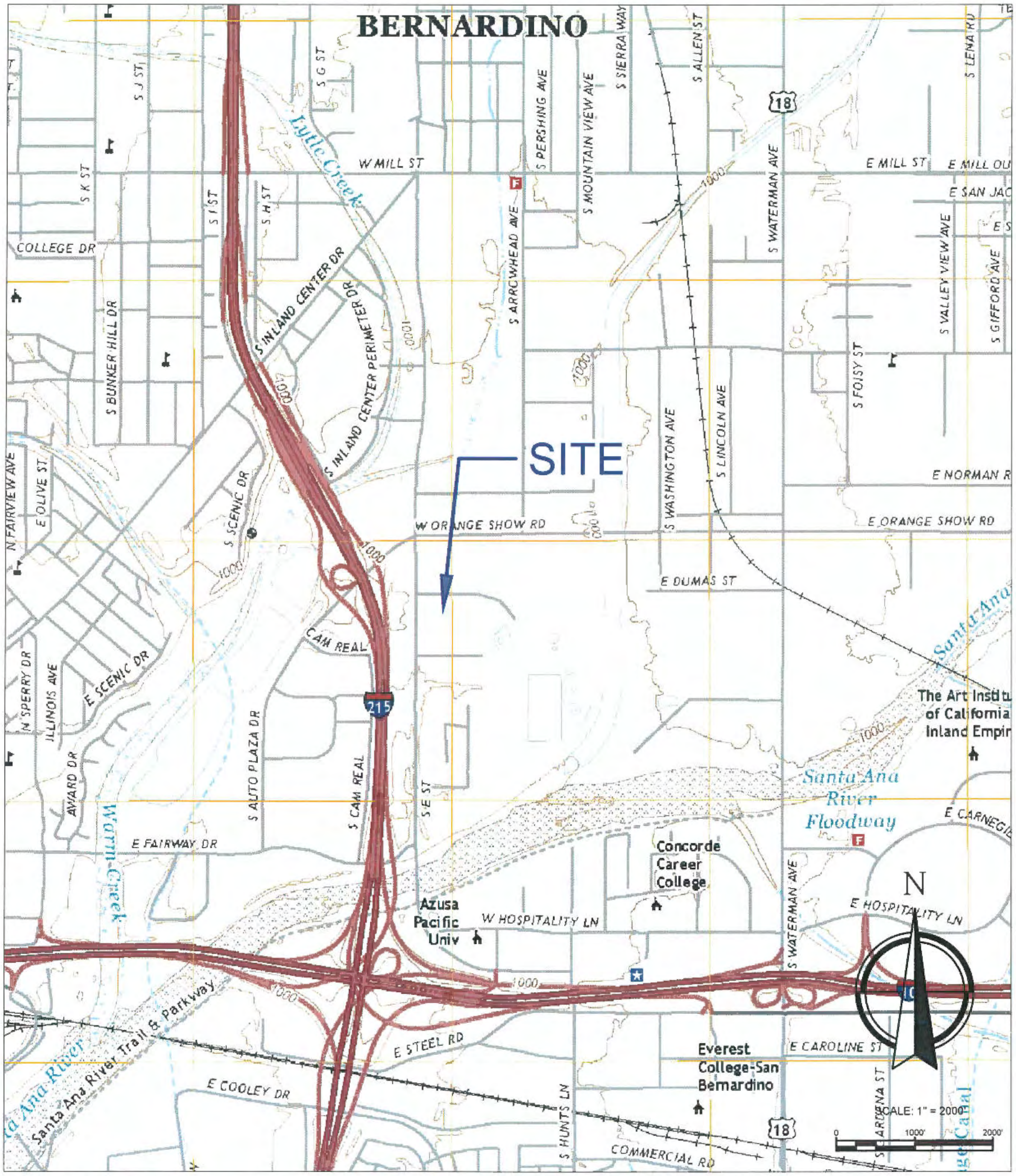
SITE CONDITIONS

The existing SBMWD site is located on the southeast corner of Chandler Place and South E Street in the city of San Bernardino. An Index Map showing the general vicinity of the site is presented on the following page. The coordinates of the site are latitude 34.0769° N and longitude 117.2931° W (World Geodetic System of 1984). The area proposed for the new administration and warehouse buildings are currently vacant. It was reported that the City of San Bernardino's main post office previously existed on the western portion of the property. The post office building included a basement. It was not known if the footings and slabs associated with the demolished structure were removed and the debris hauled from the site. The surrounding properties are occupied by commercial development. The area topography is generally flat, and the site slopes downward to the southwest at a gradient of less than 1 percent.

FIELD AND LABORATORY INVESTIGATION

The soils underlying the new administration and warehouse building areas were explored by means of seven test borings drilled with a truck-mounted flight-auger to depths of up to 62 feet below the existing ground surface. Also, two shallow borings were drilled to a depth of 6 feet in the vicinity of the proposed parking and drive areas. The approximate locations of the test borings are indicated on Enclosure 1. The soils encountered were examined and visually classified by one of our field engineers. A summary of the soil classifications appears as Enclosure 2. The exploration logs show subsurface conditions at the dates and locations indicated, and may not be representative of other locations and times. The stratification lines presented on the logs represent the approximate boundaries between soil types, and the transitions may be gradual. A

INDEX MAP



SOURCE DOCUMENTS: USGS SAN BERNADINO SOUTH QUADRANGLE, CALIFORNIA, 7.5 MINUTE SERIES, 2018

TOWNSHIP AND RANGE: SECTION 22, T1S, R4W

LATITUDE: 34.0769° N

LONGITUDE: 117.2931° W

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INCORPORATED

Rpt. No.: 6392
File No.: S-14163

hollow-stem auger with an outside diameter of 7.9 inches was utilized. The inside diameter of the auger was 4.3 inches.

Bulk and relatively undisturbed samples were obtained at selected levels within the explorations and delivered to our laboratory for testing and evaluation. The driving energy or blow counts required to advance the sampler at each sample interval were also noted. Relatively undisturbed soil samples were recovered with a California sampler. The California sampler was a 2.9-inch outside diameter, 2.5-inch inside diameter, split-barrel sampler lined with brass tubes. The sampler was 18 inches long. The sampler conformed to the requirements of ASTM D 3550. A 140-pound automatic trip hammer was lifted hydraulically and was dropped 30 inches for each blow. Standard penetration tests were performed as Boring 4 was advanced. The standard penetration test blow counts are shown on the log for Boring 4. Standard penetration testing was performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was 18 inches long and was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was lifted hydraulically and was dropped 30 inches for each blow. An efficiency value of 1.0 was assumed for the automatic trip hammer.

Included in our laboratory testing were moisture/density determinations on all undisturbed samples. Optimum moisture content/maximum dry density relationships were established for typical soil types so that the relative compaction of the subsoils could be determined. Direct shear testing was conducted on selected samples to determine their strength parameters. A composite sample of potential subgrade soil was tested for gradation, sand equivalent, and "R" value for pavement design purposes. The moisture/density data are presented on the boring logs, Enclosure 2. The maximum density and direst shear test results appear on Enclosures 3 and 4, respectively. Subgrade soil test data are summarized on Enclosure 5. Chemical testing, comprised of pH, soluble sulfate, chloride, redox potential, and resistivity testing, was also performed. These test results are presented in the "Chemical Test Results" section of this report.

SOIL CONDITIONS

Borings 6, 7, 8, and 9 were drilled through 3.0 to 3.5 inches of asphalt concrete pavement followed by 2.0 to 12.0 inches of aggregate base. Undocumented fill consisting of loose to dense silty sands with debris, silty sands, silty sands with gravel, sands, and sands with varying amounts of gravel was encountered in all our explorations to depths ranging from about 3 feet to 10 feet. The fill is associated with previous grading at the site and backfill associated with the demolition of the previously existing basement. The natural soils immediately underlying the fill consisted of medium dense silty sands, sands, and sands with gravel. The deeper soils consisted of medium dense to very dense silty sands with varying amounts of gravel, sands with varying amounts of gravel, sands with gravel and cobbles; and stiff sandy silts. Refusal to the truck-mounted flight-auger occurred on cobbles in Borings 4 and 8 at depths of 62 feet and 22.5 feet, respectively. Based on published geologic reports for this area, dense alluvial soil is considered to extend to a depth of at least 100 feet beneath the site. The depths of existing fill are itemized on the following table:

Boring Number	Depth of Fill (ft.)
B-1	8.0
B-2	10.0
B-3	10.0
B-4	10.0
B-5	*6.0+
B-6	3.0
B-7	5.0
B-8	3.0
B-9	6.0

* Natural ground was not encountered at the termination depth of the boring

Neither bedrock nor free ground water was noted at our boring locations. The near-surface soils observed in our test borings are granular and non-plastic, and are considered to have a very low expansion potential in accordance with ASTM D4829.

LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction is a phenomenon that occurs when a soil undergoes a transformation from a solid state to a liquefied condition due to the effects of increased pore-water pressure. Loose saturated soils with particle sizes in the medium sand to silt range are particularly susceptible to liquefaction when subjected to seismic ground shaking. Affected soils lose all strength during liquefaction, and foundation failure can occur.

Free ground water was not encountered at our boring locations. The San Bernardino Valley Municipal Water District (SBVMWD) is responsible for the management of groundwater levels in the San Bernardino Valley. Part of that management is a "Dewatering Contingency Plan for the Area of Historic High Groundwater" described in the November 29, 2017 letter from SBVMWD, and presented herewith as Enclosure 7. The intent of the groundwater management is to prevent groundwater levels shallower than 50 feet from the ground surface. For the purpose of our liquefaction analysis, we have assumed an historic high ground water level of 50 feet.

It is anticipated that major earthquake ground shaking will occur during the lifetime of the proposed development from the seismically active San Jacinto fault located approximately 0.5 mile southwest of the site. This fault would create the most significant earthshaking event. Based on a possible earthquake magnitude of 7.8, a peak horizontal ground acceleration of 0.96g is assigned to the site. To evaluate the potential for liquefaction and seismically induced settlement of the subsoils, the soils were analyzed for relative density. The most effective measurement of relative density of sands with respect to liquefaction potential is standard penetration resistance. Standard penetration tests were performed as Boring 4 was advanced to a depth of 62 feet. The standard penetration test "N" values are presented on the boring log for Boring 4.

Using the information presented in Table 3 of Page 73 of the publication by Idriss and Boulanger (Soil Liquefaction During Earthquakes, Idriss and Boulanger, MNO-12, 2008) an analysis was conducted to determine the sampler correction factor Cs. The SPT sampler is machined to fit liners, therefore a correction factor of 1.0 may not be appropriate. Throughout the test boring, a calculation was performed to determine the average $(N_1)_{60}$ value from which Cs was subsequently determined. An average Cs value of 1.3 was calculated and used in the analysis.

The standard penetration data provided input for the LiquefyPro Version 4.3 program for liquefaction and seismically induced settlement. As indicated in Special Publication 117A (Revised) Release, "Guidelines for Evaluating and Mitigating Seismic Hazards in California, March 2009," a safety factor of 1.3 was used in this analysis. The results of this evaluation are shown on Enclosure 8. Due to the depth to historic high ground water, the potential for liquefaction is low. This analysis reveals a total potential dynamic settlement of 2.74 inches in Boring 4. The total settlement will occur over a large area and will not affect local buried utilities. Within the building area, we would estimate the differential dynamic settlement would be about one-half the total. Based on a minimum administration building dimension of about 88.3 feet, a maximum angular distortion of about 1/773 is calculated, which is within tolerable limits. It is our judgment that neither liquefaction nor seismically induced dry settlement need be a consideration in the design of the proposed construction.

SEISMIC SHEAR-WAVE SURVEY

One 184-foot-long seismic line was performed within the western portion of the site. The results of the seismic shear-wave survey conducted by Terra Geosciences revealed that the average shear-wave velocity ("weighted average") in the upper 100 feet of the subject survey area is 1,064.7 feet per second. The report states that: ""This average velocity classifies the underlying soils to that of Site Class D ("Stiff Soil"), which has a velocity range from 600 to 1,200 ft/sec (ASCE 2017; Table 20.3-1)."" The report also states that: ""The "weighted average" velocity is computed from a formula that is used by the ASCE (2017; Section 20.4, Equation 20.4-1) to determine the average shear-wave velocity for the upper 100 feet of the subsurface (V100)."" Lastly, the report states that: "The detailed shear-wave model displays these calculated layer boundaries/depths and associated velocities (feet/second) for the 161-foot profile where locally measured." The shear-wave survey is presented as "Appendix A" in the ground-motion seismic analysis report by Terra Geosciences, Enclosure 8.

CONCLUSIONS

It appears that the existing artificial fill is non-uniform and undocumented, varying from loose to dense. The depth of existing artificial fill encountered in our test borings ranged from 3 feet to 10 feet. The natural soil encountered below the artificial fill appears to be competent. To assure uniform and acceptable foundation conditions, we recommend the artificial fill and any loose upper natural soils within the new structure areas be densified by subexcavation and recompaction where existing improvements will allow. Complete stabilization of the existing artificial fill under pavement areas would require removal and recompaction of the existing artificial fill. The cost of complete removal and recompaction of the existing fill within pavement areas does not appear to be warranted. Substantial stabilization can be obtained by removal and recompaction of the upper 3 feet of artificial fill within pavement areas. Recommendations for foundation design and slabs-on-grade are provided below for a very low (Expansion Index of 0 to 20) expansion potential. Subsequent to site preparation, the new structures may be safely founded on conventional continuous and isolated footings bearing entirely on compacted fill. Detailed recommendations are provided below.

RECOMMENDATIONS

FOUNDATION DESIGN

Where the site is prepared as recommended, the new administration and warehouse buildings may be founded on conventional continuous and isolated footings. The footings should be at least 12 inches wide and should be placed at least 18 inches below the lowest final adjacent grade. These footings should be designed for a maximum safe soil bearing pressure of 2,500 pounds per square foot for dead plus live loads. If the footing embedment is increased to 24 inches below the lowest final adjacent grade, the maximum safe soil bearing pressure can be increased to 3,000 pounds per square foot. Footings for ancillary structures, such as trash enclosures and site walls, May be as shallow as 12 inches below the lowest final adjacent grade, and should be designed for a maximum safe soil bearing pressure of 2,000 pounds per square foot. These bearing capacity values may be increased by one-third for wind and seismic loading.

The continuous footings should be reinforced with at least two No. 4 bars, one placed near the top and one near the bottom of the footings. This recommendation for foundation reinforcement is based on geotechnical considerations. Structural design may require additional foundation reinforcement.

SEISMIC DESIGN PARAMETERS

The development of the seismic ground motion parameters is described in detail in the ground-motion seismic analysis report performed in our behalf by Terra Geosciences (Enclosure 8). In summary, the 2019 California Building Code and the ASCE Standard 7-16 coefficients and factors are provided in the following table:

Factor or Coefficient	***Value***
Latitude	34.0769° N
Longitude	117.2931° W
S_S	2.437g
S_1	0.977g
F_a	1.0

Factor or Coefficient	***Value***
F_v	1.7
S_{MS}	2.439g
S_{M1}	2.215g
S_{DS}	1.630g
S_{D1}	1.480g
PGA	0.96g
T_L	8 seconds
Site Class	D

LATERAL LOADING

Resistance to lateral loads will be provided by passive earth pressure and basal friction. For footings bearing against compacted fill, passive earth pressure may be considered to develop at a rate of 350 pounds per square foot per foot of depth. Basal friction may be computed at 0.4 times the normal dead load. The resistance from basal friction and passive earth pressure may be combined directly without reduction. The allowable lateral resistance may be increased by one-third for wind and seismic loading.

SLABS-ON-GRADE

Concrete slab-on-grade design recommendations are listed below. The slab-on-grade recommendations assume underlying utility trench backfills and pad subgrade soils have been densified to a relative compaction of at least 90 percent (ASTM D1557).

1. It is our opinion that the recommended compacted fill soils should provide adequate support for concrete slabs-on-grade without the use of a gravel base. The final pad surface should be rolled to provide a smooth dense surface upon which to place the concrete.

2. The slab-on-grade floors should be at least 4 inches thick – structural considerations may require a thicker slab. Concrete slabs-on-grade supporting significant loads may be designed using a modulus of subgrade reaction of 250 pounds per cubic inch.

3. The slab-on-grade floors should be reinforced with at least No. 4 bars at 16 inches on-center each way or equivalent.

4. Slabs to receive moisture-sensitive floor coverings should be underlain with a moisture vapor retardant membrane, such as 15-mil Stego Wrap or equivalent. The moisture vapor retardant membrane should conform to ASTM E 1745-11 (Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs). The moisture vapor retardant membrane should be lapped into the footing excavations to provide full coverage of the subgrade soils. Punctures and/or holes cut for plumbing should be taped to minimize moisture emissions through the membrane. The project inspector and/or a representative of the geotechnical engineer should inspect the placement of the moisture vapor retardant membrane prior to covering. Installation of the moisture vapor retardant membrane should be performed in accordance with ASTM E 1643-11 (Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs).

5. The slab concrete should be placed directly on the moisture vapor retardant membrane. Placing concrete directly on the moisture vapor retardant membrane will increase shrinkage and curling forces and make finishing more difficult. To accommodate these concerns, the structural engineer should provide appropriate mix design criteria for concrete placed directly on the moisture vapor retardant membrane.

6. We recommend a maximum water-cement ratio of 0.50 for all building slab concrete. Architectural or structural considerations may require the utilization of a lower water-cement ratio. Where slab concrete is placed directly on the moisture vapor retardant membrane without the presence of an intervening layer of absorptive sand, a lower maximum water-cement ratio may be needed.

7. Preparation of the concrete floor slabs should conform to ASTM F 710-11 (Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring) and the manufacturer's recommendations. Moisture vapor emission tests should be performed to verify acceptable moisture emission rates prior to flooring installation.

SITE PREPARATION

We assume that the site will be prepared in accordance with the California Building Code and the current City of San Bernardino Grading Ordinance. The recommendations presented below are to establish additional grading criteria. These recommendations should be considered preliminary and are subject to modification or expansion based on a geotechnical review of the project foundation and grading plans.

- All areas to be graded should be stripped of man-made obstructions and other deleterious materials. Buried structures that are encountered should be removed. Underground utilities encountered should also be removed and relocated or abandoned. All cavities created during site clearing should be cleaned of loose and disturbed soil, shaped to provide access for construction equipment, and backfilled with fill placed and compacted as described below.

- Existing artificial fill should be removed from the new buildings and pavement areas. The depths of existing artificial fill encountered in our test borings ranged from 3 feet to 10 feet. The existing artificial fill may extend to greater depths in areas not explored. The removals should extend beyond the building areas a horizontal distance at least equal to the depth of removal or 5 feet, whichever distance is greater. The existing artificial fill need not be removed to depths greater than 3 feet within proposed pavement areas. Unsuitable debris should be separated from the removed fill and hauled from the site. The removed artificial fill should be stockpiled pending replacement or be placed in areas previously prepared.

- Overexcavation

    - <ins>New administration and warehouse building areas</ins> – The existing artificial fill underlying the new building areas should be removed as described above. The natural soil exposed in the bottom of the overexcavation should be evaluated by the representative of the geotechnical engineer. Natural soil exhibiting a relative compaction of less than 85 percent (ASTM D1557) should be further overexcavated until undisturbed soil exhibiting a relative compaction of at least 85 percent is encountered. Where not restricted by existing structures, the overexcavation should extend beyond the new building areas, including roof overhang and/or canopy footings, a horizontal distance at least equal to the depth of overexcavation below the final ground surface or 5 feet, whichever distance is greater. The slope of the backcut should not be steeper than 1/2H:1V. The representative of the geotechnical engineer should evaluate the conditions encountered and determine where the overexcavation can be terminated.

  - <u>Pavement and hardscape areas</u> – Should natural soil be encountered at a depth of less than 3 feet below asphalt concrete and portland cement concrete pavement and hardscape areas, the soils exposed in the subexcavated surface should be scarified to a minimum depth of 12 inches. The scarified soil should be moisture conditioned to within 2 percent of the optimum moisture content, and densified to a relative compaction of a least 90 percent (ASTM D1557).

- Subexcavated surfaces and all other surfaces to receive fill should be scarified to a minimum depth of 12 inches, moisture conditioned to within 2 percent of the optimum moisture content, and densified to a minimum relative compaction of 90 percent (ASTM D1557).

- The on-site soils should provide adequate quality fill material provided they are free from significant organic matter and other deleterious materials and are at acceptable moisture contents. Import fill should be inorganic, granular, non-expansive soil free from rocks or lumps greater than 8 inches in maximum dimension and should exhibit a very low expansion potential (expansion index less than 21), negligible sulfate content (less than 1,000 ppm soluble sulfate by weight), and low corrosion potential. Prior to bringing import fill to the site, the contractor should obtain certification to verify that the proposed import meets the State of California Department of Toxic Substance Control (DTSC) environmental standards. Proposed import should be sampled at the source and tested by this firm for expansion index, soluble sulfate content, and corrosion potential.

- All fill should be placed in 8-inch or less lifts; each lift should be moisture conditioned to within 2 percent of the optimum moisture content. Engineered fill should be densified to a minimum relative compaction of 90 percent (ASTM D1557). Where the horizontal limits of overexcavation cannot be achieved, the engineered fill should be densified to a relative compaction of at least 95 percent.

- The surface of the site should be graded to provide positive drainage away from the structures. Drainage should be directed to established swales and then to appropriate drainage structures to minimize the possibility of erosion. Water should not be allowed to pond adjacent to footings and grade beams.

SHRINKAGE AND SUBSIDENCE

Volume change in going from cut to fill conditions is anticipated where near-surface grading will occur. Assuming the fill will be compacted to an average relative compaction of 93 percent, an average cut-fill shrinkage of 10 percent is estimated. Further volume loss will occur through subsidence during preparation of the natural ground surface. Although the contractor's methods and equipment utilized in preparing the natural ground will have a significant effect on the amount of natural ground subsidence that will occur, our experience indicates as much as 0.10 foot of subsidence in areas prepared to receive fill should be anticipated. These values are exclusive of losses due to stripping or removal of subsurface obstructions.

ASPHALT CONCRETE AND PORTLAND CEMENT CONCRETE PAVEMENT

A representative sample of upper soils at the site has been tested for relevant subgrade properties and exhibits a moderate stability under traffic loading ("R" value of 65). A Traffic Index of 5.0 was assumed for interior parking and driveway areas for conventional vehicular traffic, and a Traffic Index of 6.0 was assumed where heavier truck traffic will be accommodated. Recommendations for portland cement concrete (PCC) for hardscape are also presented below. In conjunction with the test data shown on Enclosure 5, we believe the sections presented on the following table should provide durable pavement.

		"R"	Thickness (Inches)	
Location	**TI**	**Value**	**Asphalt Concrete**	**Aggregate Base**
Pavement areas for conventional passenger cars and light trucks	5.0	65	2.5	4.0
Pavement areas for heavier trucks	6.0	65	3.0	4.0

Location	TI	"R" Value	Thickness (Inches) Portland Cement Concrete
Pavement areas for conventional passenger cars and light trucks	5.0	65	4.5
Pavement areas for heavier trucks	6.0	65	6.5

Location	Thickness (Inches) Portland Cement Concrete
Pavement areas for pedestrian traffic	3.5

The foregoing thickness for portland cement concrete pavement is for unreinforced concrete placed directly on the compacted subgrade soil. Aggregate base is not geotechnically required for the PCC pavement sections; however, if aggregate base is to be utilized for the PCC pavement, we recommend a minimum of 4 inches of aggregate base placed over the 12 inches of compacted subgrade soil. The design engineer may wish to provide some level of reinforcement to minimize the width of shrinkage cracks.

For hardscape areas to receive only pedestrian traffic, we recommend the PCC pavement be at least 3.5 inches in thickness and be placed directly on the compacted subgrade soil. Prior to the placement of hardscape concrete, we recommend that the final subgrade surface be scarified to a depth of at least 12 inches, moisture conditioned to within 2 percent of the optimum moisture content, and densified to a minimum relative compaction of 90 percent (ASTM D1557). There are no geotechnical conditions indicating the need for reinforcement of the concrete pavement. The design engineer may wish to provide some level of reinforcement to minimize the width of shrinkage cracks.

Portland cement concrete for pavement should be proportioned for a maximum slump of 4 inches and to achieve a minimum compressive strength of 3,000 psi at 28 days. If additional workability is desired, a plasticizing or water-reducing admixture should be utilized in lieu of increasing the water content. Control joints for the 3.5-inch-thick pavement should be spaced no more than 10.5 feet on-center each way. The control joints for the 4.5-inch-thick pavement should be spaced no more than 13.5 feet on-center each way. The control joints for the 6.5-inch-thick pavement should be spaced no more than 19.5 feet on-center each way. Control joints should be established either by hand groovers, plastic inserts, or saw-cutting as soon as the concrete can be cut without dislodging aggregate. Cutting the control joints the day after the concrete pour will likely result in uncontrolled shrinkage cracks. Concrete should not be placed in hot and windy weather. Water curing should commence immediately after the final finishing and should continue for at least 7 days.

The above designs are preliminary and for estimating purposes only. We recommend that during the process of rough grading, observation and additional testing of the actual subgrade soils should be performed. Final pavement design sections can then be determined. The foregoing pavement sections assume that utility trench backfill below all proposed pavement areas will be compacted to at least 90 percent relative compaction. Prior to the placement of aggregate base, we recommend that the final subgrade surface be scarified to a depth of at least 12 inches, moisture conditioned to within 2 percent of the optimum moisture content, and compacted to a minimum relative compaction of at least 90 percent (ASTM D1557). Aggregate base should be densified to at least 95 percent relative compaction. Suggested specifications for aggregate base material are presented on Enclosure 6. The preparation of the subgrade and compaction of the aggregate base should be monitored by a representative of the geotechnical engineer.

CHEMICAL TEST RESULTS

The chemical test results from a sample taken from Boring 1 between the ground surface and a depth of 6 feet are shown on the following table:

Analysis	**Result**	**Units**
Saturated Resistivity	3700	ohm-cm
Chloride	ND (Not Detected)	ppm
Sulfate	50	ppm
pH	7.3	pH units
Redox Potential	196	mV

The chemical test results from a sample taken from Boring 7 between the ground surface and a depth of 5 feet are shown on the following table:

Analysis	Result	Units
Saturated Resistivity	10900	ohm-cm
Chloride	ND (Not Detected)	ppm
Sulfate	10	ppm
pH	7.4	pH units
Redox Potential	252	mV

The soil tested in Borings 1 and 7 exhibited negligible soluble sulfate content; therefore, sulfate-resistant concrete will not be required for this project. In addition, the results of the corrosivity testing indicate that the soil tested is not detrimentally corrosive to ferrous-metal pipes.

FOUNDATION AND GRADING PLAN REVIEW

The project foundation and grading plans should be reviewed by the geotechnical engineer. Additional recommendations may be required at that time.

CONSTRUCTION OBSERVATIONS

All grading operations, including the preparation of the ground surface, should be observed and compaction tests performed by this firm. No fill should be placed on any prepared surface until that surface has been evaluated by the representative of the geotechnical engineer. All footing and excavations should be observed by the representative of the geotechnical engineer prior to placement of forms or reinforcing steel.

The conclusions and recommendations presented in this report are based upon the field and laboratory investigation described herein, and represent our best engineering judgment. Should conditions be encountered in the field that appear different from those described in this report, we should be contacted immediately in order that appropriate recommendations might be prepared.

Respectfully submitted,

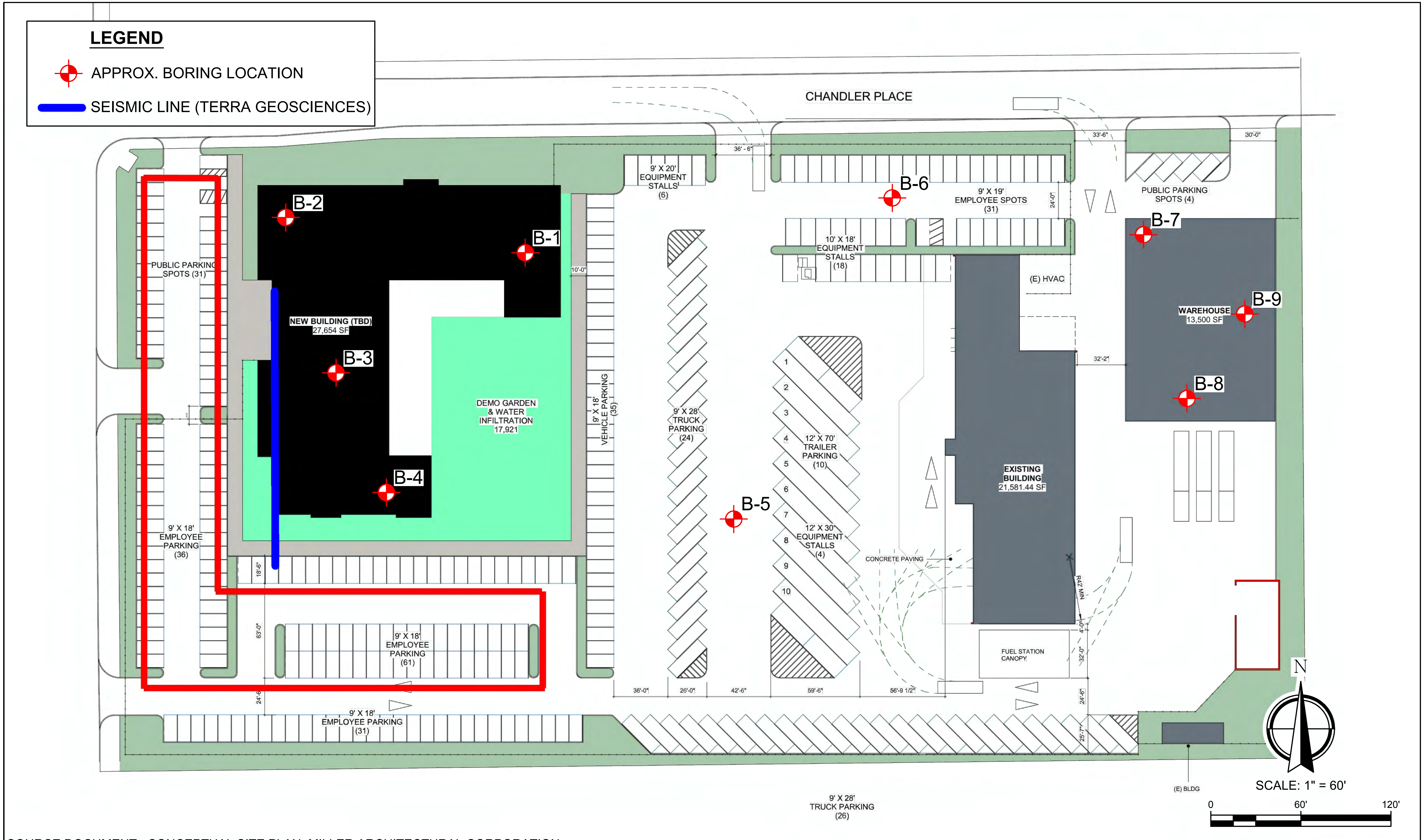
JOHN R. BYERLY, INC.

John R. Byerly, Geotechnical Engineer
President

REGISTERED PROFESSIONAL ENGINEER
JOHN R. BYERLY
GE 000179
EXP. 06/30/21
GEOTECHNICAL
STATE OF CALIFORNIA

JRB:MLL:jet

Enclosures:
(1) Plot Plan
(2) Test Boring Logs
(3) Maximum Density Determinations
(4) Direct Shear Test Results
(5) Subgrade Soil Tests
(6) Specifications for Aggregate Base
(7) San Bernardino Valley Municipal Water District (SBVMWD) Letter
(8) Liquefaction and Dynamic Settlement Analysis
(9) Ground-Motion Seismic Analysis Report



SOURCE DOCUMENT: CONCEPTUAL SITE PLAN, MILLER ARCHITECTURAL CORPORATION

John R. Byerly
INCORPORATED

SOILS INVESTIGATION

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT
SOUTHEAST CORNER OF CHANDLER PLACE AND SOUTH E STREET
SAN BERNARDINO, CALIFORNIA

Enclosure 1
Rpt. No.: 6392
File No.: S-14163

Boring 1

Boring Date: 3/16/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table
0						GWT not encountered
		26	116	4.5	88	
		24	114	3.7	86	
5		24	115	3.9	87	
		14	101	10..3	82	
10		16	111	7.1	85	
15		42	112	4.0	92	
20		32	119	1.7	90	
25		50	124	1.9	94	
30		28	120	2.4	91	
35						

SP	Gray fine to coarse sand with gravel, damp and medium dense (FILL)
SP	Gray-brown fine to coarse sand with some gravel, damp and medium dense (FILL)
SM	Black silty fine sand with old flood debris, moist and loose (FILL)
SP	Gray-brown fine to coarse sand with gravel, damp and medium dense (ORIGINAL GROUND)
SM	Gray-brown silty fine to coarse sand with gravel, moist and medium dense
SP	Light gray fine sand, damp and dense
SP	Light brown fine to coarse sand with gravel, dry and dense
SP	Light gray-brown fine to coarse sand with gravel, dry and dense

Total Depth at 31.0 Feet
No Free Ground Water Encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\S-14163 (Rpt. No. 6392).log Date: 4/24/2020

LOG OF BORING

John R. Byerly, Inc.

SBMWD New Administration and Warehouse Buildings

Enclosure 2, Page 1
Rpt. No.: 6392
File No.: S-14163

Boring 2

Boring Date: 3/16/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0						GWT not encountered	SP	Gray fine to coarse sand with gravel, damp and medium dense (FILL)
		29	117	4.9	89		SP	Gray fine to coarse sand with some gravel, damp and medium dense (FILL)
		28	115	3.8	87		SP	Gray-brown fine to coarse sand with some gravel, damp and medium dense (FILL)
5		28	117	10.7	90		SM	Gray-brown silty fine to coarse sand with gravel, moist and dense (FILL)
		23	112	7.4	86			- becoming medium dense at 7.5 feet
10		28	107	3.2	88		SP	Light gray fine sand, damp and medium dense (ORIGINAL GROUND)
							SM	Gray-brown silty fine sand, moist and medium dense
15		39	111	2.6	91		SP	Light gray-brown fine sand, dry and dense
20		29	119	2.0	90		SP	Light brown fine to coarse sand with gravel, dry and dense
25		34	---	---	---			
							SP	Light gray-brown fine to coarse sand with gravel, dry and dense
30		50/9"	113	2.7	93		SP	Light gray fine sand, dry and dense
								Total Depth at 31.0 Feet No Free Ground Water Encountered
35								

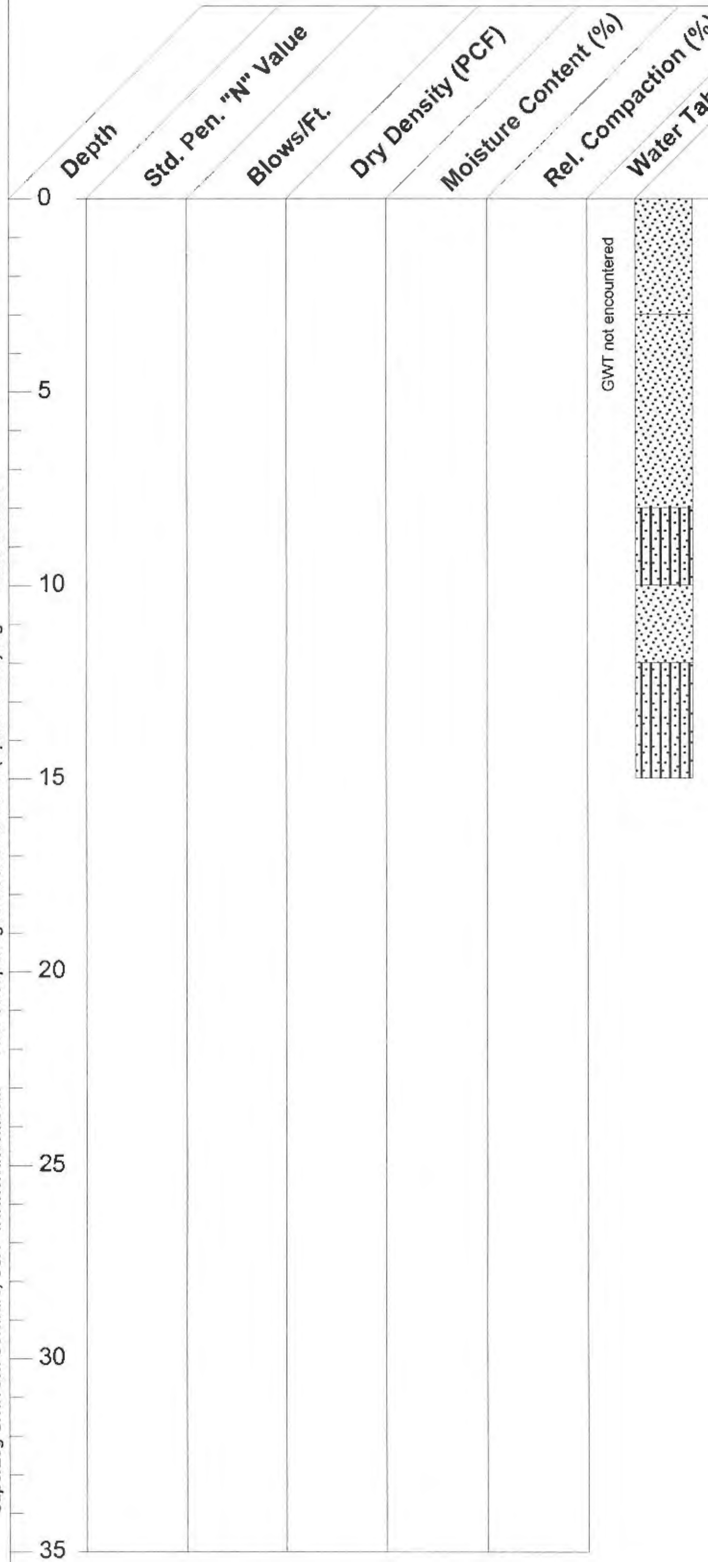
LOG OF BORING

John R. Byerly, Inc.

SBMWD New Administration and Warehouse Buildings

Boring 3

Boring Date: 3/17/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger



SP	Brown fine to coarse sand with gravel, damp and medium dense (FILL)
SP	Gray-brown fine to coarse sand with gravel, damp and medium dense (FILL)
SM	Dark gray-brown silty fine to coarse sand with gravel, moist and medium dense (FILL)
SP	Ligh gray fine sand, damp and medium dense (ORIGINAL GROUND)
SM	Gray-brown silty fine sand, moist and medium dense - with some gravel at 14.0 feet

Total Depth at 15.0 Feet
No Free Ground Water Encountered

LOG OF BORING

Boring 4

Boring Date: 3/16/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0								
		46	123	4.6	93	GWT not encountered	SP	Gray fine to coarse sand with gravel, damp and medium dense (FILL)
		21	113	7.8	87		SM	Gray fine to coarse sand, damp and dense (FILL)
	25	20	114	3.2	86		SP	Gray-brown silty fine to coarse sand, moist and medium dense (FILL)
								Gray fine to coarse sand, damp and medium dense (FILL)
10	33	29	117	3.6	89		SP	Light gray-orange fine sand, damp and medium dense (ORIGINAL GROUND)
	34	39	110	4.0	90		SP	Gray-brown orange fine sand, damp and dense
20	58	50	124	2.4	94		SP	Gray-orange fine to coarse sand with some gravel, dry and dense
							SP	Light gray fine to coarse sand with some gravel, dry and very dense
	55	50	125	2.9	95			
30	300	50/1"	---	---	---			
	64						SP	Gray-brown fine to coarse sand with gravel, damp and very dense
40	51						SP	Gray fine to coarse sand with gravel, damp and very dense
	120							
50	68							
	75							
60	120						SP	Light gray-orange fine sand with gravel and cobbles, damp and very dense
								Refual on Cobbles at 62.0 Feet
								No Free Ground Water Encountered
70								

LOG OF BORING

John R. Byerly, Inc.

SBMWD New Administration and Warehouse Buildings

Enclosure 2, Page 4
Rpt. No.: 6392
File No.: S-14163

Boring 5

Boring Date: 3/17/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0						GWT not encountered	SM	Gray-brown silty fine to coarse sand with gravel, moist and medium dense (FILL)
		33	114	7.5	88			
		18	111	8.4	85			
5		19	112	11.5	86			
10								
15								
20								
25								
30								
35								

Total Depth at 6.0 Feet
No Free Ground Water Encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\S-14163 (Rpt. No. 6392).log Date: 4/24/2020

LOG OF BORING

John R. Byerly, Inc.

SBMWD New Administration and Warehouse Buildings

Enclosure 2, Page 1
Rpt. No.: 6392
File No.: S-14163

Boring 6

Boring Date: 3/16/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger

Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table
	21	113	7.9	87	GWT not encountered
	24	110	8.7	89	
	18	106	10.3	86	

Depth: 0, 5, 10, 15, 20, 25, 30, 35

SM — 3.5 inches of asphalt concrete over 2.0 inches of aggregate base

Gray-brown silty fine to coarse sand, moist and medium dense (FILL)

SM — Gray silty fine sand, moist and medium dense (ORIGINAL GROUND)

Total Depth at 6.0 Feet
No Free Ground Water Encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\S-14163 (Rpt. No. 6392).log Date: 4/24/2020

LOG OF BORING

John R. Byerly, Inc.

SBMWD New Administration and Warehouse Buildings

Boring 7

Boring Date: 3/16/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger

Depth	Std. Pen. "N" Value Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table
0					GWT not encountered
	18	106	8.6	86	
	18	109	9.3	88	
5	16	106	7.8	86	
	15	105	7.1	85	
10	22	---	21.9	---	
15	45	112	3.5	92	
20	50/8"	124	2.0	94	
25	50/11"	120	2.4	91	
30	50/11	121	1.6	92	
35					

	3.0 inches of asphalt concrete over 12.0 inches of aggregate base
SM	Gray-brown silty fine sand, moist and medium dense (FILL)
SP	Light gray-brown fine sand, moist and medium dense (ORIGINAL GROUND)
SP	Light gray fine sand, damp and medium dense
ML	Gray sandy silt, very moist and stiff - with seams of fine sand at 11.5 feet
ML	Black sandy silt, moist and stiff
SP	Light gray fine sand, damp and dense
SP	Gray fine sand, damp and dense - with gravel and cobbles at 18.5 feet
SP	Light brown fine to coarse sand with gravel and cobbles, dry and dense
SP	Light gray-brown fine to coarse sand with gravel, dry and dense
SP	Light gray fine to coarse sand, dry and dense

Total Depth at 31.0 Feet
No Free Ground Water Encountered

LOG OF BORING

John R. Byerly, Inc.

SBMWD New Administration and Warehouse Buildings

Boring 8

Boring Date: 3/16/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0						GWT not encountered		3.0 inches of asphalt concrete over 7.0 inches of aggregate base
		19	106	7.5	86		SM	Gray-brown silty fine sand, moist and medium dense (FILL)
		23	109	9.1	89		SP	Gray fine sand, moist and medium dense (ORIGINAL GROUND)
5								
		16	104	5.2	85			- becoming damp at 5.5 feet
		15	104	3.3	85		SP	Gray-orange fine sand, damp and medium dense
							SP	Light gray fine sand, dry and medium dense
10								
		20	106	2.4	87			
15								
		40	111	2.9	91		SP	Gray-orange fine sand, dry and dense
								- with some cobbles at 17.0 feet
20								
		50/4"	---	2.0	---		SP	Light gray-brown fine to coarse sand with gravel and cobbles, dry and very dense
25								
30								
35								

Refusal on Cobbles at 22.5 Feet
No Free Ground Water Encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\S-14163 (Rpt. No. 6392).log Date: 4/24/2020

LOG OF BORING

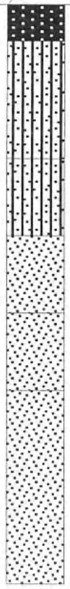
John R. Byerly, Inc.

SBMWD New Administration and Warehouse Buildings

Enclosure 2, Page 8
Rpt. No.: 6392
File No.: S-14163

Boring 9

Boring Date: 3/16/20
Surface Elevation:
Drilling Method: Truck-Mounted Flight-Auger



Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0						GWT not encountered		3.5 inches of asphalt concrete over 8.0 inches of aggregate base
							SM	Brown silty fine sand, moist and medium dense (FILL)
5							SM	Dark brown silty fine sand, moist and medium dense (FILL)
							SP	Brown fine sand, damp and medium dense (ORIGINAL GROUND)
							SP	Light gray fine sand, dry and medium dense
10							SP	Gray fine sand, dry and medium dense
15								Total Depth at 15.0 Feet No Free Ground Water Encountered
20								
25								
30								
35								

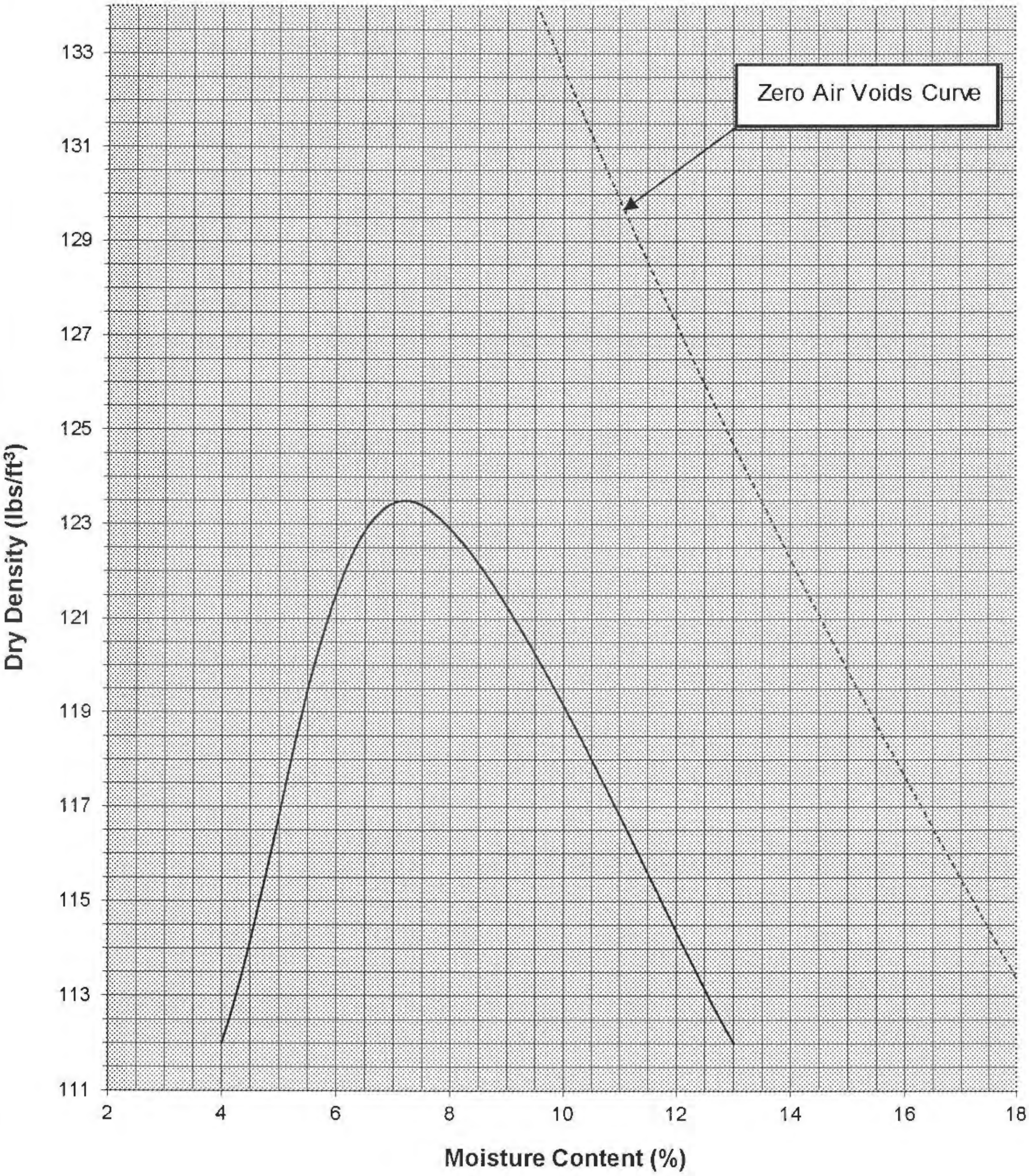
LOG OF BORING

John R. Byerly, Inc.

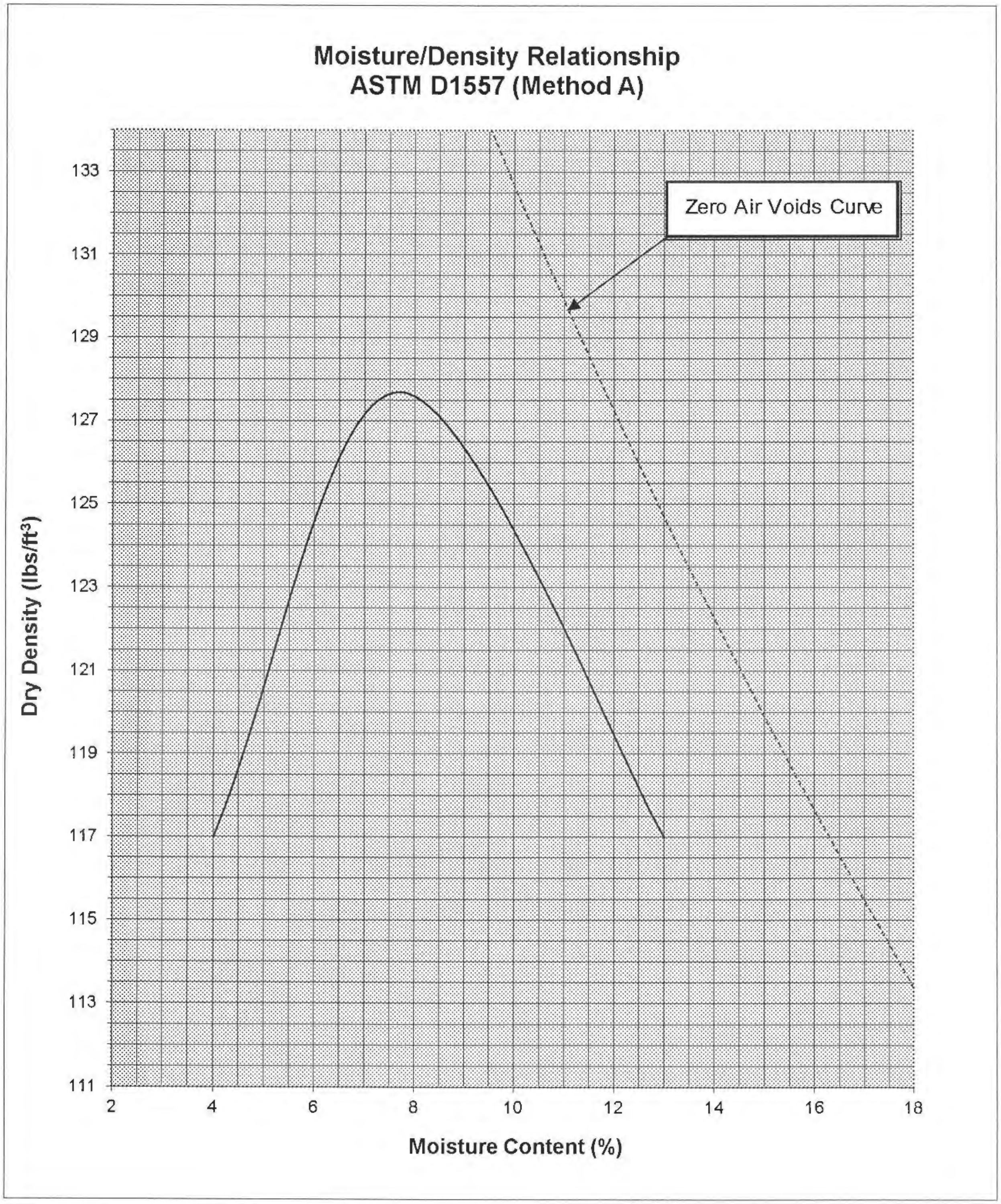
SBMWD New Administration and Warehouse Buildings

Enclosure 2, Page 9
Rpt. No.: 6392
File No.: S-14163

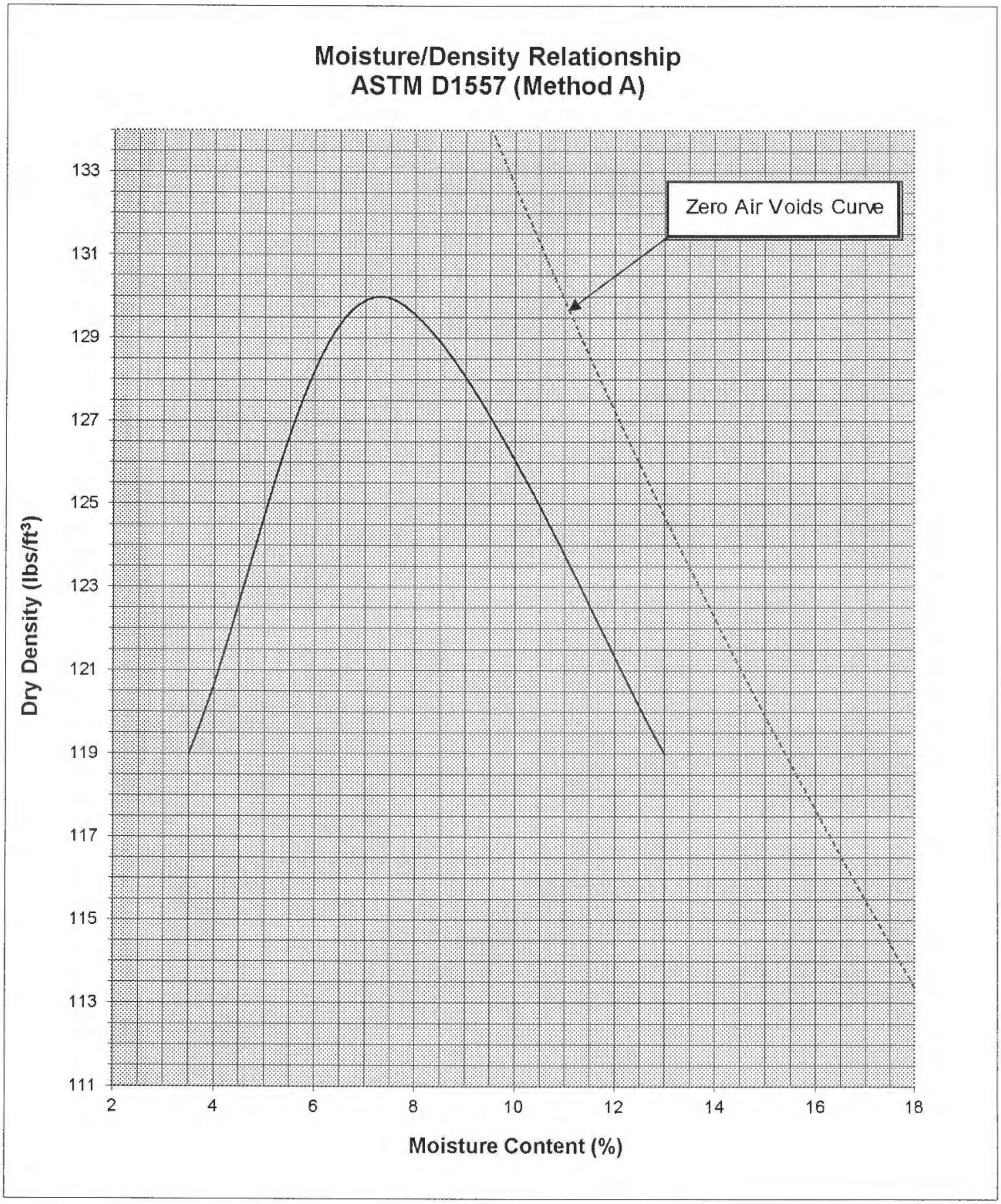
Moisture/Density Relationship
ASTM D1557 (Method A)



Boring No.	B-8
Depth (ft.)	2.0
Optimum Moisture (%)	7.2
Maximum Dry Density (pcf)	123.5
Soil Classification	Gray-brown silty fine sand (SM)

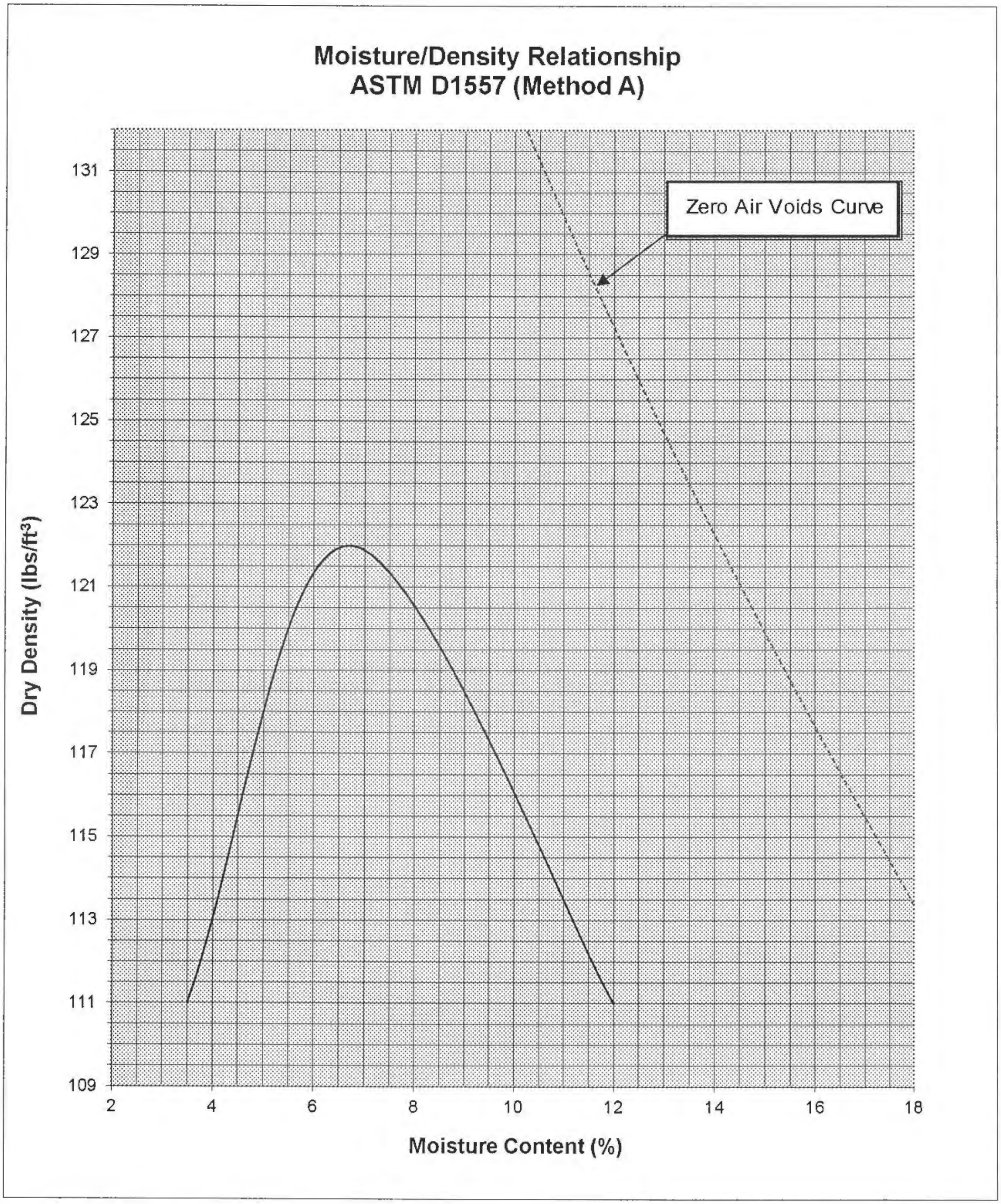


Boring No.	B-6
Depth (ft.)	2.0
Optimum Moisture (%)	7.7
Maximum Dry Density (pcf)	127.7
Soil Classification	Gray-brown silty fine to medium sand (SM)

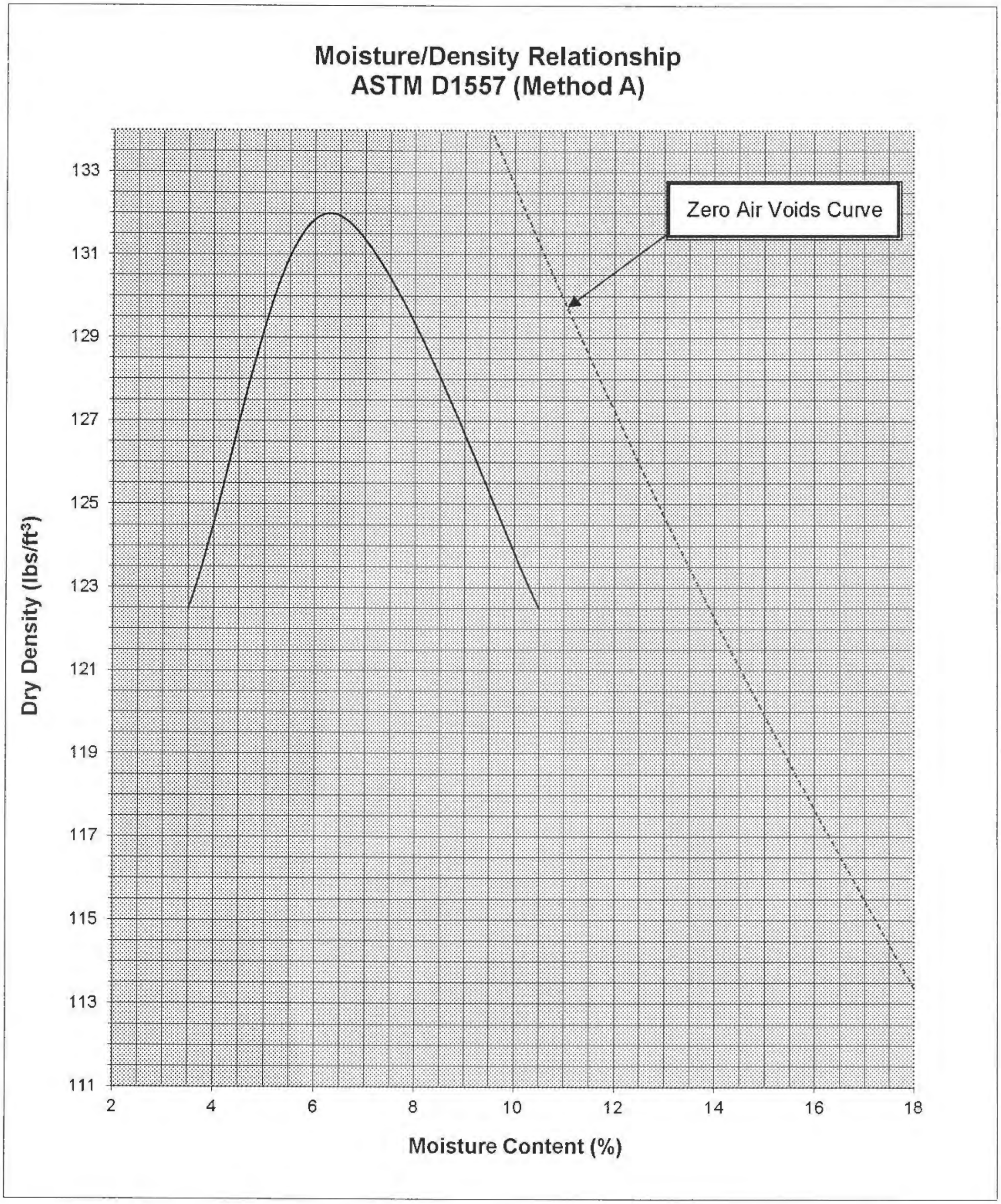


Boring No.	B-2
Depth (ft.)	6.0
Optimum Moisture (%)	7.3
Maximum Dry Density (pcf)	130.0
Soil Classification	Gray-brown silty fine to coarse sand with gravel (SM)

SBMWD New Administration and Warehouse Buildings	Enclosure 3, Page 3 Rpt. No.: 6392 File No.: S-14163



Boring No.	B-7
Depth (ft.)	5.0
Optimum Moisture (%)	6.7
Maximum Dry Density (pcf)	122.0
Soil Classification	Light gray-brown fine sand (SP)



Boring No.	B-1
Depth (ft.)	3.0
Optimum Moisture (%)	6.3
Maximum Dry Density (pcf)	132.0
Soil Classification	Gray-brown fine to coarse sand with some gravel (SP)

DIRECT SHEAR TESTS

Test Boring No.	Depth of Sample (Ft.)	Angle of Internal Friction (°)	Cohesion (PSF)
B-7	3.5	33	50
B-8	5.0	32	0

RESULTS OF SUBGRADE SOIL TESTS

California Department of Transportation Test Methods 202, 217, & 301
ASTM Designations C136 and D2419

PROJECT: SBMWD New Administration and Warehouse Buildings

		Percent Passing Sieve Size:															
Sample No.	**Location**	**3"**	**2½"**	**2"**	**1½"**	**1"**	**3/4"**	**1/2"**	**3/8"**	**No. 4**	**No. 8**	**No. 16**	**No. 30**	**No. 50**	**No. 100**	**No. 200**	**Sand Equiv.**
1	B-5 at 0-5'				100	96	91	85	81	75	71	63	49	30	18	10	44

STABILOMETER "R" VALUE

Sample No.		1	
Moisture Content (%)	8.1	8.6	9.0
Dry Density (lbs./cu. ft.)	126.2	125.1	124.5
Exudation Pressure (psi)	630	363	167
Expansion Pressure (psf)	0.000	0.000	0.000
"R" Value	68	66	62
"R" Value at 300 PSI Exudation		65	

Enclosure 5
Rpt. No.: 6392
File No.: S-14163

SUGGESTED SPECIFICATIONS FOR CLASS II BASE

Sieve Size	**Percent Finer Than**
1 Inch	100
3/4 Inch	90 - 100
No. 4	35 - 60
No. 30	10 - 30
No. 200	2 - 9
Sand Equivalent (Minimum)	25
"R" Value (minimum) at 300 psi Exudation	78

San Bernardino Valley Municipal Water District

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

November 29, 2017

Ms. Jennifer Thomburg
Senior Engineering Geologist
Department of Conservation
California Geological Survey
801 K Street
Sacramento, CA 95814

Re: Management of High Groundwater Levels Beneath Dorothy Ingrhram Learning Center – CGS Application No. 04-CGS3076

Dear Ms. Thornburg:

One of the objectives of the *Upper Santa Ana River Watershed Integrated Regional Water Management Plan* is to manage the groundwater levels in the San Bernardino Valley, primarily beneath the City of San Bernardino, to reduce the risk of liquefaction. A regional groundwater flow model was developed by the United States Geological Survey and is used to establish a threshold for artificial recharge of the groundwater basin to help prevent high groundwater (levels shallower than 50 feet from ground surface). This threshold is published each year in the Basin Technical Adivosory Committee (BTAC) Regional Annual Water Management Plan (Annual Plan) and is tracked by the BTAC on a monthly basis.

Although water agencies believe that shallow groundwater levels are not likely to return, there is always a chance they could recur on a short-term basis. For this reason, the BTAC developed a *Dewatering Contingency Plan for the Area of Historic High Groundwater* (Contingency Plan) that can be quickly implemented. The Contingency Plan generally consists of retail water agencies shifting from other water supplies to their groundwater wells located in the Area of Historic High Groundwater until groundwater levels are deeper than 50 feet from land surface.

Please call me at (909) 387-9215 if you would like to discuss further.

Sincerely,

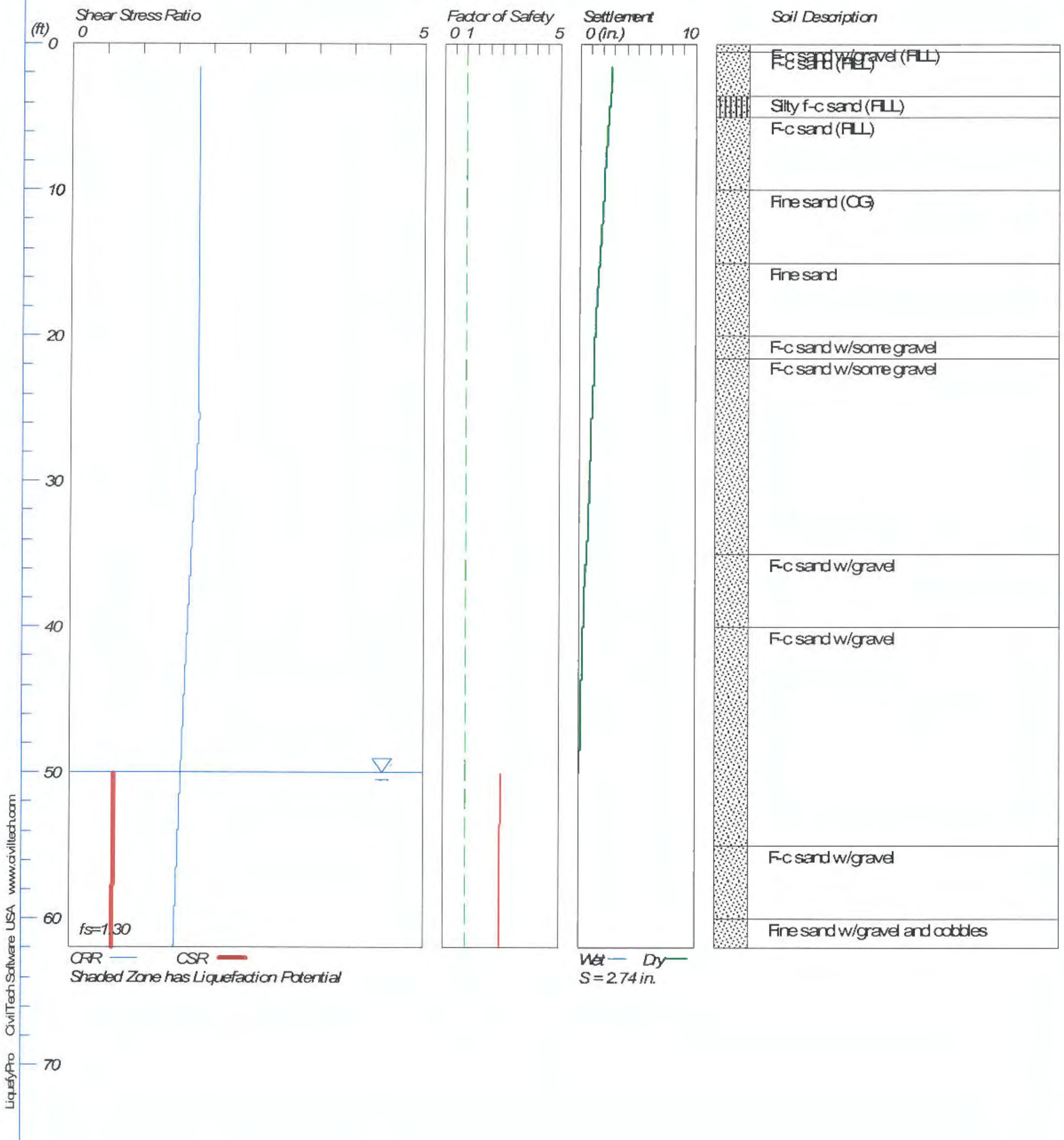
Robert M. Tincher, M.S., P.E.
Manager of Water Resources

Enclosure 7
Rpt. No.: 6392
File No.: S-14163

LIQUEFACTION ANALYSIS

NEW ADMINSTRATION AND WAREHOUSE BUILDINGS FOR SBMWD

Hole No.=B-4 Water Depth=50.0 ft Surface Elev.=984 feet above MSL Magnitude=7.8
Acceleration=0.96g



John R. Byerly, Inc. **S-14163**

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                                             LIQUEFACTION ANALYSIS CALCULATION SHEET

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*******************************************************************************************
*******************
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        Input File Name: T:\Liquefy4\S-14163.1.liq
        Title:  NEW ADMINISTRATION AND WAREHOUSE BUILDINGS FOR SBMWD
        Subtitle:  S-14163

        Surface Elev.=984 feet above MSL
        Hole No.=B-4
        Depth of Hole= 62.0 ft
        Water Table during Earthquake= 50.0 ft
        Water Table during In-Situ Testing= 70.0 ft
        Max. Acceleration= 0.96 g
        Earthquake Magnitude= 7.8
        User defined factor of safty (applied to CSR)       User fs=1.3
        fs=user,  Plot one CSR (fs=user)

        Hammer Energy Ratio, Ce=1
        Borehole Diameter, Cb=1.15
        Sampeling Method, Cs=1.3
        SPT Fines Correction Method: Stark/Olson et al.*
        Settlement Analysis Method: Ishihara / Yoshimine*
        Fines Correction for Liquefaction: Stark/Olson et al.*
        Fine Correction for Settlement: Post-Liq. Correction *
        Average Input Data: Smooth*
        * Recommended Options

Input Data:
        Depth   SPT     Gamma   Fines
        ft              pcf     %
        ____________________________________
        1.5     32.0    128.7   1.0
        3.5     15.0    121.8   25.0
        6.0     25.0    117.6   1.0
        10.0    33.0    121.2   1.0
        11.0    33.0    121.2   1.0
        16.0    34.0    114.4   1.0
        21.0    58.0    127.0   1.0
        26.0    55.0    128.6   1.0
        30.0    300.0   130.0   1.0
        35.0    64.0    130.0   1.0
        40.0    51.0    130.0   1.0
        45.0    120.0   135.0   1.0
        50.0    68.0    135.0   1.0
        55.0    75.0    135.0   1.0
        60.0    120.0   135.0   1.0
        ____________________________________

Output Results:
        Settlement of saturated sands=0.00 in.
        Settlement of dry sands=2.74 in.
```

```
Total settlement of saturated and dry sands=2.74 in.
Differential Settlement=1.369 to 1.807 in.

Depth   CRRm    CSRfs   F.S.    S_sat.  S_dry   S_all
ft              w/fs            in.     in.     in.
_______________________________________________________
1.50    1.81    0.81    5.00    0.00    2.74    2.74
2.50    1.81    0.81    5.00    0.00    2.71    2.71
3.50    1.81    0.80    5.00    0.00    2.61    2.61
4.50    1.81    0.80    5.00    0.00    2.49    2.49
5.50    1.81    0.80    5.00    0.00    2.40    2.40
6.50    1.81    0.80    5.00    0.00    2.31    2.31
7.50    1.81    0.80    5.00    0.00    2.23    2.23
8.50    1.81    0.80    5.00    0.00    2.14    2.14
9.50    1.81    0.79    5.00    0.00    2.09    2.09
10.50   1.81    0.79    5.00    0.00    2.04    2.04
11.50   1.81    0.79    5.00    0.00    1.97    1.97
12.50   1.81    0.79    5.00    0.00    1.88    1.88
13.50   1.81    0.79    5.00    0.00    1.80    1.80
14.50   1.81    0.78    5.00    0.00    1.71    1.71
15.50   1.81    0.78    5.00    0.00    1.63    1.63
16.50   1.81    0.78    5.00    0.00    1.54    1.54
17.50   1.81    0.78    5.00    0.00    1.46    1.46
18.50   1.81    0.78    5.00    0.00    1.37    1.37
19.50   1.81    0.77    5.00    0.00    1.31    1.31
20.50   1.81    0.77    5.00    0.00    1.27    1.27
21.50   1.81    0.77    5.00    0.00    1.24    1.24
22.50   1.81    0.77    5.00    0.00    1.20    1.20
23.50   1.81    0.77    5.00    0.00    1.16    1.16
24.50   1.81    0.76    5.00    0.00    1.11    1.11
25.50   1.82    0.76    5.00    0.00    1.05    1.05
26.50   1.80    0.76    5.00    0.00    0.99    0.99
27.50   1.79    0.76    5.00    0.00    0.96    0.96
28.50   1.78    0.76    5.00    0.00    0.92    0.92
29.50   1.77    0.76    5.00    0.00    0.88    0.88
30.50   1.76    0.75    5.00    0.00    0.84    0.84
31.50   1.75    0.74    5.00    0.00    0.80    0.80
32.50   1.74    0.74    5.00    0.00    0.75    0.75
33.50   1.72    0.73    5.00    0.00    0.70    0.70
34.50   1.71    0.72    5.00    0.00    0.65    0.65
35.50   1.70    0.72    5.00    0.00    0.57    0.57
36.50   1.69    0.71    5.00    0.00    0.49    0.49
37.50   1.68    0.70    5.00    0.00    0.42    0.42
38.50   1.67    0.70    5.00    0.00    0.38    0.38
39.50   1.66    0.69    5.00    0.00    0.33    0.33
40.50   1.65    0.68    5.00    0.00    0.29    0.29
41.50   1.64    0.68    5.00    0.00    0.25    0.25
42.50   1.63    0.67    5.00    0.00    0.21    0.21
43.50   1.62    0.67    5.00    0.00    0.19    0.19
44.50   1.61    0.66    5.00    0.00    0.16    0.16
45.50   1.61    0.65    5.00    0.00    0.14    0.14
46.50   1.60    0.65    5.00    0.00    0.12    0.12
47.50   1.59    0.64    5.00    0.00    0.09    0.09
48.50   1.58    0.63    5.00    0.00    0.06    0.06
49.50   1.57    0.63    5.00    0.00    0.02    0.02
50.50   1.56    0.62    2.51    0.00    0.00    0.00
51.50   1.55    0.62    2.50    0.00    0.00    0.00
52.50   1.54    0.62    2.49    0.00    0.00    0.00
53.50   1.54    0.62    2.48    0.00    0.00    0.00
54.50   1.53    0.62    2.47    0.00    0.00    0.00
55.50   1.52    0.62    2.47    0.00    0.00    0.00
56.50   1.51    0.61    2.46    0.00    0.00    0.00
57.50   1.50    0.61    2.46    0.00    0.00    0.00
```

```
        58.50   1.50    0.61    2.46    0.00    0.00    0.00
        59.50   1.49    0.61    2.46    0.00    0.00    0.00
        60.50   1.48    0.60    2.45    0.00    0.00    0.00
        61.50   1.48    0.60    2.46    0.00    0.00    0.00
        _______________________________________________________
        * F.S.<1, Liquefaction Potential Zone
        (F.S. is limited to 5,  CRR is limited to 2,    CSR is limited to 2)

        Units           Depth = ft, Stress or Pressure = tsf (atm), Unit Weight =
pcf, Settlement = in.

_________________________________________________________________________________
        CRRm            Cyclic resistance ratio from soils
        CSRfs           Cyclic stress ratio induced by a given earthquake (with user
request factor of safety)
        F.S.            Factor of Safety against liquefaction, F.S.=CRRm/CSRfs
        S_sat           Settlement from saturated sands
        S_dry           Settlement from dry sands
        S_all           Total settlement from saturated and dry sands
        NoLiq           No-Liquefy Soils
```

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                                            LIQUEFACTION ANALYSIS CALCULATION SHEET

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        Input File Name: T:\Liquefy4\S-14163.1.liq
        Title:  NEW ADMINISTRATION AND WAREHOUSE BUILDINGS FOR SBMWD
        Subtitle:  S-14163

 Input Data:

        Surface Elev.=984 feet above MSL
        Hole No.=B-4
        Depth of Hole=62.0 ft
        Water Table during Earthquake= 50.0 ft
        Water Table during In-Situ Testing= 70.0 ft
        Max. Acceleration=0.96 g
        Earthquake Magnitude=7.8
        User defined factor of safty (applied to CSR)       User fs=1.3
        fs=user,  Plot one CSR (fs=user)

        Hammer Energy Ratio, Ce=1
        Borehole Diameter, Cb=1.15
        Sampeling Method, Cs=1.3
        SPT Fines Correction Method: Stark/Olson et al.*
        Settlement Analysis Method: Ishihara / Yoshimine*
        Fines Correction for Liquefaction: Stark/Olson et al.*
        Fine Correction for Settlement: Post-Liq. Correction *
        Average Input Data: Smooth*
        * Recommended Options

        Depth   SPT     Gamma   Fines
        ft              pcf     %
        ____________________________________
        1.5     32.0    128.7   1.0
        3.5     15.0    121.8   25.0
        6.0     25.0    117.6   1.0
        10.0    33.0    121.2   1.0
        11.0    33.0    121.2   1.0
        16.0    34.0    114.4   1.0
        21.0    58.0    127.0   1.0
        26.0    55.0    128.6   1.0
        30.0    300.0   130.0   1.0
        35.0    64.0    130.0   1.0
        40.0    51.0    130.0   1.0
        45.0    120.0   135.0   1.0
        50.0    68.0    135.0   1.0
        55.0    75.0    135.0   1.0
        60.0    120.0   135.0   1.0
        ____________________________________

 Output Results:          (Interval = 1.00 ft)
```

```
CSR Calculation:
Depth   gamma   sigma   gamma'  sigma'  rd      CSR     fs      CSRfs
ft      pcf     tsf     pcf     tsf                     (user)  w/fs
______________________________________________________________________
1.50    128.7   0.097   128.7   0.097   1.00    0.62    1.3     0.81
2.50    125.3   0.160   125.3   0.160   0.99    0.62    1.3     0.81
3.50    121.8   0.222   121.8   0.222   0.99    0.62    1.3     0.80
4.50    120.1   0.282   120.1   0.282   0.99    0.62    1.3     0.80
5.50    118.4   0.342   118.4   0.342   0.99    0.62    1.3     0.80
6.50    118.1   0.401   118.1   0.401   0.98    0.61    1.3     0.80
7.50    119.0   0.460   119.0   0.460   0.98    0.61    1.3     0.80
8.50    119.9   0.520   119.9   0.520   0.98    0.61    1.3     0.80
9.50    120.8   0.580   120.8   0.580   0.98    0.61    1.3     0.79
10.50   121.2   0.641   121.2   0.641   0.98    0.61    1.3     0.79
11.50   120.5   0.701   120.5   0.701   0.97    0.61    1.3     0.79
12.50   119.2   0.761   119.2   0.761   0.97    0.61    1.3     0.79
13.50   117.8   0.820   117.8   0.820   0.97    0.60    1.3     0.79
14.50   116.4   0.879   116.4   0.879   0.97    0.60    1.3     0.78
15.50   115.1   0.937   115.1   0.937   0.96    0.60    1.3     0.78
16.50   115.7   0.994   115.7   0.994   0.96    0.60    1.3     0.78
17.50   118.2   1.053   118.2   1.053   0.96    0.60    1.3     0.78
18.50   120.7   1.112   120.7   1.112   0.96    0.60    1.3     0.78
19.50   123.2   1.173   123.2   1.173   0.95    0.60    1.3     0.77
20.50   125.7   1.235   125.7   1.235   0.95    0.59    1.3     0.77
21.50   127.2   1.299   127.2   1.299   0.95    0.59    1.3     0.77
22.50   127.5   1.362   127.5   1.362   0.95    0.59    1.3     0.77
23.50   127.8   1.426   127.8   1.426   0.95    0.59    1.3     0.77
24.50   128.1   1.490   128.1   1.490   0.94    0.59    1.3     0.76
25.50   128.4   1.554   128.4   1.554   0.94    0.59    1.3     0.76
26.50   128.8   1.619   128.8   1.619   0.94    0.59    1.3     0.76
27.50   129.1   1.683   129.1   1.683   0.94    0.58    1.3     0.76
28.50   129.5   1.748   129.5   1.748   0.93    0.58    1.3     0.76
29.50   129.8   1.813   129.8   1.813   0.93    0.58    1.3     0.76
30.50   130.0   1.878   130.0   1.878   0.93    0.58    1.3     0.75
31.50   130.0   1.943   130.0   1.943   0.92    0.57    1.3     0.74
32.50   130.0   2.008   130.0   2.008   0.91    0.57    1.3     0.74
33.50   130.0   2.073   130.0   2.073   0.90    0.56    1.3     0.73
34.50   130.0   2.138   130.0   2.138   0.89    0.56    1.3     0.72
35.50   130.0   2.203   130.0   2.203   0.89    0.55    1.3     0.72
36.50   130.0   2.268   130.0   2.268   0.88    0.55    1.3     0.71
37.50   130.0   2.333   130.0   2.333   0.87    0.54    1.3     0.70
38.50   130.0   2.398   130.0   2.398   0.86    0.54    1.3     0.70
39.50   130.0   2.463   130.0   2.463   0.85    0.53    1.3     0.69
40.50   130.5   2.528   130.5   2.528   0.84    0.53    1.3     0.68
41.50   131.5   2.593   131.5   2.593   0.84    0.52    1.3     0.68
42.50   132.5   2.659   132.5   2.659   0.83    0.52    1.3     0.67
43.50   133.5   2.726   133.5   2.726   0.82    0.51    1.3     0.67
44.50   134.5   2.793   134.5   2.793   0.81    0.51    1.3     0.66
45.50   135.0   2.860   135.0   2.860   0.80    0.50    1.3     0.65
46.50   135.0   2.928   135.0   2.928   0.80    0.50    1.3     0.65
47.50   135.0   2.995   135.0   2.995   0.79    0.49    1.3     0.64
48.50   135.0   3.063   135.0   3.063   0.78    0.49    1.3     0.63
49.50   135.0   3.130   135.0   3.130   0.77    0.48    1.3     0.63
50.50   135.0   3.198   72.6    3.184   0.76    0.48    1.3     0.62
51.50   135.0   3.265   72.6    3.220   0.75    0.48    1.3     0.62
52.50   135.0   3.333   72.6    3.256   0.75    0.48    1.3     0.62
53.50   135.0   3.400   72.6    3.292   0.74    0.48    1.3     0.62
54.50   135.0   3.468   72.6    3.329   0.73    0.47    1.3     0.62
55.50   135.0   3.535   72.6    3.365   0.72    0.47    1.3     0.62
56.50   135.0   3.603   72.6    3.401   0.71    0.47    1.3     0.61
57.50   135.0   3.670   72.6    3.438   0.71    0.47    1.3     0.61
58.50   135.0   3.738   72.6    3.474   0.70    0.47    1.3     0.61
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        59.50   135.0   3.805   72.6    3.510   0.69    0.47    1.3     0.61
        60.50   135.0   3.873   72.6    3.547   0.68    0.46    1.3     0.60
        61.50   135.0   3.940   72.6    3.583   0.67    0.46    1.3     0.60
        _______________________________________________________________________
        CSR is based on water table at 50.0 during earthquake

        CRR Calculation from SPT or BPT data:
        Depth   SPT     Cebs    Cr      sigma'  Cn      (N1)60  Fines   d(N1)60
(N1)60f CRR7.5
        ft                                                      %

________________________________________________________________________________

_
        1.50    32.00   1.49    0.75    0.097   1.70    61.00   1.0     0.00
61.00   2.00
        2.50    23.50   1.49    0.75    0.160   1.70    44.79   13.0    1.92
46.71   2.00
        3.50    15.00   1.49    0.75    0.222   1.70    28.59   25.0    4.80
33.39   2.00
        4.50    19.00   1.49    0.75    0.282   1.70    36.22   15.4    2.50
38.71   2.00
        5.50    23.00   1.49    0.75    0.342   1.70    43.84   5.8     0.19
44.03   2.00
        6.50    26.00   1.49    0.75    0.401   1.58    46.04   1.0     0.00
46.04   2.00
        7.50    28.00   1.49    0.75    0.460   1.47    46.28   1.0     0.00
46.28   2.00
        8.50    30.00   1.49    0.85    0.520   1.39    52.87   1.0     0.00
52.87   2.00
        9.50    32.00   1.49    0.85    0.580   1.31    53.39   1.0     0.00
53.39   2.00
        10.50   33.00   1.49    0.85    0.641   1.25    52.39   1.0     0.00
52.39   2.00
        11.50   33.10   1.49    0.85    0.701   1.19    50.23   1.0     0.00
50.23   2.00
        12.50   33.30   1.49    0.85    0.761   1.15    48.51   1.0     0.00
48.51   2.00
        13.50   33.50   1.49    0.85    0.820   1.10    47.00   1.0     0.00
47.00   2.00
        14.50   33.70   1.49    0.85    0.879   1.07    45.68   1.0     0.00
45.68   2.00
        15.50   33.90   1.49    0.95    0.937   1.03    49.74   1.0     0.00
49.74   2.00
        16.50   36.40   1.49    0.95    0.994   1.00    51.85   1.0     0.00
51.85   2.00
        17.50   41.20   1.49    0.95    1.053   0.97    57.03   1.0     0.00
57.03   2.00
        18.50   46.00   1.49    0.95    1.112   0.95    61.94   1.0     0.00
61.94   2.00
        19.50   50.80   1.49    0.95    1.173   0.92    66.61   1.0     0.00
66.61   2.00
        20.50   55.60   1.49    0.95    1.235   0.90    71.04   1.0     0.00
71.04   2.00
        21.50   57.70   1.49    0.95    1.299   0.88    71.91   1.0     0.00
71.91   2.00
        22.50   57.10   1.49    0.95    1.362   0.86    69.48   1.0     0.00
69.48   2.00
        23.50   56.50   1.49    0.95    1.426   0.84    67.19   1.0     0.00
67.19   2.00
        24.50   55.90   1.49    0.95    1.490   0.82    65.03   1.0     0.00
65.03   2.00
        25.50   55.30   1.49    0.95    1.554   0.80    62.99   1.0     0.00
62.99   2.00
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         26.50    85.62   1.49    0.95    1.619   0.79    95.57   1.0     0.00
95.57    2.00
         27.50    146.87  1.49    0.95    1.683   0.77    160.78  1.0     0.00
160.78   2.00
         28.50    208.12  1.49    1.00    1.748   0.76    235.34  1.0     0.00
235.34   2.00
         29.50    269.36  1.49    1.00    1.813   0.74    299.11  1.0     0.00
299.11   2.00
         30.50    276.41  1.49    1.00    1.878   0.73    301.57  1.0     0.00
301.57   2.00
         31.50    229.21  1.49    1.00    1.943   0.72    245.85  1.0     0.00
245.85   2.00
         32.50    182.01  1.49    1.00    2.008   0.71    192.04  1.0     0.00
192.04   2.00
         33.50    134.81  1.49    1.00    2.073   0.69    139.99  1.0     0.00
139.99   2.00
         34.50    87.61   1.49    1.00    2.138   0.68    89.59   1.0     0.00
89.59    2.00
         35.50    62.70   1.49    1.00    2.203   0.67    63.16   1.0     0.00
63.16    2.00
         36.50    60.10   1.49    1.00    2.268   0.66    59.67   1.0     0.00
59.67    2.00
         37.50    57.50   1.49    1.00    2.333   0.65    56.28   1.0     0.00
56.28    2.00
         38.50    54.90   1.49    1.00    2.398   0.65    53.01   1.0     0.00
53.01    2.00
         39.50    52.30   1.49    1.00    2.463   0.64    49.83   1.0     0.00
49.83    2.00
         40.50    57.90   1.49    1.00    2.528   0.63    54.44   1.0     0.00
54.44    2.00
         41.50    71.70   1.49    1.00    2.593   0.62    66.56   1.0     0.00
66.56    2.00
         42.50    85.50   1.49    1.00    2.659   0.61    78.38   1.0     0.00
78.38    2.00
         43.50    99.29   1.49    1.00    2.726   0.61    89.92   1.0     0.00
89.92    2.00
         44.50    113.09  1.49    1.00    2.793   0.60    101.18  1.0     0.00
101.18   2.00
         45.50    114.80  1.49    1.00    2.860   0.59    101.49  1.0     0.00
101.49   2.00
         46.50    104.40  1.49    1.00    2.928   0.58    91.22   1.0     0.00
91.22    2.00
         47.50    94.00   1.49    1.00    2.995   0.58    81.21   1.0     0.00
81.21    2.00
         48.50    83.60   1.49    1.00    3.063   0.57    71.42   1.0     0.00
71.42    2.00
         49.50    73.20   1.49    1.00    3.130   0.57    61.86   1.0     0.00
61.86    2.00
         50.50    68.70   1.49    1.00    3.198   0.56    57.44   1.0     0.00
57.44    2.00
         51.50    70.10   1.49    1.00    3.265   0.55    58.00   1.0     0.00
58.00    2.00
         52.50    71.50   1.49    1.00    3.333   0.55    58.55   1.0     0.00
58.55    2.00
         53.50    72.90   1.49    1.00    3.400   0.54    59.10   1.0     0.00
59.10    2.00
         54.50    74.30   1.49    1.00    3.468   0.54    59.65   1.0     0.00
59.65    2.00
         55.50    79.49   1.49    1.00    3.535   0.53    63.21   1.0     0.00
63.21    2.00
         56.50    88.49   1.49    1.00    3.603   0.53    69.70   1.0     0.00
69.70    2.00
         57.50    97.49   1.49    1.00    3.670   0.52    76.08   1.0     0.00
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76.08    2.00
         58.50    106.49  1.49     1.00     3.738    0.52     82.35    1.0      0.00
82.35    2.00
         59.50    115.49  1.49     1.00     3.805    0.51     88.52    1.0      0.00
88.52    2.00
         60.50    120.00  1.49     1.00     3.873    0.51     91.16    1.0      0.00
91.16    2.00
         61.50    120.00  1.49     1.00     3.940    0.50     90.38    1.0      0.00
90.38    2.00
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         CRR is based on water table at 70.0 during In-Situ Testing

         Factor of Safety,  - Earthquake Magnitude= 7.8:
         Depth    sigC'    CRR7.5   Ksigma   CRRv     MSF      CRRm     CSRfs    F.S.
         ft       tsf      tsf                                          w/fs     CRRm/CSRfs
         ____________________________________________________________________________
         1.50     0.06     2.00     1.00     2.00     0.90     1.81     0.81     5.00
         2.50     0.10     2.00     1.00     2.00     0.90     1.81     0.81     5.00
         3.50     0.14     2.00     1.00     2.00     0.90     1.81     0.80     5.00
         4.50     0.18     2.00     1.00     2.00     0.90     1.81     0.80     5.00
         5.50     0.22     2.00     1.00     2.00     0.90     1.81     0.80     5.00
         6.50     0.26     2.00     1.00     2.00     0.90     1.81     0.80     5.00
         7.50     0.30     2.00     1.00     2.00     0.90     1.81     0.80     5.00
         8.50     0.34     2.00     1.00     2.00     0.90     1.81     0.80     5.00
         9.50     0.38     2.00     1.00     2.00     0.90     1.81     0.79     5.00
         10.50    0.42     2.00     1.00     2.00     0.90     1.81     0.79     5.00
         11.50    0.46     2.00     1.00     2.00     0.90     1.81     0.79     5.00
         12.50    0.49     2.00     1.00     2.00     0.90     1.81     0.79     5.00
         13.50    0.53     2.00     1.00     2.00     0.90     1.81     0.79     5.00
         14.50    0.57     2.00     1.00     2.00     0.90     1.81     0.78     5.00
         15.50    0.61     2.00     1.00     2.00     0.90     1.81     0.78     5.00
         16.50    0.65     2.00     1.00     2.00     0.90     1.81     0.78     5.00
         17.50    0.68     2.00     1.00     2.00     0.90     1.81     0.78     5.00
         18.50    0.72     2.00     1.00     2.00     0.90     1.81     0.78     5.00
         19.50    0.76     2.00     1.00     2.00     0.90     1.81     0.77     5.00
         20.50    0.80     2.00     1.00     2.00     0.90     1.81     0.77     5.00
         21.50    0.84     2.00     1.00     2.00     0.90     1.81     0.77     5.00
         22.50    0.89     2.00     1.00     2.00     0.90     1.81     0.77     5.00
         23.50    0.93     2.00     1.00     2.00     0.90     1.81     0.77     5.00
         24.50    0.97     2.00     1.00     2.00     0.90     1.81     0.76     5.00
         25.50    1.01     2.00     1.00     2.01     0.90     1.82     0.76     5.00
         26.50    1.05     2.00     1.00     2.00     0.90     1.80     0.76     5.00
         27.50    1.09     2.00     0.99     1.98     0.90     1.79     0.76     5.00
         28.50    1.14     2.00     0.98     1.97     0.90     1.78     0.76     5.00
         29.50    1.18     2.00     0.98     1.96     0.90     1.77     0.76     5.00
         30.50    1.22     2.00     0.97     1.94     0.90     1.76     0.75     5.00
         31.50    1.26     2.00     0.97     1.93     0.90     1.75     0.74     5.00
         32.50    1.30     2.00     0.96     1.92     0.90     1.74     0.74     5.00
         33.50    1.35     2.00     0.95     1.91     0.90     1.72     0.73     5.00
         34.50    1.39     2.00     0.95     1.90     0.90     1.71     0.72     5.00
         35.50    1.43     2.00     0.94     1.88     0.90     1.70     0.72     5.00
         36.50    1.47     2.00     0.94     1.87     0.90     1.69     0.71     5.00
         37.50    1.52     2.00     0.93     1.86     0.90     1.68     0.70     5.00
         38.50    1.56     2.00     0.93     1.85     0.90     1.67     0.70     5.00
         39.50    1.60     2.00     0.92     1.84     0.90     1.66     0.69     5.00
         40.50    1.64     2.00     0.91     1.83     0.90     1.65     0.68     5.00
         41.50    1.69     2.00     0.91     1.82     0.90     1.64     0.68     5.00
         42.50    1.73     2.00     0.90     1.81     0.90     1.63     0.67     5.00
         43.50    1.77     2.00     0.90     1.80     0.90     1.62     0.67     5.00
         44.50    1.82     2.00     0.89     1.79     0.90     1.61     0.66     5.00
         45.50    1.86     2.00     0.89     1.78     0.90     1.61     0.65     5.00
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46.50   1.90    2.00    0.88    1.77    0.90    1.60    0.65    5.00
47.50   1.95    2.00    0.88    1.76    0.90    1.59    0.64    5.00
48.50   1.99    2.00    0.87    1.75    0.90    1.58    0.63    5.00
49.50   2.03    2.00    0.87    1.74    0.90    1.57    0.63    5.00
50.50   2.08    2.00    0.86    1.73    0.90    1.56    0.62    2.51
51.50   2.12    2.00    0.86    1.72    0.90    1.55    0.62    2.50
52.50   2.17    2.00    0.85    1.71    0.90    1.54    0.62    2.49
53.50   2.21    2.00    0.85    1.70    0.90    1.54    0.62    2.48
54.50   2.25    2.00    0.84    1.69    0.90    1.53    0.62    2.47
55.50   2.30    2.00    0.84    1.68    0.90    1.52    0.62    2.47
56.50   2.34    2.00    0.84    1.67    0.90    1.51    0.61    2.46
57.50   2.39    2.00    0.83    1.66    0.90    1.50    0.61    2.46
58.50   2.43    2.00    0.83    1.66    0.90    1.50    0.61    2.46
59.50   2.47    2.00    0.82    1.65    0.90    1.49    0.61    2.46
60.50   2.52    2.00    0.82    1.64    0.90    1.48    0.60    2.45
61.50   2.56    2.00    0.82    1.63    0.90    1.48    0.60    2.46
-----------------------------------------------------------------------------
* F.S.<1: Liquefaction Potential Zone.  (If above water table: F.S.=5)
(F.S. is limited to 5,  CRR is limited to 2,    CSR is limited to 2)


CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:
Depth   Ic      qc/N60  qc1     (N1)60  Fines   d(N1)60 (N1)60s
ft                      tsf             %
_______________________________________________________________________
1.50    -       -       -       61.00   1.0     0.10    61.09
2.50    -       -       -       44.79   13.0    1.20    45.99
3.50    -       -       -       28.59   25.0    2.19    30.78
4.50    -       -       -       36.22   15.4    1.41    37.62
5.50    -       -       -       43.84   5.8     0.55    44.39
6.50    -       -       -       46.04   1.0     0.10    46.13
7.50    -       -       -       46.28   1.0     0.10    46.37
8.50    -       -       -       52.87   1.0     0.10    52.97
9.50    -       -       -       53.39   1.0     0.10    53.49
10.50   -       -       -       52.39   1.0     0.10    52.49
11.50   -       -       -       50.23   1.0     0.10    50.33
12.50   -       -       -       48.51   1.0     0.10    48.60
13.50   -       -       -       47.00   1.0     0.10    47.10
14.50   -       -       -       45.68   1.0     0.10    45.78
15.50   -       -       -       49.74   1.0     0.10    49.84
16.50   -       -       -       51.85   1.0     0.10    51.94
17.50   -       -       -       57.03   1.0     0.10    57.13
18.50   -       -       -       61.94   1.0     0.10    62.04
19.50   -       -       -       66.61   1.0     0.10    66.70
20.50   -       -       -       71.04   1.0     0.10    71.14
21.50   -       -       -       71.91   1.0     0.10    72.00
22.50   -       -       -       69.48   1.0     0.10    69.57
23.50   -       -       -       67.19   1.0     0.10    67.29
24.50   -       -       -       65.03   1.0     0.10    65.13
25.50   -       -       -       62.99   1.0     0.10    63.09
26.50   -       -       -       95.57   1.0     0.10    95.67
27.50   -       -       -       100.00  1.0     0.10    100.10
28.50   -       -       -       100.00  1.0     0.10    100.10
29.50   -       -       -       100.00  1.0     0.10    100.10
30.50   -       -       -       100.00  1.0     0.10    100.10
31.50   -       -       -       100.00  1.0     0.10    100.10
32.50   -       -       -       100.00  1.0     0.10    100.10
33.50   -       -       -       100.00  1.0     0.10    100.10
34.50   -       -       -       89.59   1.0     0.10    89.68
35.50   -       -       -       63.16   1.0     0.10    63.26
36.50   -       -       -       59.67   1.0     0.10    59.76
37.50   -       -       -       56.28   1.0     0.10    56.38
```

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    38.50    -      -      -      53.01   1.0    0.10    53.10
    39.50    -      -      -      49.83   1.0    0.10    49.92
    40.50    -      -      -      54.44   1.0    0.10    54.54
    41.50    -      -      -      66.56   1.0    0.10    66.66
    42.50    -      -      -      78.38   1.0    0.10    78.48
    43.50    -      -      -      89.92   1.0    0.10    90.01
    44.50    -      -      -      100.00  1.0    0.10    100.10
    45.50    -      -      -      100.00  1.0    0.10    100.10
    46.50    -      -      -      91.22   1.0    0.10    91.32
    47.50    -      -      -      81.21   1.0    0.10    81.30
    48.50    -      -      -      71.42   1.0    0.10    71.52
    49.50    -      -      -      61.86   1.0    0.10    61.96
    50.50    -      -      -      57.44   1.0    0.10    57.53
    51.50    -      -      -      58.00   1.0    0.10    58.09
    52.50    -      -      -      58.55   1.0    0.10    58.65
    53.50    -      -      -      59.10   1.0    0.10    59.20
    54.50    -      -      -      59.65   1.0    0.10    59.75
    55.50    -      -      -      63.21   1.0    0.10    63.31
    56.50    -      -      -      69.70   1.0    0.10    69.80
    57.50    -      -      -      76.08   1.0    0.10    76.18
    58.50    -      -      -      82.35   1.0    0.10    82.45
    59.50    -      -      -      88.52   1.0    0.10    88.61
    60.50    -      -      -      91.16   1.0    0.10    91.26
    61.50    -      -      -      90.38   1.0    0.10    90.48
    ________________________________________________________________

    Settlement of Saturated Sands:
    Settlement Analysis Method: Ishihara / Yoshimine*
    Depth   CSRfs   F.S.    Fines   (N1)60s Dr      ec      dsz     dsv     S
    ft      w/fs            %               %       %       in.     in.     in.

________________________________________________________________________________
        61.95   0.60    2.46    1.0     90.13   100.00  0.000   0.000   0.000
0.000
        61.50   0.60    2.46    1.0     90.48   100.00  0.000   0.000   0.000
0.000
        60.50   0.60    2.45    1.0     91.26   100.00  0.000   0.000   0.000
0.000
        59.50   0.61    2.46    1.0     88.61   100.00  0.000   0.000   0.000
0.000
        58.50   0.61    2.46    1.0     82.45   100.00  0.000   0.000   0.000
0.000
        57.50   0.61    2.46    1.0     76.18   100.00  0.000   0.000   0.000
0.000
        56.50   0.61    2.46    1.0     69.80   100.00  0.000   0.000   0.000
0.000
        55.50   0.62    2.47    1.0     63.31   100.00  0.000   0.000   0.000
0.000
        54.50   0.62    2.47    1.0     59.75   100.00  0.000   0.000   0.000
0.000
        53.50   0.62    2.48    1.0     59.20   100.00  0.000   0.000   0.000
0.000
        52.50   0.62    2.49    1.0     58.65   100.00  0.000   0.000   0.000
0.000
        51.50   0.62    2.50    1.0     58.09   100.00  0.000   0.000   0.000
0.000
        50.50   0.62    2.51    1.0     57.53   100.00  0.000   0.000   0.000
0.000
        50.05   0.62    2.52    1.0     57.28   100.00  0.000   0.000   0.000
0.000

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```
         Settlement of Saturated Sands=0.000 in.
         dsz is per each segment: dz=0.05 ft
         dsv is per each print interval: dv=1 ft
         S is cumulated settlement at this depth

         Settlement of Dry Sands:
         Depth    sigma'   sigC'    (N1)60s CSRfs    Gmax     g*Ge/Gm  g_eff    ec7.5    Cec
ec       dsz      dsv      S
         ft       tsf      tsf              w/fs     tsf                        %
%        in.      in.      in.
____________________________________________________________________________________________
         __________________________
         50.00    3.16     2.06     57.25   0.62     2468.5   8.0E-4   0.5064   0.1601   1.12
0.1791   2.1E-3   0.002    0.002
         49.50    3.13     2.03     61.96   0.63     2520.6   7.8E-4   0.4618   0.1460   1.12
0.1633   2.0E-3   0.020    0.023
         48.50    3.06     1.99     71.52   0.63     2615.4   7.4E-4   0.3921   0.1240   1.12
0.1386   1.7E-3   0.036    0.058
         47.50    3.00     1.95     81.30   0.64     2699.2   7.1E-4   0.3402   0.1076   1.12
0.1203   1.4E-3   0.031    0.089
         46.50    2.93     1.90     91.32   0.65     2773.9   6.8E-4   0.3000   0.0949   1.12
0.1061   1.3E-3   0.027    0.116
         45.50    2.86     1.86     100.10  0.65     2826.8   6.6E-4   0.2719   0.0860   1.12
0.0961   1.2E-3   0.024    0.140
         44.50    2.79     1.82     100.10  0.66     2793.3   6.6E-4   0.2704   0.0855   1.12
0.0956   1.1E-3   0.023    0.163
         43.50    2.73     1.77     90.01   0.67     2663.7   6.8E-4   0.2993   0.0947   1.12
0.1058   1.3E-3   0.024    0.187
         42.50    2.66     1.73     78.48   0.67     2513.6   7.1E-4   0.3431   0.1085   1.12
0.1213   1.5E-3   0.027    0.215
         41.50    2.59     1.69     66.66   0.68     2350.9   7.5E-4   0.4065   0.1286   1.12
0.1437   1.7E-3   0.032    0.246
         40.50    2.53     1.64     54.54   0.68     2171.0   8.0E-4   0.5064   0.1601   1.12
0.1790   2.1E-3   0.039    0.285
         39.50    2.46     1.60     49.92   0.69     2080.7   8.2E-4   0.5557   0.1757   1.12
0.1965   2.4E-3   0.047    0.332
         38.50    2.40     1.56     53.10   0.70     2095.7   8.0E-4   0.5092   0.1610   1.12
0.1800   2.2E-3   0.045    0.377
         37.50    2.33     1.52     56.38   0.70     2108.7   7.8E-4   0.4676   0.1479   1.12
0.1653   2.0E-3   0.041    0.419
         36.50    2.27     1.47     59.76   0.71     2119.9   7.6E-4   1.0000   0.3162   1.12
0.3536   4.2E-3   0.069    0.487
         35.50    2.20     1.43     63.26   0.72     2129.2   7.4E-4   1.0000   0.3162   1.12
0.3536   4.2E-3   0.085    0.572
         34.50    2.14     1.39     89.68   0.72     2356.1   6.6E-4   0.7162   0.2265   1.12
0.2532   3.0E-3   0.081    0.653
         33.50    2.07     1.35     100.10  0.73     2406.4   6.3E-4   0.5717   0.1808   1.12
0.2021   2.4E-3   0.050    0.703
         32.50    2.01     1.30     100.10  0.74     2368.4   6.3E-4   0.5522   0.1746   1.12
0.1952   2.3E-3   0.048    0.750
         31.50    1.94     1.26     100.10  0.74     2329.7   6.2E-4   0.5320   0.1682   1.12
0.1881   2.3E-3   0.046    0.796
         30.50    1.88     1.22     100.10  0.75     2290.4   6.2E-4   0.5112   0.1617   1.12
0.1807   2.2E-3   0.044    0.841
         29.50    1.81     1.18     100.10  0.76     2250.5   6.1E-4   0.4832   0.1528   1.12
0.1709   2.1E-3   0.042    0.883
         28.50    1.75     1.14     100.10  0.76     2209.8   6.0E-4   0.4491   0.1420   1.12
0.1588   1.9E-3   0.039    0.922
         27.50    1.68     1.09     100.10  0.76     2168.6   5.9E-4   0.4171   0.1319   1.12
0.1475   1.8E-3   0.037    0.959
         26.50    1.62     1.05     95.67   0.76     2094.9   5.9E-4   0.4134   0.1307   1.12
0.1462   1.8E-3   0.034    0.993
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          25.50   1.55     1.01     63.09   0.76     1787.1  6.6E-4  0.7543  0.2385  1.12
0.2667    3.2E-3  0.058    1.051
          24.50   1.49     0.97     65.13   0.76     1768.5  6.4E-4  0.6441  0.2037  1.12
0.2277    2.7E-3  0.059    1.110
          23.50   1.43     0.93     67.29   0.77     1749.0  6.3E-4  0.5516  0.1744  1.12
0.1950    2.3E-3  0.050    1.161
          22.50   1.36     0.89     69.57   0.77     1728.5  6.1E-4  0.4737  0.1498  1.12
0.1675    2.0E-3  0.043    1.204
          21.50   1.30     0.84     72.00   0.77     1707.1  5.9E-4  0.4078  0.1290  1.12
0.1442    1.7E-3  0.037    1.241
          20.50   1.24     0.80     71.14   0.77     1658.2  5.8E-4  0.3762  0.1190  1.12
0.1330    1.6E-3  0.033    1.274
          19.50   1.17     0.76     66.70   0.77     1581.7  5.7E-4  0.3731  0.1180  1.12
0.1319    1.6E-3  0.032    1.306
          18.50   1.11     0.72     62.04   0.78     1503.3  5.7E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.069    1.375
          17.50   1.05     0.68     57.13   0.78     1422.8  5.8E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    1.459
          16.50   0.99     0.65     51.94   0.78     1339.6  5.8E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    1.544
          15.50   0.94     0.61     49.84   0.78     1282.6  5.7E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    1.629
          14.50   0.88     0.57     45.78   0.78     1207.6  5.7E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    1.714
          13.50   0.82     0.53     47.10   0.79     1177.8  5.5E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    1.799
          12.50   0.76     0.49     48.60   0.79     1146.4  5.2E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    1.884
          11.50   0.70     0.46     50.33   0.79     1113.2  5.0E-4  0.9993  0.3160  1.12
0.3533    4.2E-3  0.085    1.969
          10.50   0.64     0.42     52.49   0.79     1079.1  4.7E-4  0.6916  0.2187  1.12
0.2445    2.9E-3  0.070    2.039
          9.50    0.58     0.38     53.49   0.79     1033.3  4.5E-4  0.5013  0.1585  1.12
0.1772    2.1E-3  0.049    2.088
          8.50    0.52     0.34     52.97   0.80     975.1   4.2E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.055    2.143
          7.50    0.46     0.30     46.37   0.80     877.7   4.2E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    2.228
          6.50    0.40     0.26     46.13   0.80     817.8   3.9E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    2.313
          5.50    0.34     0.22     44.39   0.80     745.7   3.7E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.085    2.397
          4.50    0.28     0.18     37.62   0.80     641.2   3.5E-4  1.0000  0.3714  1.12
0.4153    5.0E-3  0.088    2.485
          3.50    0.22     0.14     30.78   0.80     531.6   3.4E-4  1.0000  0.5470  1.12
0.6116    7.3E-3  0.124    2.609
          2.50    0.16     0.10     45.99   0.81     516.2   2.5E-4  1.0000  0.3162  1.12
0.3536    4.2E-3  0.101    2.710
          1.50    0.10     0.06     61.09   0.81     440.6   1.8E-4  0.0410  0.0130  1.12
0.0145    1.7E-4  0.028    2.738

_______________________________________________________________________________________
________________________________
          Settlement of Dry Sands=2.738 in.
          dsz is per each segment: dz=0.05 ft
          dsv is per each print interval: dv=1 ft
          S is cumulated settlement at this depth

          Total Settlement of Saturated and Dry Sands=2.738 in.
          Differential Settlement=1.369 to 1.807 in.

          Units          Depth = ft, Stress or Pressure = tsf (atm), Unit Weight =
pcf, Settlement = in.
```

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT)
fc	Friction from CPT testing
Gamma	Total unit weight of soil
Gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [tsf]
sigma'	Effective vertical stress [tsf]
sigC'	Effective confining pressure [tsf]
rd	Stress reduction coefficient
CSR	Cyclic stress ratio induced by earthquake
fs	User request factor of safety, apply to CSR
w/fs	With user request factor of safety inside
CSRfs	CSR with User request factor of safety
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksigma	Overburden stress correction factor for CRR7.5
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksigma
MSF	Magnitude scaling factor for CRR (M=7.5)
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
F.S.	Factor of Safety against liquefaction F.S.=CRRm/CSRfs
Cebs	Energy Ratio, Borehole Dia., and Sample Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after seattlement fines corrections
ec	Volumetric strain for saturated sands
ds	Settlement in each Segment dz
dz	Segment for calculation, dz=0.050 ft
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for dry sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

TERRA
GEOSCIENCES

GROUND-MOTION SEISMIC ANALYSIS

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT PROJECT

SE CORNER OF CHANDLER PLACE AND SOUTH "E" STREET

CITY OF SAN BERNARDINO, CALIFORNIA

Project No. 203388-1

March 19, 2020

Prepared for:

John R. Byerly, Inc.
2257 South Lilac Avenue
Bloomington, CA 92316

John R. Byerly, Inc.
2257 South Lilac Avenue
Bloomington, CA 92316

Attention: Mr. John R. Byerly

Regarding: Ground-Motion Seismic Analysis
San Bernardino Municipal Water Department Project
SE Corner of Chandler Place and South "E" Street
City of San Bernardino, California
JRB File No. S-14163

INTRODUCTION

At your request, this firm has prepared a ground-motion seismic analysis report for the proposed San Bernardino Municipal Water Department project, as referenced above. The purpose of this study was to evaluate the site-specific ground motion parameters to aid in the seismic design for this project, based on the current 2019 California Building Code (CBC). Our work included performing a seismic shear-wave study for determining the Site Classification and V_{S30} input values for this analysis. The location of the seismic shear-wave survey line has been approximated on a captured Google™ Earth image (Google™ Earth, 2020), as presented on Plate 1, in addition to being transposed onto a partial copy of the provided Conceptual Site Plan, prepared by Miller Architectural Corporation, dated August 22, 2019, as presented on the Seismic Line Location Map (see Plate 2), for reference. The scope of services provided for this evaluation included the following:

- **Review of available published and unpublished geologic/seismic data in our files pertinent to the site.**
- **Performing a seismic surface-wave survey by a licensed State of California Professional Geophysicist that included one traverse for shear-wave velocity analysis purposes.**
- **Evaluation of the local and regional tectonic setting including performing a site-specific CBC ground motion analysis.**
- **Preparation of this report presenting our findings, with respect to the seismic design parameters.**

Accompanying Maps and Appendices

Plate 1-	Google™ Earth Imagery Map
Plate 2-	Seismic Line Location Map
Appendix A -	Shear-Wave Survey
Appendix B -	Site Specific Ground Motion Analysis
Appendix C -	References

PROJECT SUMMARY

Based on the information that has been provided, we understand that construction of a new 30,000 square-foot, two-story administration and associated warehouse building are proposed to be constructed within the subject property. The location of the proposed structures and associated appurtenances, are shown on the Seismic Line Location Map, Plate 2, for reference. For this project, we have performed a field reconnaissance, which included observation of the exploratory boring that were being drilled during our field study, reviewed pertinent available geologic and geotechnical data in our files, along with performing a seismic shear-wave survey.

To aid in determining the soil Site Classification of the site for ground motion analysis purposes, a seismic shear-wave survey using the multi-channel analysis of surface waves (MASW) and microtremor array measurements (MAM) methods was performed in order to assess the one-dimensional average shear-wave velocity structure beneath the subject site to a depth of at least 100 feet. This survey line was performed within the western portion of the site (as shown on Plates 1 and 2), which provided the necessary survey line length, as well as being representative for the site development.

The resultant shear wave velocity (V_S) within the upper 100 feet (30 meters) was then used to determine the Site Classification (ASCE, 2017, Table 20.3-1) of the subject project study area for the seismic analysis. The detailed results of this survey, including the supportive data, are presented within Appendix A for reference.

Geologic mapping of the local area by Morton (1978), indicates that the subject construction areas are mantled by Holocene age younger alluvial deposits, with presumably progressively older alluvial deposits at depth. These surficial deposits are generally described as being comprised of unconsolidated sandy-pebbly-bouldery alluvium. Fife and Morton (1974) indicate that up to 1,000± feet of Quaternary age alluvial sediments are present below the site. Site-specific exploration by John R. Byerly, Inc. (JRB, 2020) revealed that the project development area is underlain by interbedded dense to very-dense fine-grained sand, fine- to medium-grained sand, and fine- to coarse-grained sand, with varying amounts of gravel throughout, to a depth of at least 62 feet.

The approximate location of the seismic shear-wave traverse (Seismic Line SW-1) is shown on a captured Google™ Earth (2020) image, as presented as the Google™ Earth Imagery Map, Plate 1. Additionally, the survey line is also shown on a partial copy of the provided Conceptual Site Plan, prepared by Miller Architectural Corporation, dated August 22, 2019, as presented on the Seismic Line Location Map, Plate 2. Photographic views of the seismic line traverse have been included within Appendix A for both visual and reference purposes.

SITE-SPECIFIC GROUND MOTION ANALYSIS

As requested, we have performed a site-specific seismic ground motion analysis as discussed above. Geographically, the proposed development project is located at Latitude 34.0769 and Longitude -117.2931 (World Geodetic System of 1984). The mapped spectral acceleration parameters, coefficients, and other related seismic parameters, were evaluated using the OSHPD Seismic Design Maps Tool web application (OSHPD, 2020) and the California Building Code criteria (CBC, 2019), with the site-specific ground motion analysis being performed following Section 21 of the ASCE 7-16 Standard (ASCE, 2017).

The results of this site-specific ground motion analysis have been summarized and are tabulated below, with the detailed analysis being presented within Appendix B:

TABLE 1 – SUMMARY OF SEISMIC DESIGN PARAMETERS

Factor or Coefficient	Value
S_S	**2.437g**
S_1	**0.977g**
F_a	**1.0**
F_v	**1.7**
S_{DS}	**1.630g**
S_{D1}	**1.480g**
S_{MS}	**2.439g**
S_{M1}	**2.215g**
T_L	**8 Seconds**
MCE_G PGA	**0.96g**
Shear-Wave Velocity (V_{30})	**1,064.7 ft/sec**
Site Classification	**D**
Risk Category	**II**

CLOSURE

Our conclusions and recommendations are based on an interpretation of available existing geologic, geophysical, geotechnical, and seismic data. No subsurface exploration was performed by this firm for this evaluation. We make no warranty, either express or implied. Should conditions be encountered at a later date or more information becomes available that appear to be different than those indicated in this report, we reserve the right to reevaluate our conclusions and recommendations and provide appropriate mitigation measures, if warranted. If this report is not understood, it is the responsibility of the owner, contractor, engineer, and/or governmental agency, etc., to contact this office for further clarification.

Respectfully submitted,
TERRA GEOSCIENCES

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CEG 1459

Professional Geophysicist
PGP 1002

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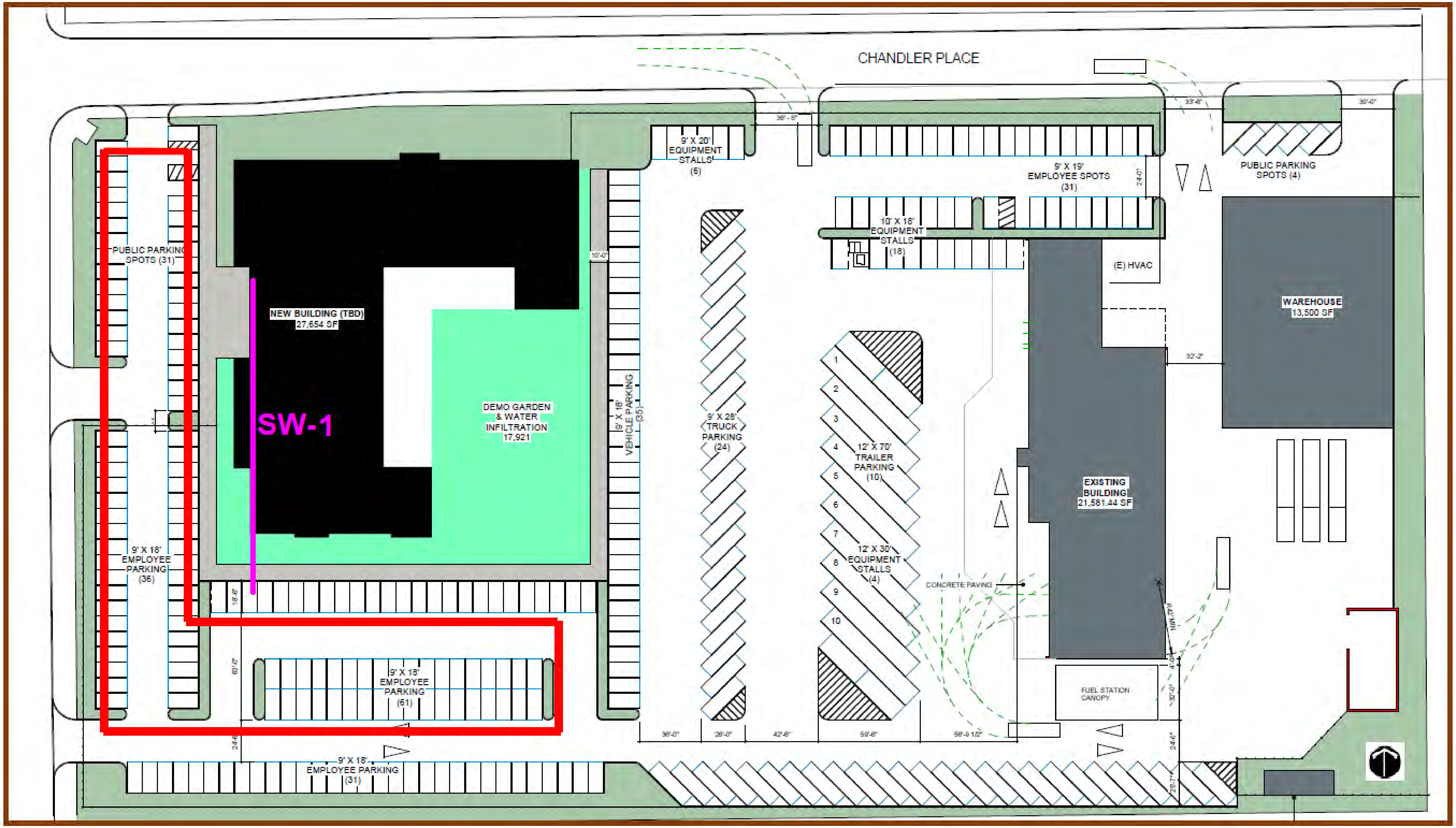
GOOGLE™ EARTH IMAGERY MAP

Google™ Earth (2020); Seismic shear-wave survey line (SW-1) shown as red line.

SEISMIC LINE LOCATION MAP



Base Map: Conceptual Site Plan (Miller Architectural Corporation); Seismic shear-wave survey line (SW-1) shown as purple line.

APPENDIX A

SHEAR-WAVE SURVEY

SHEAR-WAVE SURVEY

Methodology

The fundamental premise of this survey uses the fact that the Earth is always in motion at various seismic frequencies. These relatively constant vibrations of the Earth's surface are called microtremors, which are very small with respect to amplitude and are generally referred to as background "noise" that contain abundant surface waves. These microtremors are caused by both human activity (i.e., cultural noise, traffic, factories, etc.) and natural phenomenon (i.e., wind, wave motion, rain, atmospheric pressure, etc.) which have now become regarded as useful signal information. Although these signals are generally very weak, the recording, amplification, and processing of these surface waves has greatly improved by the use of technologically improved seismic recording instrumentation and recently developed computer software. For this application, we are mainly concerned with the Rayleigh wave portion of the seismic signals, which is also referred to as "ground roll" since the Rayleigh wave is the dominant component of ground roll.

For the purposes of this study, there are two ways that the surface waves were recorded, one being "active" and the other being "passive." Active means that seismic energy is intentionally generated at a specific location relative to the survey spread and recording begins when the source energy is imparted into the ground (i.e., MASW survey technique). Passive surveying, also called "microtremor surveying," is where the seismograph records ambient background vibrations (i.e., MAM survey technique), with the ideal vibration sources being at a constant level. Longer wavelength surface waves (longer-period and lower-frequency) travel deeper and thus contain more information about deeper velocity structure and are generally obtained with passive survey information. Shorter wavelength (shorter-period and higher-frequency) surface waves travel shallower and thus contain more information about shallower velocity structure and are generally collected with the use of active sources. For the most part, higher frequency active source surface waves will resolve the shallower velocity structure and lower frequency passive source surface waves will better resolve the deeper velocity structure. Therefore, the combination of both of these surveying techniques provides a more accurate depiction of the subsurface velocity structure.

The assemblage of the data that is gathered from these surface wave surveys results in development of a dispersion curve. Dispersion, or the change in phase velocity of the seismic waves with frequency, is the fundamental property utilized in the analysis of surface wave methods. The fundamental assumption of these survey methods is that the signal wavefront is planar, stable, and isotropic (coming from all directions) making it independent of source locations and for analytical purposes uses the spatial autocorrelation method (SPAC). The SPAC method is based on theories that are able to detect "signals" from background "noise" (Okada, 2003). The shear wave velocity (V_S) can then be calculated by mathematical inversion of the dispersive phase velocity of the surface waves which can be significant in the presence of velocity layering, which is common in the near-surface environment.

Field Procedures

One seismic shear-wave survey traverse was performed at the site as approximated on the Google™ Earth Imagery Map and Seismic Line Location Map, Plates 1 and 2, respectively. For data collection, the field survey employed a twenty-four channel Geometrics StrataVisor™ NZXP model signal-enhancement refraction seismograph. This survey employed both active (MASW) and passive (MAM) source methods to ensure that both quality shallow and deeper shear-wave velocity information was recorded (Park et al., 2005). Both the MASW and MAM survey lines used the same linear geometry array that consisted of a 184-foot long spread using a series of twenty-four 4.5-Hz geophones that were spaced at regular eight-foot intervals.

For the MASW survey, the ground vibrations were recorded using a one second record length at a sampling rate of 0.5-milliseconds. Two seismic records were obtained using a 30-foot offset from the beginning and end of the survey line utilizing a 16-pound sledge-hammer as the energy source to produce the seismic waves. Each of these shot points used multiple shots (stacking) to improve the signal to noise ratio of the data.

The MAM survey did not require the introduction of artificial seismic sources and only background ambient noise was recorded. The ambient ground vibrations were recorded using a thirty-two second record length at a two-millisecond sampling rate with 30 separate seismic records being obtained for quality control purposes. The seismic-wave forms and associated frequency spectrum that were displayed on the seismograph screen were used to assess the recorded seismic wave data for quality control purposes in the field. The acceptable records were digitally recorded on the in-board seismograph computer and subsequently transferred to a flash drive so that they could be subsequently transferred to our office computer for analysis.

Data Processing

For analysis and presentation of the shear-wave profile and supportive illustrations, this study used the SeisImager/SW™ computer software program developed by Geometrics, Inc. (2009). Both the active (MASW) and passive (MAM) survey results were combined for this analysis (Park et al., 2005). The combined results maximize the resolution and overall depth range in order to obtain one high resolution V_s curve over the entire sampled depth range. These methods economically and efficiently estimate one-dimensional subsurface shear-wave velocities using data collected from standard primary-wave (P-wave) refraction surveys, however, it should be noted that surface waves by their physical nature cannot resolve relatively abrupt or small-scale velocity anomalies.

Processing of the data proceeded by calculating the dispersion curve from the input data which subsequently created an initial shear-wave model based on the observed data. This initial model was then inverted in order to converge on the best fit of the initial model and the observed data, creating the final shear-wave model (Seismic Line SW-1) as presented within this appendix.

Data Analysis

Data acquisition went very smoothly and the quality was considered to be very good. The seismic model data indicates that the average shear-wave velocity beneath the survey traverse has numerous velocity layers that generally increases in velocity with depth, with the exception of a velocity reversal occurring at depth (greater than 100 feet). Analysis revealed that the average shear-wave velocity ("weighted average") in the upper 100 feet of the subject survey area is **1,064.7** feet per second (324.5 meters per second) as shown on the Shear-Wave Model for Seismic Line SW-1, as presented within this appendix. This average velocity classifies the underlying soils to that of Site Class "**D**" ("Stiff Soil"), which has a velocity range from 600 to 1,200 ft/sec (ASCE, 2017; Table 20.3-1).

The "weighted average" velocity is computed from a formula that is used by the ASCE (2017; Section 20.4, Equation 20.4-1) to determine the average shear-wave velocity for the upper 100 feet of the subsurface (V100).

$$\mathbf{Vs = 100/[(d1/v1) + (d2/v2) + ...+ (dn/vn)]}$$

Where d1, d2, d3,...,tn, are the thicknesses for layers 1, 2, 3,...n, up to 100 feet, and v1, v2, v3,...,vn, are the seismic velocities (feet/second) for layers 1, 2, 3,...n. The detailed shear-wave model displays these calculated layer boundaries/depths and associated velocities (feet/second) for the 161-foot profile where locally measured. The constrained data is represented by the dark-gray shading on the shear-wave model. The associated Dispersion Curves (for both the active and passive methods) which show the data quality and picks, along with the resultant combined dispersion curve model, are also included within this appendix, for reference purposes.

Limitations

This survey was performed using "state of the art" geophysical equipment, techniques, and computer software. We make no warranty, either expressed or implied. It should be understood that when using these theoretical geophysical principles and techniques, sources of error are possible in both the data obtained and in the interpretation. Compared with traditional borehole shear-wave surveys of which use vertical body waves, the sources of error (if present) using horizontal surface waves for this project are not believed to be greater than 15 percent. It is also important to understand that the fundamental limitation for seismic surveys is known as nonuniqueness, wherein a specific seismic data set does not provide sufficient information to determine a single "true" earth model. Therefore, the interpretation of any seismic data set uses "best-fit" approximations along with the geologic models that appear to be most reasonable for the local area being surveyed.

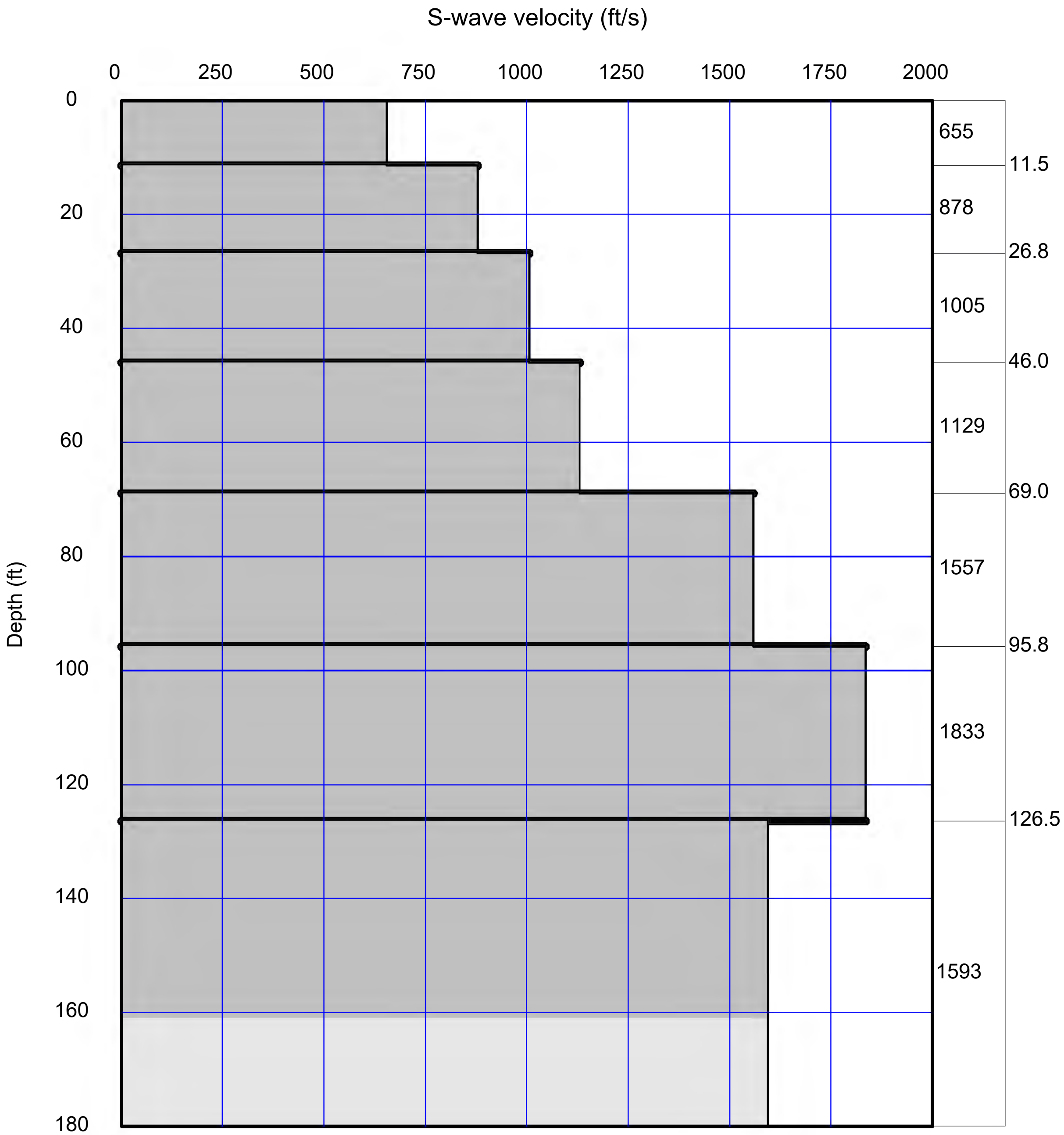
SHEAR-WAVE SURVEY LINE PHOTOGRAPHS

View looking north along Seismic Line SW-1.

View looking south along Seismic Line SW-1.

SEISMIC LINE SW-1

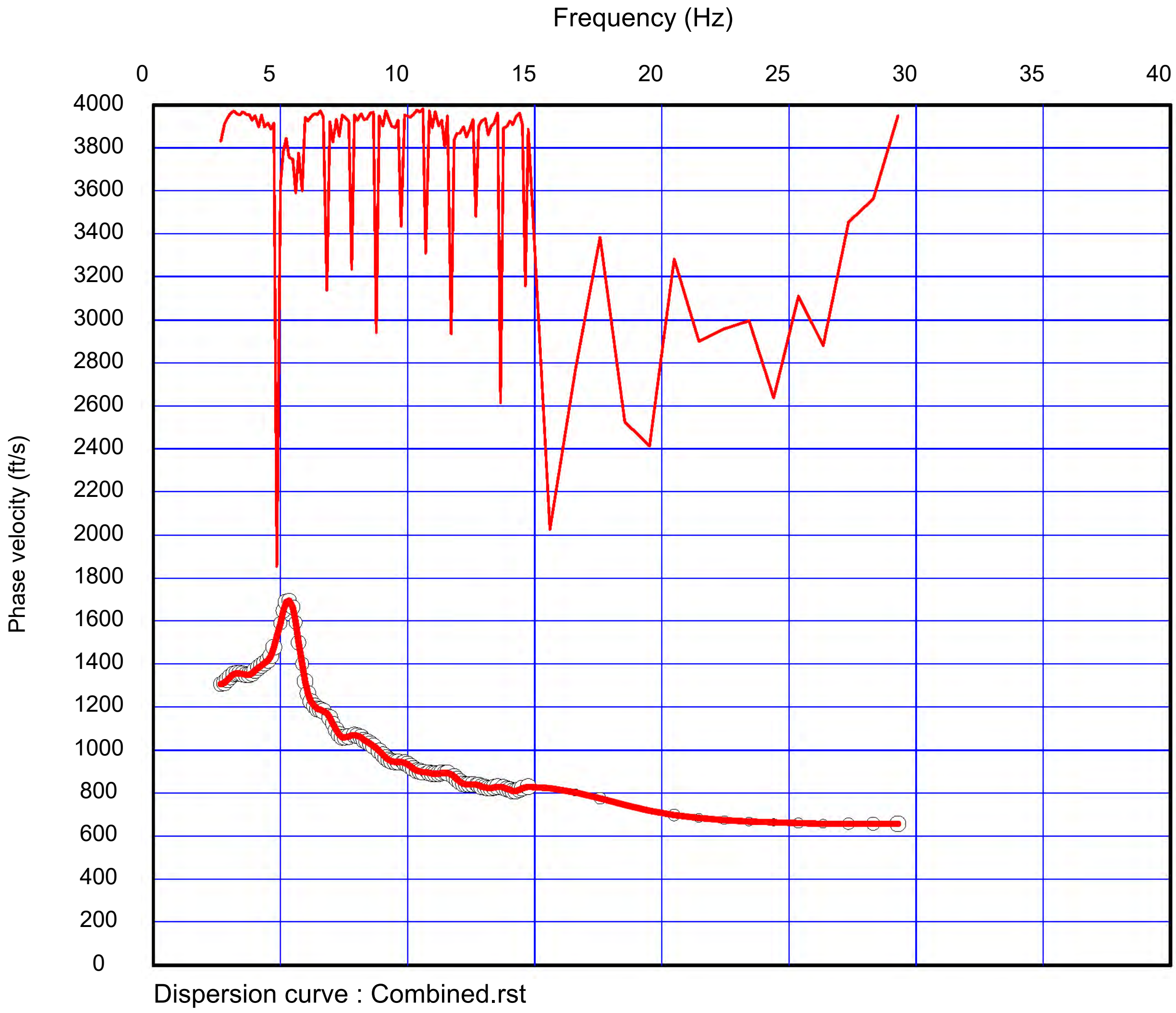
SHEAR-WAVE MODEL



S-wave velocity model (inverted) : Final.rst

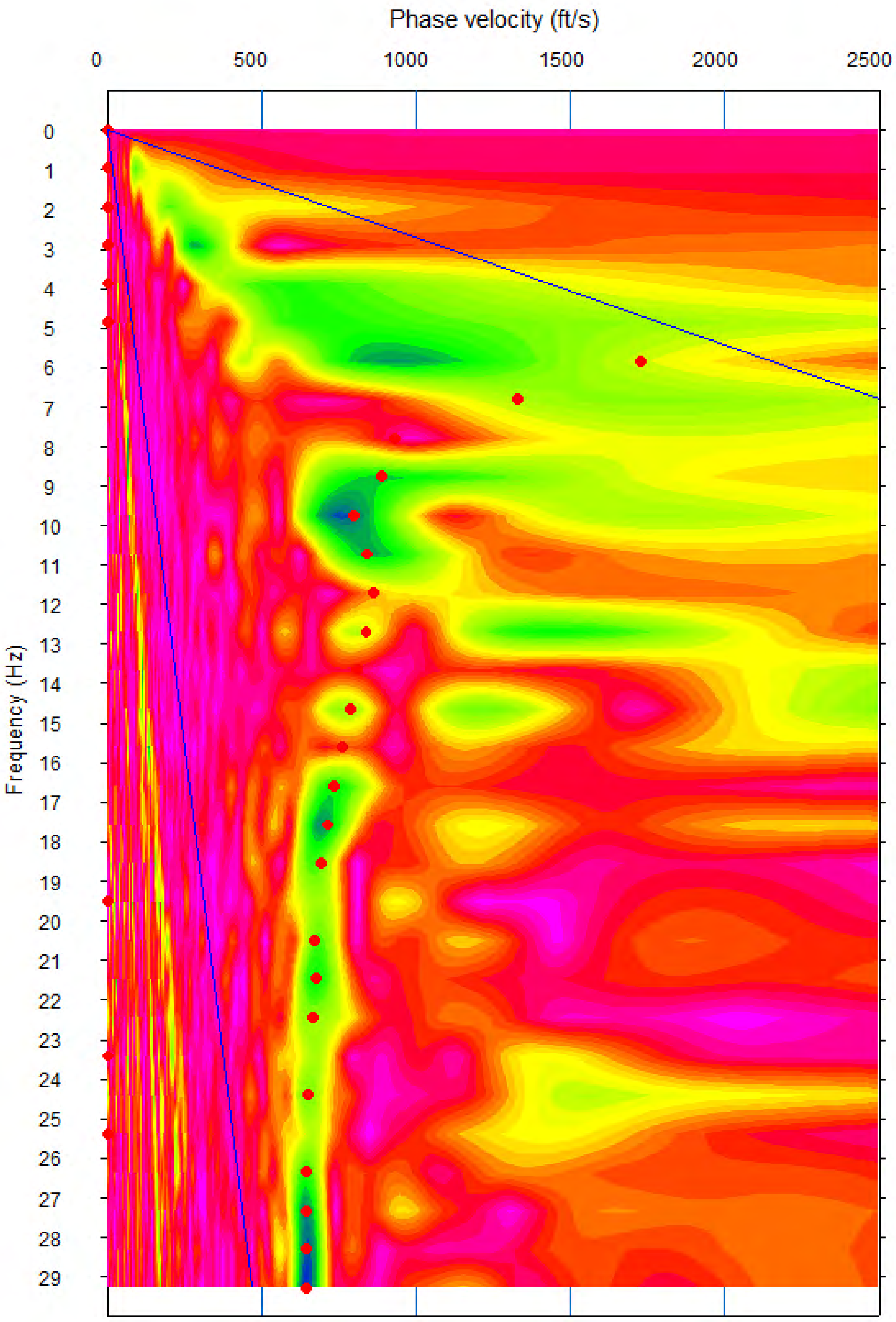
Average Vs 100ft = 1064.7 ft/sec

SHEAR-WAVE MODEL SW-1



COMBINED DISPERSION CURVE

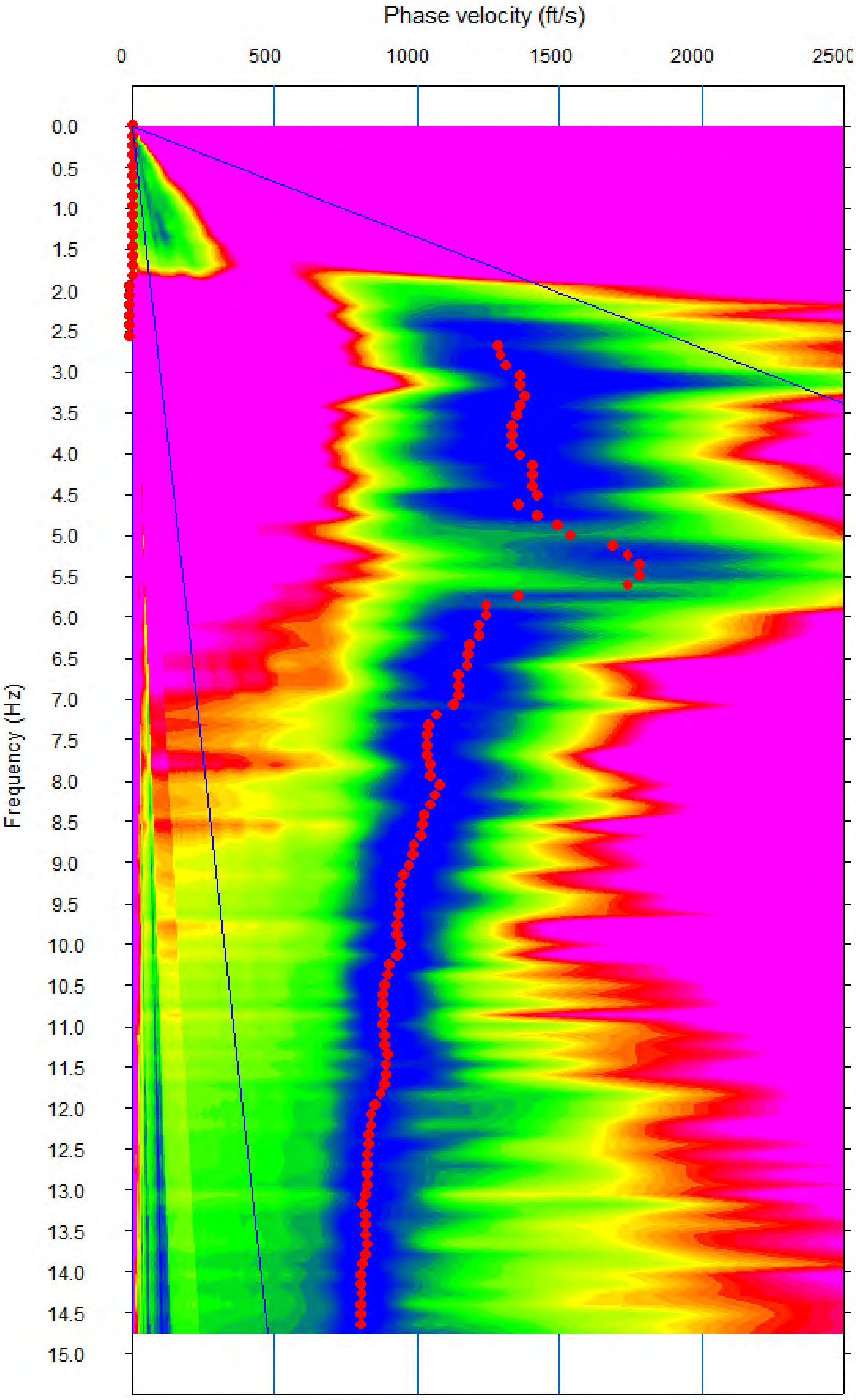
SEISMIC LINE SW-1



Dispersion Curve: Active.dat

ACTIVE DISPERSION CURVE

SEISMIC LINE SW-1



Dispersion Curve: Passive.dat

PASSIVE DISPERSION CURVE

APPENDIX B

SITE-SPECIFIC GROUND MOTION ANALYSIS

SITE-SPECIFIC GROUND MOTION ANALYSIS

A detailed summary of the site-specific ground motion analysis, which follows Section 21 of the ASCE Standard 7-16 (2017) and the 2019 California Building Code is presented below, with the Seismic Design Parameters Summary included within this appendix following the summary text.

- **Mapped Spectral Acceleration Parameters (CBC 1613A.2.1)**-

  Based on maps prepared by the U.S.G.S (Risk-Adjusted Maximum Considered Earthquake (MCE_R) Ground Motion Parameter for the Conterminous United States for the 0.2 and 1-second Spectral Response Acceleration (5% of Critical Damping; Site Class B/C), a value of **2.437g** for the 0.2 second period (S_S) and **0.977** for the 1.0 second period (S_1) was calculated (ASCE 7-16 Figures 22-1, 22-2 and CBC 1613A.2.1).

- **Site Classification (CBC 1613A.2.2 & ASCE 7-16 Chapter 20)**-

  Based on the site-specific measured shear-wave value of 1,064.7 feet/second (324.5 m/sec), the soil profile type used should be Site Class **"D."** This Class is defined as having the upper 100 feet (30 meters) of the subsurface being underlain by "stiff soil" with average shear-wave velocities of 600 to 1,200 feet/second (180 to 360 meters/second), as detailed within this appendix.

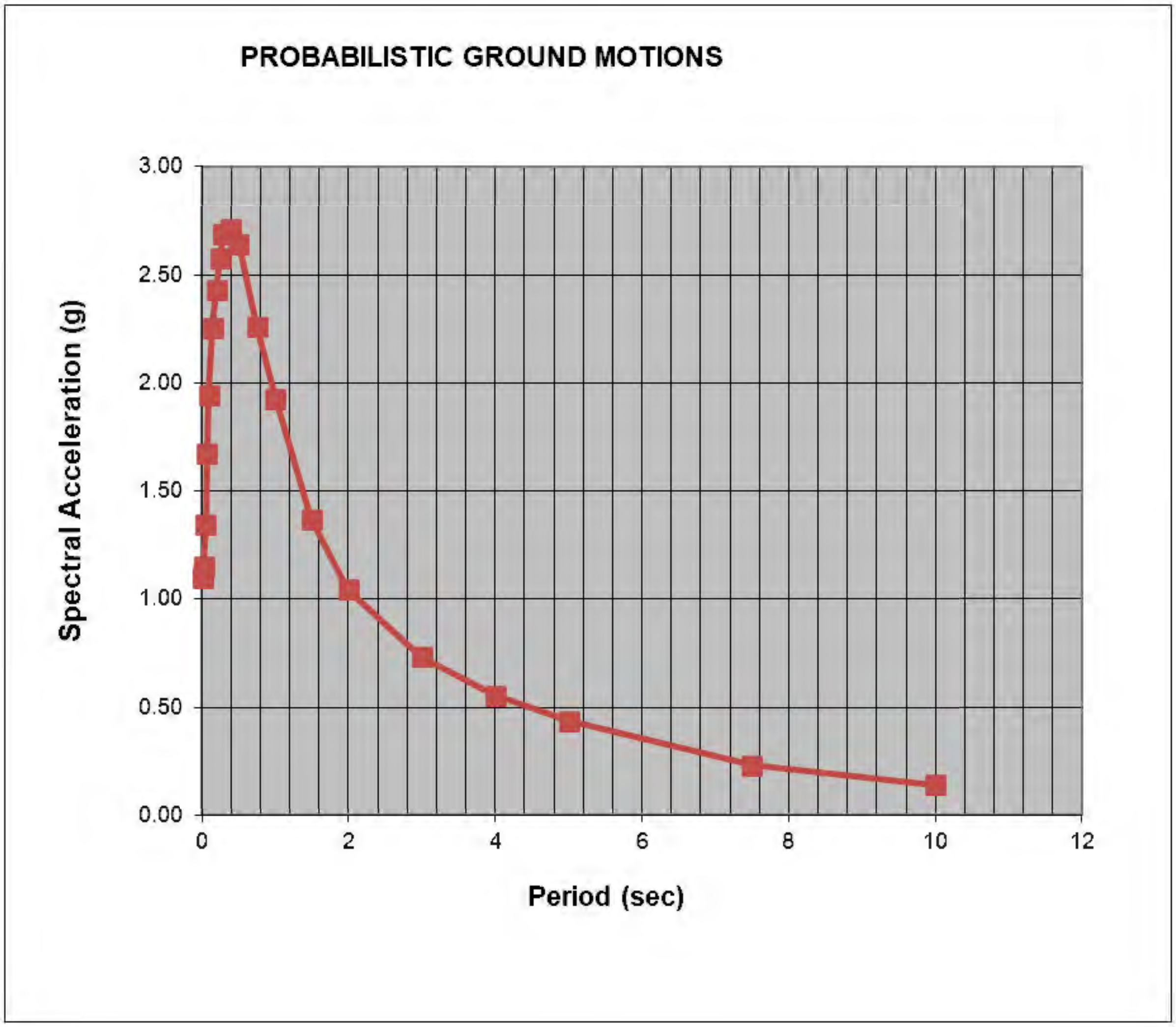
- **Site Coefficients (CBC 1613A.2.3)**-

  Based on CBC Tables 1613A.2.3(1) and 1613A.2.3(2), the site coefficient **F_a = 1.0** and **F_v = 1.7**, respectively.

- **Probabilistic (MCE_R) Ground Motions (ASCE 7 Section 21.2.1.1)**-

  Per Section 21.2.1.1 (**Method 1**), the probabilistic MCE spectral accelerations shall be taken as the spectral response accelerations in the direction of maximum response represented by a five percent damped acceleration response spectrum that is expected to achieve a one percent probability of collapse within a 50-year period.

  The probabilistic analysis included the use of the Open Seismic Hazard Analysis (OpenSHA). The selected Earthquake Rupture Forecast (ERF) was UCERF3 along with a Probability of Exceedance of 2% in 50 Years. The average of four Next Generation Attenuation West-2 Relations (2014 NGA) were utilized to produce a response spectrum. These included Chiou & Youngs (2014), Abrahamsom et al. (2014), Campbell & Bozorgnia (2014), and Boore et al. (2014). The Probabilistic Risk Targeted Response Spectrum was determined as the product of the ordinates of the probabilistic response spectrum and the applicable risk coefficient (C_R). These values were then modified to produce a spectrum based upon the maximum rotated components of ground motion. The resulting MCE_R Response Spectrum is indicated below:



◆ ***Deterministic Spectral Response Analyses (ASCE 7 Section 21.2.2)***-

The deterministic MCE$_R$ response acceleration at each period shall be calculated as an 84th-percentile 5 percent damped spectral response acceleration in the direction of maximum horizontal response computed at that period. The largest such acceleration calculated for the characteristic earthquakes on all known active faults within the region shall be used. Analyses were conducted using the average of four Next Generation Attenuation West-2 Relations (2014 NGA), including Chiou & Youngs (2014), Abrahamsom et al. (2014), Campbell & Bozorgnia (2014), and Boore et al. (2014).

Based on our review of the Fault Section Database within the Uniform California Earthquake Rupture Forecast (UCERF 3; Field et al., 2013), published geologic data, and based on the combined segment length and maximum magnitude of the San Jacinto Fault Zone, a moment magnitude (M$_W$) used for this fault was 7.8.

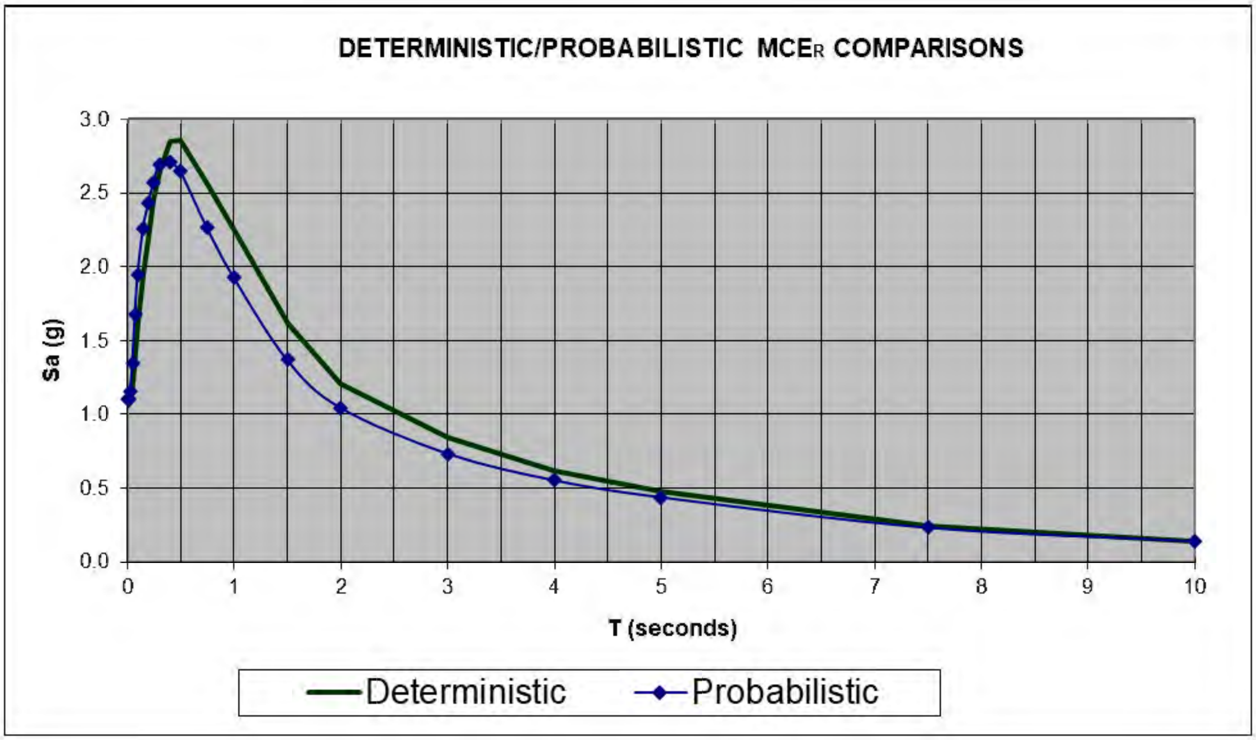
Following is a summary of the Deterministic Spectral Response Acceleration Values and Comparison with Deterministic Lower Limit.

Deterministic Summary and Comparison with Deterministic Lower Limit - Section 21.2.3

Period	Deterministic	Probabilistic	Lower Value (Site Specific MCE_{R})	Governing Method	
T	MCE_R	MCE_R			
0.010	1.06	1.10	1.06	Deterministic Governs	
0.020	1.07	1.11	1.07	Deterministic Governs	
0.030	1.09	1.15	1.09	Deterministic Governs	
0.050	1.21	1.34	1.21	Deterministic Governs	
0.075	1.43	1.67	1.43	Deterministic Governs	
0.100	1.63	1.95	1.63	Deterministic Governs	
0.150	1.95	2.26	1.95	Deterministic Governs	
0.200	2.19	2.43	2.19	Deterministic Governs	
0.250	2.46	2.57	2.46	Deterministic Governs	
0.300	2.65	2.69	2.65	Deterministic Governs	
0.400	2.85	2.71	2.71	Probabilistic Governs	
0.500	2.85	2.64	2.64	Probabilistic Governs	
0.750	2.56	2.26	2.26	Probabilistic Governs	
1.000	2.25	1.93	1.93	Probabilistic Governs	
1.500	1.62	1.37	1.37	Probabilistic Governs	
2.000	1.21	1.04	1.04	Probabilistic Governs	
3.000	0.84	0.73	0.73	Probabilistic Governs	
4.000	0.62	0.55	0.55	Probabilistic Governs	
5.000	0.48	0.44	0.44	Probabilistic Governs	
7.500	0.24	0.23	0.23	Probabilistic Governs	
10.000	0.14	0.14	0.14	Probabilistic Governs	

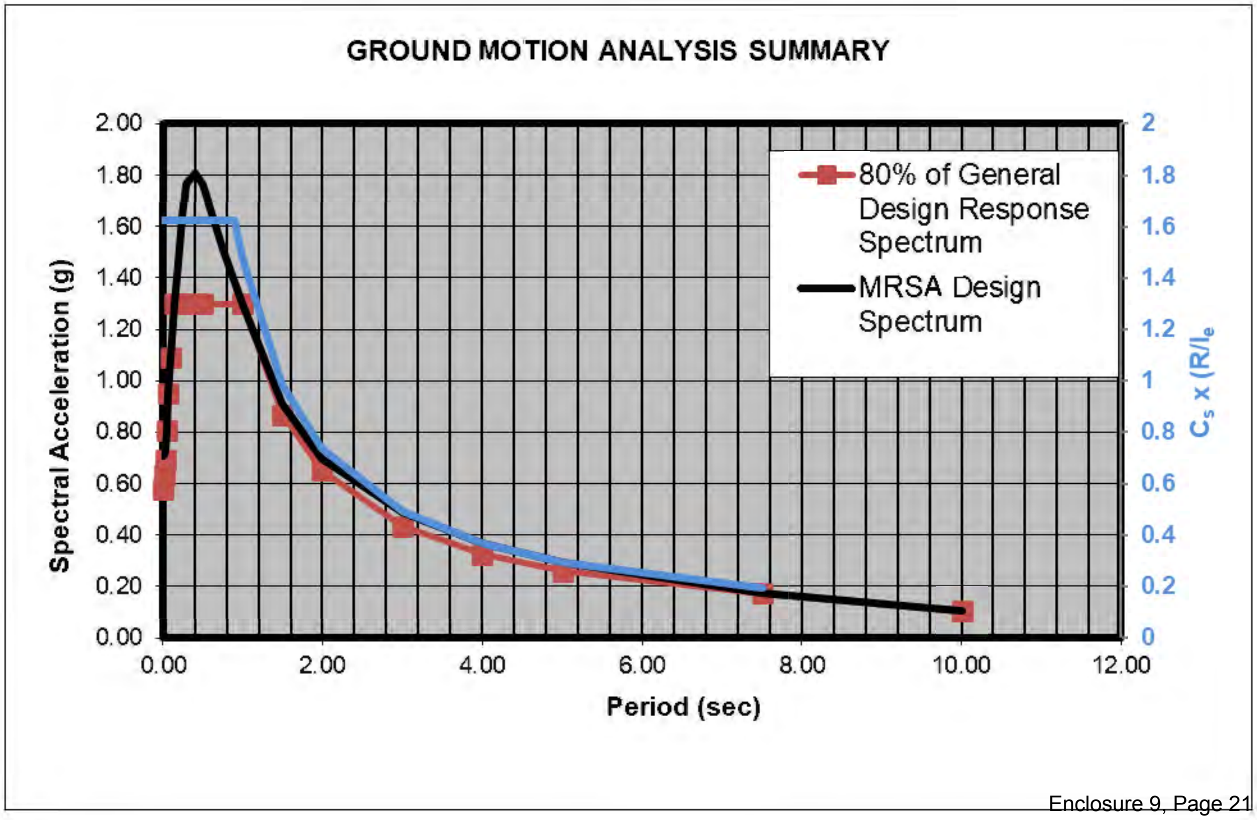
- **Site Specific MCE_R (ASCE 7 Section 21.2.3)**-

  The site-specific MCE_R spectral response acceleration at any period, S_{aM}, shall be taken as the lesser of the spectral response accelerations from the probabilistic ground motions of Section 21.2.1 and the deterministic ground motions of Section 21.2.2. The deterministic ground motions were compared with the probabilistic ground motions that were determined in accordance with Section 21.2.1. These are plotted in the following diagram:



- ***Design Response Spectrum (ASCE 7 Section 21.3)***-

In accordance with Section 21.3, the Design Response Spectrum was developed by the following equation: $S_a = 2/3S_{aM}$, where S_{aM} is the MCE$_R$ spectral response acceleration obtained from Section 21.1 or 21.2. The design spectral response acceleration shall not be taken less than 80 percent of S_a. These are plotted and compared with 80% of the CBC Spectrum values in the following diagram:



- **Design Acceleration Parameters (ASCE 7 Section 21.4)**-

  Where the site-specific procedure is used to determine the design ground motion in accordance with Section 21.3, the parameter S_{DS} shall obtained from the site-specific spectra at a period of 0.2 s, except that it shall not be taken less than 90 percent of the peak spectral acceleration, S_a, at any period larger than 0.2 s. The parameter S_{D1} shall be taken as the greater of the products of Sa * T for periods between 1 and 5 seconds. The parameters S_{MS}, and S_{M1} shall be taken as 1.5 times S_{DS} and S_{D1}, respectively. The values so obtained shall not be less than 80 percent of the values determined in accordance with Section 11.4.4 for S_{MS}, and S_{M1} and Section 11.4.5 for S_{DS} and S_{D1}.

- **Site Specific Design Parameters** -

  For the 0.2 second period (S_{DS}), a value of 1.63g was computed, based upon the average spectral accelerations. The maximum average acceleration for any period exceeding 0.2 seconds was 1.81g occurring at T=0.40 seconds. This was multiplied by 0.9 to produce a value of 1.63g making this the applicable value. A value of 1.48g was calculated for S_{D1} at a period of 1 second (ASCE 7-16, 21.4). For the MCE_R 0.2 second period, a value of 2.439g (S_{MS}) was computed, along with a value of 2.215g (S_{M1}) for the MCE_R 1.0 second period was also calculated (ASCE 7-16, 21.2.3).

- **Site-Specific MCE_G Peak Ground Accelerations (ASCE 7 Section 21.5)**-

  The probabilistic geometric mean peak ground acceleration (2 percent probability of exceedance within a 50-year period) was calculated as 1.10g. The deterministic geometric mean peak ground acceleration (largest 84th percentile geometric mean peak ground acceleration for characteristic earthquakes on all known active faults within the site region) was calculated as 0.96g. The site-specific MCE_G peak ground acceleration was calculated to be **0.96g**, which was determined by using the lesser of the probabilistic (1.10g) or the deterministic (0.96g) geometric mean peak ground accelerations, but not taken as less than 80 percent of PGA_M (i.e., 1.13g x 0.80 = 0.90g).

  .

SEISMIC DESIGN PARAMETERS SUMMARY

Project:	San Bernardino MWD	Lattitude:	34.0769
Project #:	203388-1	Longitude:	-117.2931
Date:	3/1/20		

CALIFORNIA BUILDING CODE CHAPTER 16/ASCE7-16

Mapped Acceleration Parameters per ASCE 7-16, Chapter 22

S_s=	2.437	Figure 22-1
S_1=	0.977	Figure 22-2

Site Class per Table 20.3-1

Site Class=	D - Stiff Soil

Site Coefficients per ASCE 7-16 CHAPTER 11

F_a=	1	Table 11.4-1	=	1	For Site Specific Analysis per ASCE7-16 21.3
F_v=	1.7	Table 11.4-2	=	2.50	For Site Specific Analysis per ASCE7-16 21.3

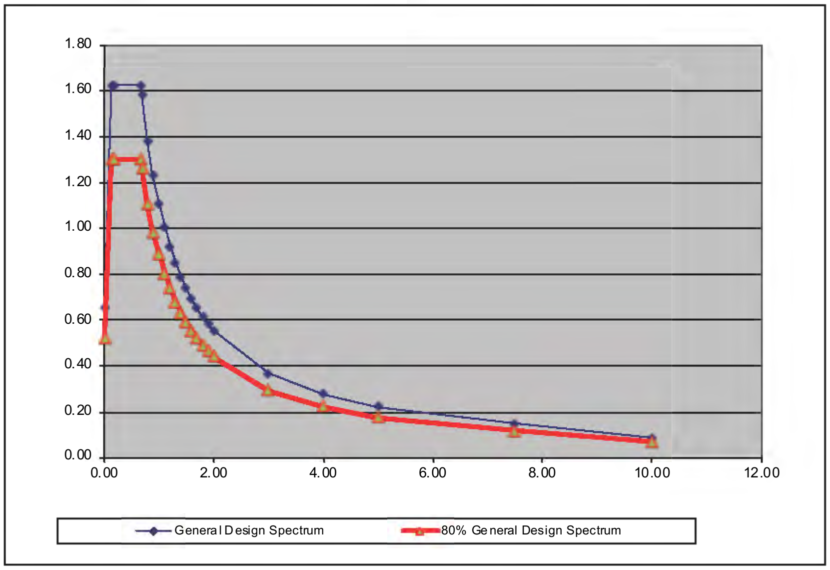
Mapped Design Spectral Response Acceleration Parameters

S_{Ms}=	2.437	Equation 11.4-1	2.437	For Site Specific Analysis per ASCE7-16 21.3
S_{M1}=	1.661	Equation 11.4-2	2.443	For Site Specific Analysis per ASCE7-16 21.3

T_0=	0.136	sec	
T_S=	0.682	sec	
T_L=	8	sec	From Fig 22-1
PGA	1.026	g	
F_{PGA}=	1.1		From Table 11
C_{RS}=	0.915		Figure 22-17
C_{R1}=	0.89		Figure 22-18

S_{DS}=	1.625	Equation 11.4-3
S_{D1}=	1.107	Equation 11.4-4

Period (T)	Sa (ASCE7-16 - 11.4.6)	80% General Design Spectrum
0.01	0.65	0.521
0.14	1.62	1.300
0.20	1.62	1.300
0.68	1.62	1.300
0.70	1.58	1.265
0.80	1.38	1.107
0.90	1.23	0.984
1.00	1.11	0.886
1.10	1.01	0.805
1.20	0.92	0.738
1.30	0.85	0.681
1.40	0.79	0.633
1.50	0.74	0.591
1.60	0.69	0.554
1.70	0.65	0.521
1.80	0.62	0.492
1.90	0.58	0.466
2.00	0.55	0.443
3.00	0.37	0.295
4.00	0.28	0.221
5.00	0.22	0.177
7.50	0.15	0.118
10.00	0.09	0.071



ASCE 7-10 - RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION ANALYSIS

Use Maximum Rotated Horizontal Component?* (Y/N) y

Presented data are the average of Chiou & Youngs (2014), Abrahamson et. al. (2014) , Boore et. al (2014) and Campbell & Bozorgnia (2014) NGA West-2 Relationship
Earthquake Rupture Forecast - UCERF3

PROBABILISTIC MCER per 21.2.1.1 **Method 1**

Risk Coefficients taken from Figures 22-18 and 22-19 of ASCE 7-16

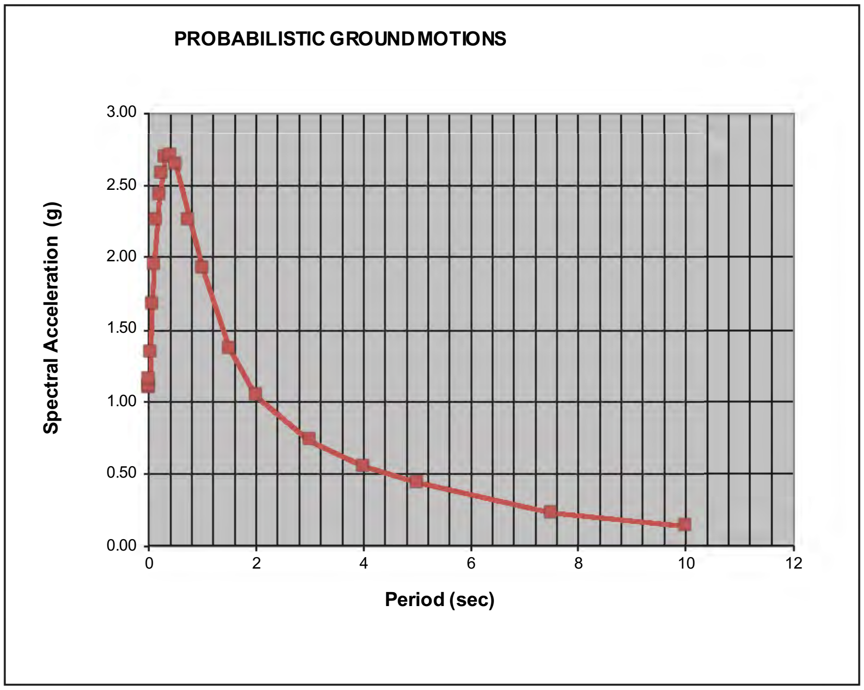
OpenSHA data

2% Probability Of Exceedance in 50 years

Maximum Rotated Horizontal Component determined per ASCE7-16

T	Sa 2% in 50	MCER
0.01	1.20	1.10
0.02	1.21	1.11
0.03	1.26	1.15
0.05	1.47	1.34
0.08	1.83	1.67
0.10	2.13	1.95
0.15	2.46	2.26
0.20	2.66	2.43
0.25	2.82	2.57
0.30	2.95	2.69
0.40	2.98	2.71
0.50	2.92	2.64
0.75	2.52	2.26
1.00	2.16	1.93
1.50	1.54	1.37
2.00	1.17	1.04
3.00	0.83	0.73
4.00	0.62	0.55
5.00	0.49	0.44
7.50	0.26	0.23
10.00	0.16	0.14

S_s=	2.66	2.43
S_1=	2.16	1.93
PGA	1.10 g	



Risk Coefficients:			
C_{RS}	0.915	Figure 22-18	Get from Mapped Values
C_{R1}	0.89	Figure 22-19	
Fa=	1	Table 11.4-1	Per ASCE7-16 - 21.2.3
Is $Sa_{(max)}$<1.2XFa?		NO	If "YES", Probabilistic Spectrum prevails

DETERMINISTIC MCE per 21.2.2

Input Parameters		San Jacinto Fault
Fault		
M	= Moment magnitude	7.8
R_{RUP}	= Closest distance to coseismic rupture (km)	0.75
R_{JB}	= Closest distance to surface projection of coseismic rupture (km)	0.75
Rx	= Horizontal distance to top edge of rupture measured perpendicular to strike (km)	0.75
U	= Unspecified Faulting Flag (Boore et.al.)	0
F_{RV}	= Reverse-faulting factor: 0 for strike slip, normal, normal-oblique; 1 for reverse, reverse-oblique and thrust	0
F_{NM}	= Normal-faulting factor: 0 for strike slip, reverse, reverse-oblique and thrust; 1 for normal and normal-oblique	0
F_{HW}	= Hanging-wall factor: 1 for site on down-dip side of top of rupture; 0 otherwise, used in AS08 and CY08	0
Z_{TOR}	= Depth to top of coseismic rupture (km)	0
δ	= Average dip of rupture plane (degrees)	90
V_{S30}	= Average shear-wave velocity in top 30m of site profile	324.5
$F_{Measured}$		1
$Z_{1.0}$	= Depth to Shear Wave Velocity of 1.0 km/sec (km)	0.3
$Z_{2.5}$	= Depth to Shear Wave Velocity of 2.5 km/sec (km)	2
Site Class		D
W (km)	= Fault rupture width (km)	16.5
F_{AS}	= 0 for mainshock; 1 for aftershock	0
σ	=Standard Deviation	1

Deterministic Summary - Section 21.2.2 (Supplement 1)

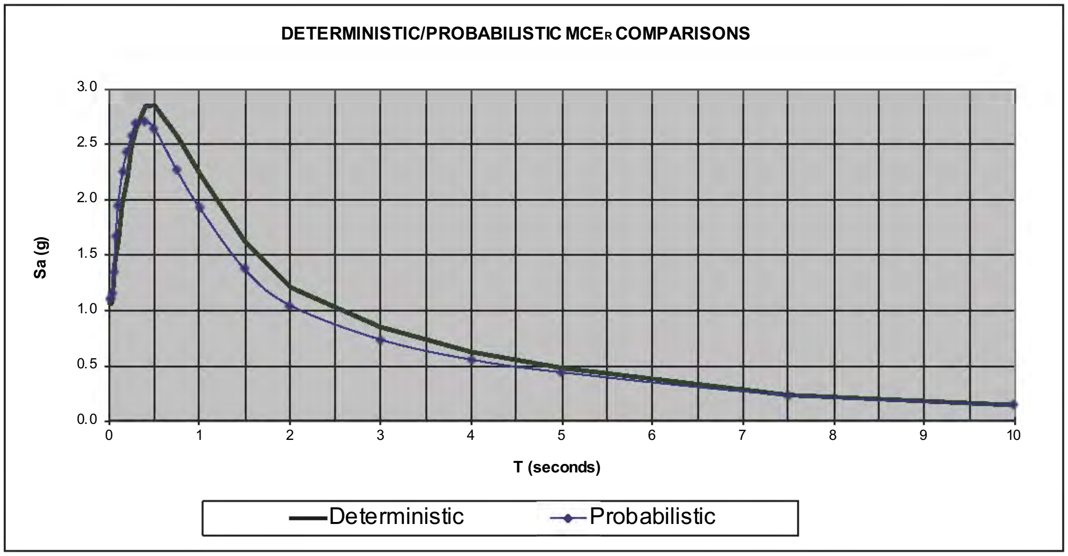
T	**Median S_a** (Average)	***Corrected**** S_a *(per ASCE7-16)*	***Scaled*** $S_{a(Average)}$
0.010	0.96	1.06	1.06
0.020	0.97	1.07	1.07
0.030	0.99	1.09	1.09
0.050	1.10	1.21	1.21
0.075	1.30	1.43	1.43
0.100	1.48	1.63	1.63
0.150	1.77	1.95	1.95
0.200	1.99	2.19	2.19
0.250	2.21	2.46	2.46
0.300	2.36	2.65	2.65
0.400	2.47	2.85	2.85
0.500	2.43	2.85	2.85
0.750	2.07	2.56	2.56
1.000	1.73	2.25	2.25
1.500	1.22	1.62	1.62
2.000	0.90	1.21	1.21
3.000	0.60	0.84	0.84
4.000	0.43	0.62	0.62
5.000	0.32	0.48	0.48
7.500	0.16	0.24	0.24
10.000	0.10	0.14	0.14
PGA	0.96		0.96 g
Max Sa=	2.85		
Fa =	1.00	Per ASCE7-16 21.2.2	
1.5XFa=	1.5		
Scaling Factor=	1.00		

* Correction is the adjustment for Maximum Rotated Value if Applicable

SITE SPECIFIC MCE$_R$ - Compare Deterministic MCE$_R$ Values (S$_a$) with Probabilistic MCE$_R$ Values (S$_a$) per 21.2.3

Presented data are the average of Chiou & Youngs (2014), Abrahamson et. al. (2014) , Boore et. al (2014) and Campbell & Bozorgnia (2014) NGA West-2 Relationships

Period	Deterministic	Probabilistic	Lower Value (Site Specific MCE$_{R)}$	Governing Method
T	MCE$_R$	MCE$_R$		
0.010	1.06	1.10	1.06	Deterministic Governs
0.020	1.07	1.11	1.07	Deterministic Governs
0.030	1.09	1.15	1.09	Deterministic Governs
0.050	1.21	1.34	1.21	Deterministic Governs
0.075	1.43	1.67	1.43	Deterministic Governs
0.100	1.63	1.95	1.63	Deterministic Governs
0.150	1.95	2.26	1.95	Deterministic Governs
0.200	2.19	2.43	2.19	Deterministic Governs
0.250	2.46	2.57	2.46	Deterministic Governs
0.300	2.65	2.69	2.65	Deterministic Governs
0.400	2.85	2.71	2.71	Probabilistic Governs
0.500	2.85	2.64	2.64	Probabilistic Governs
0.750	2.56	2.26	2.26	Probabilistic Governs
1.000	2.25	1.93	1.93	Probabilistic Governs
1.500	1.62	1.37	1.37	Probabilistic Governs
2.000	1.21	1.04	1.04	Probabilistic Governs
3.000	0.84	0.73	0.73	Probabilistic Governs
4.000	0.62	0.55	0.55	Probabilistic Governs
5.000	0.48	0.44	0.44	Probabilistic Governs
7.500	0.24	0.23	0.23	Probabilistic Governs
10.000	0.14	0.14	0.14	Probabilistic Governs



DESIGN RESPONSE SPECTRUM per Section 21.3

DESIGN ACCELERATION PARAMETERS per Section 21.4 (MRSA)

Period	2/3*MCE_R	80% General Design Response Spectrum (per ASCE 7-16 Figure 11.4-1)	Design Response Spectrum	TXSa
0.01	0.71	0.58	0.71	
0.02	0.71	0.63	0.71	
0.03	0.73	0.69	0.73	
0.05	0.81	0.81	0.81	
0.08	0.95	0.95	0.95	
0.10	1.08	1.09	1.09	
0.15	1.30	1.30	1.30	
0.20	1.46	1.30	1.46	
0.25	1.64	1.30	1.64	
0.30	1.77	1.30	1.77	
0.40	1.81	1.30	1.81	
0.50	1.76	1.30	1.76	
0.75	1.51	1.30	1.51	
1.00	1.28	1.30	1.30	1.28
1.50	0.91	0.87	0.91	1.37
2.00	0.70	0.65	0.70	1.39
3.00	0.49	0.43	0.49	1.47
4.00	0.37	0.33	0.37	1.48
5.00	0.29	0.26	0.29	
7.50	0.16	0.17	0.17	
10.00	0.09	0.10	0.10	

Highest value of S_a for any period exceeding 0.2 sec.= 1.81

90%of Highest Value = 1.63

Maximum TSa from T=1s-5s = 1.48

S_{DS}= 1.63

S_{D1}= 1.48

T_S = 0.91

S_{MS}= 2.439

S_{M1}= 2.215

PGA Determination:

Site Coefficient F_{PGA}= 1.1

Mapped PGA= 1.03 Figure 22-7

PGA_M = 1.13 g

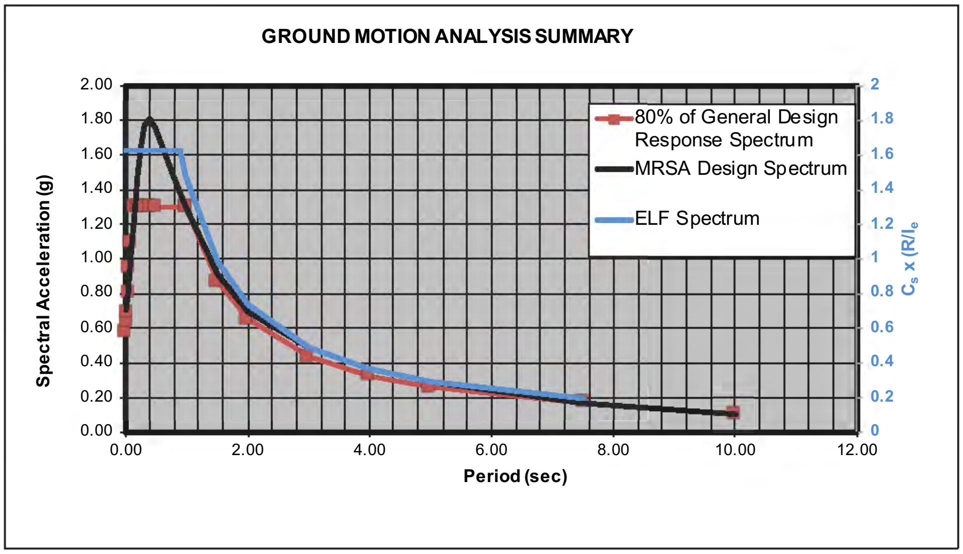
Deterministic PGA = 0.96 g

Probabilistic PGA = 1.10 g

Lesser of Deterministic/Probabilistic = 0.96 g

80% of $PGA_{M=}$ 0.90 g

MCE_G PGA= 0.96 g



APPENDIX C

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REFERENCES

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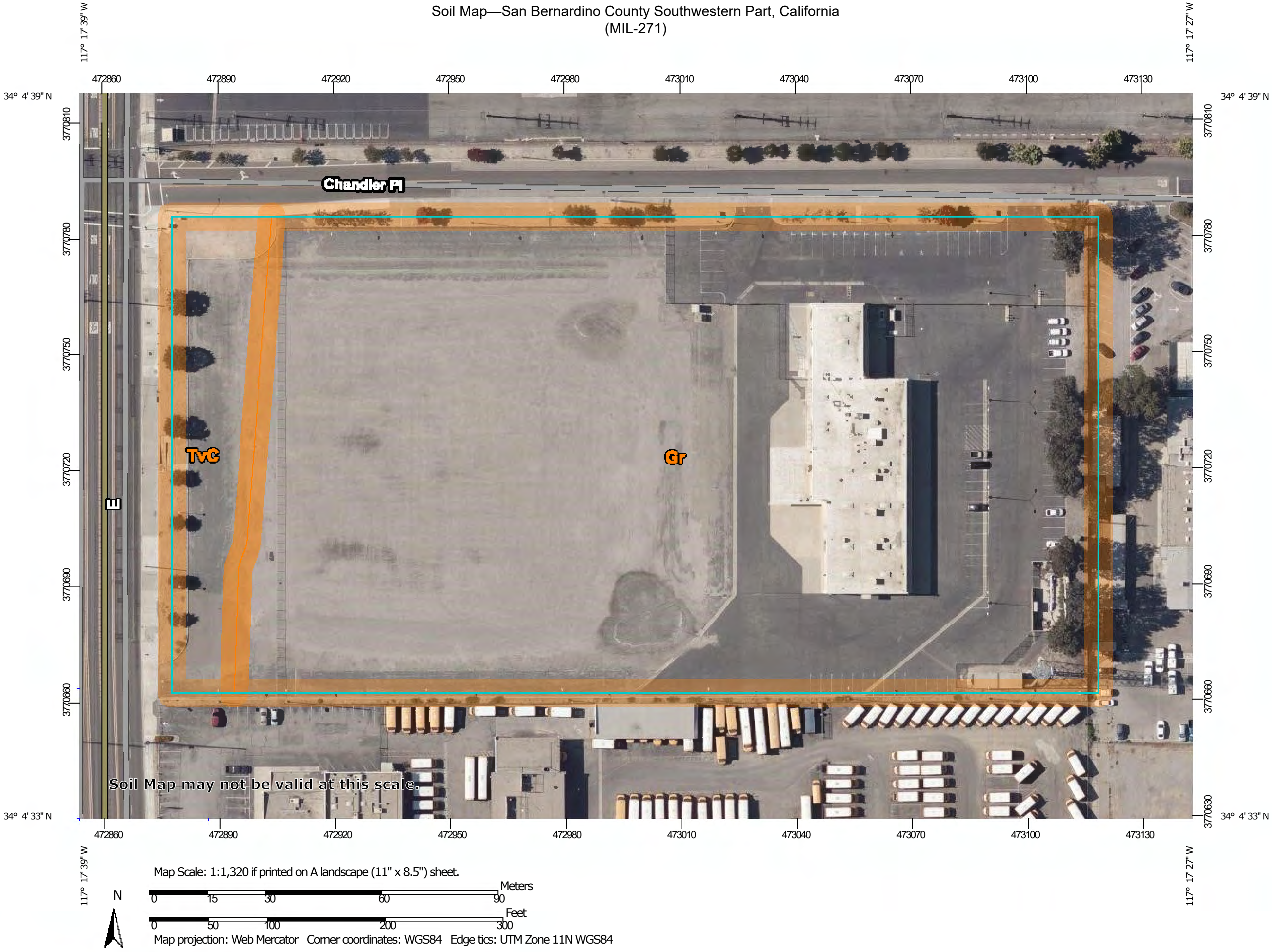
APPENDIX 5b

Soil Map—San Bernardino County Southwestern Part, California
(MIL-271)



Map Scale: 1:1,320 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
▭ Area of Interest (AOI)

Soils
▭ Soil Map Unit Polygons
〰 Soil Map Unit Lines
■ Soil Map Unit Points

Special Point Features
◉ Blowout
☒ Borrow Pit
✱ Clay Spot
◇ Closed Depression
✕ Gravel Pit
∴ Gravelly Spot
● Landfill
⋀ Lava Flow
⩩ Marsh or swamp
⚒ Mine or Quarry
◎ Miscellaneous Water
○ Perennial Water
∨ Rock Outcrop
+ Saline Spot
⁙ Sandy Spot
═ Severely Eroded Spot
◆ Sinkhole
≫ Slide or Slip
ø Sodic Spot
≡ Spoil Area
● Stony Spot
⁂ Very Stony Spot
♆ Wet Spot
△ Other
▪ Special Line Features

Water Features
〜 Streams and Canals

Transportation
┼┼┼ Rails
〰 Interstate Highways
〰 US Routes
〰 Major Roads
〰 Local Roads

Background
▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 12, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2018—Jun 30, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Gr	Grangeville fine sandy loam, warm MAAT, MLRA 19	6.7	91.3%
TvC	Tujunga gravelly loamy sand, 0 to 9 percent slopes	0.6	8.7%
Totals for Area of Interest		**7.4**	**100.0%**

APPENDIX 6

NOISE IMPACT ANALYSIS

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT
WATER FACLITIES RELOCATION PROJECT

CITY OF SAN BERNARDINO, CALIFORNIA

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PO Box 2307
San Bernardino, CA 92406-2307

March 3, 2021

Project No.: P20-029 N

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NOISE SETTING

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally considered to be unwanted sound. Sound is characterized by various parameters that describe the rate of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level or energy content of a given sound. In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level.

Loud or soft, noisy or quiet, high-and-low pitch are all qualitative terms used to describe sound. These terms are relative descriptions. The science of acoustics attempts to quantify the human perception of sound into a quantitative and measurable basis. Amplitude is the measure of the pressure exerted by sound waves. Amplitude may be so small as to be inaudible by humans, or so great as to be painful. Frequency refers to pitch or tone. The unit of measure is in cycles per second called “hertz”. Very low frequency bass tones and ultra-high frequency treble are difficult for humans to detect. Many noise generators in the ambient world are multi-spectral.

The decibel (dB) scale is used to quantify sound pressure levels. Although decibels are most commonly associated with sound, "dB" is a generic descriptor that is equal to ten times the logarithmic ratio of any physical parameter versus some reference quantity. For sound, the reference level is the faintest sound detectable by a young person with good auditory acuity.

Since the human ear is not equally sensitive to all sound frequencies within the entire auditory spectrum, human response is factored into sound descriptions by weighting sounds within the range of maximum human sensitivity more heavily in a process called “A-weighting,” written as dB(A). Any further reference in this discussion to decibels written as "dB" should be understood to be A-weighted.

Leq is a time-averaged sound level; a single-number value that expresses the time-varying sound level for the specified period as though it were a constant sound level with the same total sound energy as the time-varying level. Its unit is the decibel (dB). The most common averaging period for Leq is hourly.

Because community receptors are more sensitive to unwanted noise intrusion during more sensitive evening and nighttime hours, state law requires that an artificial dBA increment be added to quiet time noise levels. The 24-hour noise descriptor with a specified evening and nocturnal penalty is called the Community Noise Equivalent Level (CNEL). CNEL’s are a weighted average of hourly Leq’s.

NOISE THRESHOLDS

The City of San Bernardino General Plan Noise Element provides noise compatibility guidelines for a variety of uses. CNEL-based standards apply to noise sources whose noise generation is preempted from local control (such as from on-road vehicles, trains, airplanes, etc.) and are used to make land use decisions as to the suitability of a given site for its intended use. The City of San Bernardino considers office use “normally acceptable” up to 70 dBA CNEL and “conditionally acceptable” up to noise levels of up to 77 dBA CNEL. Industrial uses are not considered noise sensitive and are normally acceptable to levels of 75 dBA CNEL and conditionally acceptable up to 80 dBA CNEL.

The City of San Bernardino Municipal Code limits the time of construction to hours of lesser noise sensitivity. Per Section 8.54.070, Disturbances from Construction Activity, of the Municipal Code:

- No person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m. (Ord. MC-1246, 5-23-07)

Construction activities are exempt from numerical noise standards if there is adherence to these time-of-day restrictions.

The City of San Bernardino has no numerical noise thresholds for operational noise impacts. The Code does allow that noise is exempt when it is resulting from a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose (Municipal Code Section 8.54.060).

BASELINE NOISE LEVELS

Short term on-site noise measurements were made in order to document existing baseline levels in the project area. These help to serve as a basis for projecting future noise exposure from the project upon the surrounding community as well as determining project compatibility with the existing noise environment. Noise monitoring was conducted on Tuesday, February 9, 2021, in the early afternoon at two locations. Measurement locations are shown in Figure 1 and summarized below.

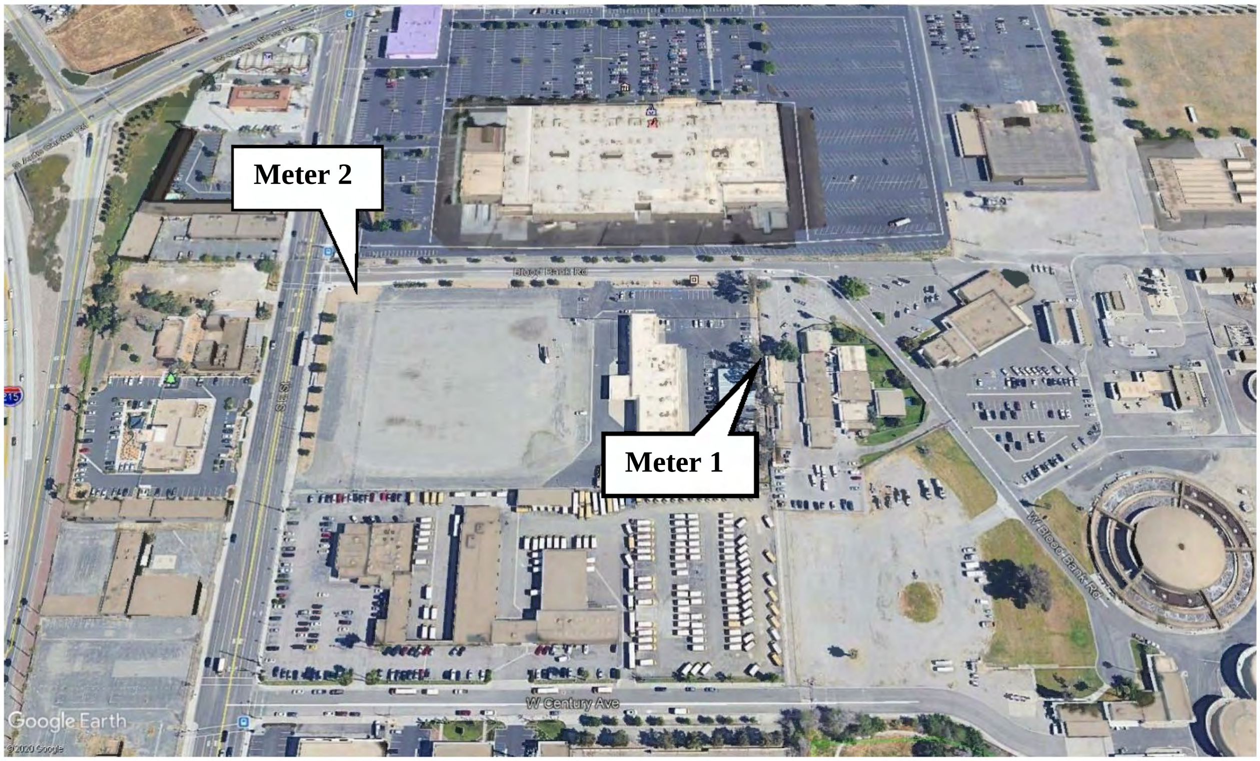
Measured Noise Levels (dBA)

Site No.	Leq	Lmax	Lmin	L10	L50	L90
1	64	76	59	69	67	61
2	66	76	56	66	65	60

Meter 1 was located on the shared property line with the animal shelter. The observed noise level at Meter 1 was 64 dBA Leq. Monitoring experience shows that 24-hour weighted CNEL's can be reasonably well estimated from mid-afternoon noise readings by adding +2 or 3 decibels. This would equate to a CNEL of 66-69 dBA. This is the approximate exterior noise level that would be expected at Building B.

Meter 2 was located to the north of the site, approximately120 feet from the E Street centerline along Chandler Place. This location is closer to traffic on E Street and more representative of noise levels at future Building A which will contain offices. The observed Leq was 66 dBA which would translate to a CNEL of 68-69 dBA. As discussed, the City of San Bernardino considers office use "normally acceptable" to 70 dBA CNEL and "conditionally acceptable" to noise levels of up to 77 dBA CNEL. Therefore, the proposed office use is compatible with the existing noise environment.

Figure 1
Noise Meter Locations



,

NOISE SIGNIFICANCE CRITERIA

According to the current CEQA Appendix G guidelines, noise impacts are considered potentially significant if they result in:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of a project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
2. Generation of excessive groundborne vibration or groundborne noise levels?
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, would the project expose people residing or working in the project area to excessive noise levels?

The terms “substantial” or “excessive” are not defined in most environmental compliance guidelines. Noise analysis methodology is accurate only to the nearest whole decibel and the human ear can only clearly detect changes of around 3 dBA; changes of less than 3 dBA, while audible under controlled circumstances, are not readily discernable in an outdoor environment. Thus, a change of 3 dBA is considered as a perceptible audible change. It would require a doubling of traffic to create a +3 dBA noise increase due to the logarithmic nature of noise calculations. The project is not within the vicinity of an airport.

SOURCES OF IMPACT

Two characteristic noise sources are typically identified with general development such as the proposed water facilities relocation project. Construction activities, especially heavy equipment, will create short-term noise increases near the project site. Upon completion, vehicular traffic on streets around the proposed project area may create a higher noise exposure. Traffic noise impacts are analyzed to ensure that the project does not adversely impact the acoustic environment of the surrounding community. In already-developed areas, the added land use intensity associated with a single project only increases traffic incrementally on existing roadways. These noise impacts are often masked by the baseline, and often preclude perception of any substantial noise level increase.

CONSTRUCTION NOISE IMPACTS

Temporary construction noise impacts vary markedly because the noise strength of construction equipment ranges widely as a function of the equipment used and its activity level. Short-term construction noise impacts tend to occur in discrete phases dominated by large, earth-moving equipment sources. Construction activities are treated separately in various community noise ordinances because they do not represent a chronic, permanent noise source.

Construction noise impacts vary markedly because the noise strength of construction equipment ranges widely as a function of the equipment used which changes during the course of the project. Construction noise tends to occur in discrete phases dominated initially by earth-moving sources and later for finish construction. Figure 2 shows the typical range of construction activity noise generation as a function of equipment used in various building phases. The earth-moving sources are seen to be the noisiest with equipment noise ranging up to about 90 dB(A) at 50 feet from the source. Spherically radiating point sources of noise emissions are atmospherically attenuated by a factor of 6 dB per doubling of distance, or about 20 dB in 500 feet of propagation. The loudest earth-moving noise sources may therefore sometimes be detectable above the local background beyond 1,000 feet from the construction area. An impact radius of 1,000 feet or more pre-supposes a clear line-of-sight and no other machinery or equipment noise that would mask project construction noise. With buildings and other barriers to interrupt line-of-sight conditions, the potential “noise envelope” around individual construction sites is reduced. Construction noise impacts are, therefore, somewhat less than that predicted under idealized input conditions.

Construction noise exposure can be further worsened when several pieces of equipment operate in close proximity. Because of the logarithmic nature of decibel addition, two equally loud pieces of equipment will be +3 dB louder than either one individually. Three simultaneous sources are +5 dB louder than any single source. Thus, while average operational equipment noise levels are perhaps 5 dB less than at peak power, simultaneous equipment operation can still yield an apparent noise strength equal to any individual source at peak noise output. The average heavy equipment reference noise level is 85 dB(A).

There are no sensitive uses surrounding the project site that would be impacted by construction noise. The nearest residence is to the northwest, across the 215 freeway, approximately 2,500 feet from the project site, along Scenic Drive. At 2,500 feet, in an urban environment and with an intervening freeway, construction noise will not be perceptible.

As discussed, the City of San Bernardino Municipal Code does not establish quantitative construction noise standards. Instead, the City, in Section 8.54.070 the City of San Bernardino Municipal Code, has established the allowable hours of construction to be between the hours of 7:00 AM and 8:00 PM.

Nevertheless, although not a sensitive use, construction noise impacts may be viewed as a temporary nuisance at the adjacent animal shelter. In addition to time restrictions placed on permits, the following recommended measures are proposed to minimize any adverse noise impact:

-Locate stationary construction equipment away from the adjacent animal shelter; and

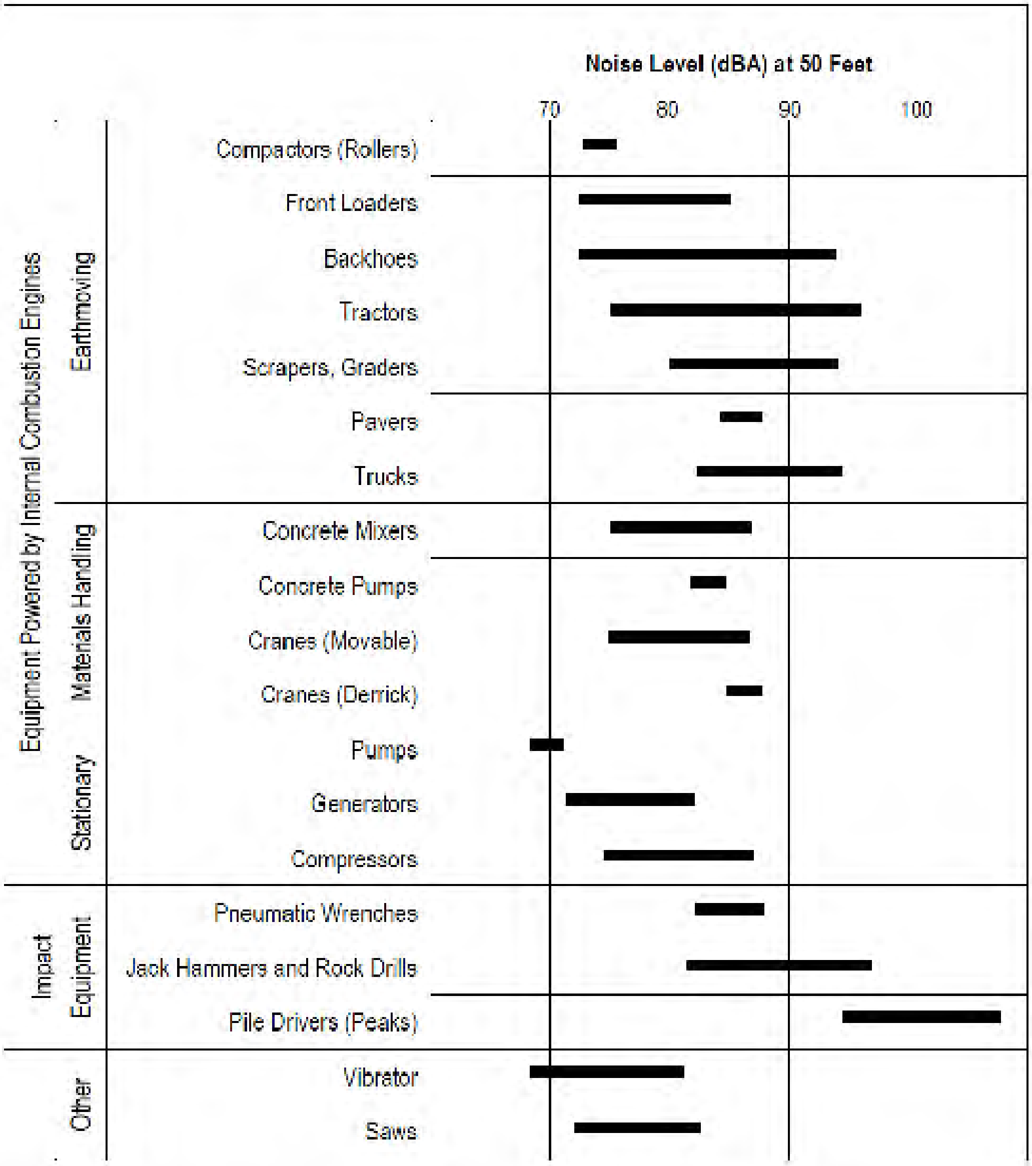
-Shut off construction equipment that is not in use; and

-Ensure construction vehicles and equipment (fixed or mobile) be equipped with properly operating and maintained mufflers.

These measures are included as conditions on any project construction permits and will serve to minimize any adverse construction noise impact potential. Construction impacts are minimized by time restrictions placed on permits which in addition to the recommended measures will minimize any adverse noise impact.

Figure 2

Typical Construction Equipment Noise Generation Levels



Source: EPA PB 206717, Environmental Protection Agency, December 31, 1971, "Noise from Construction Equipment and Operations."

CONSTRUCTION ACTIVITY VIBRATION

Construction activities generate ground-borne vibration when heavy equipment travels over unpaved surfaces or when it is engaged in soil movement. The effects of ground-borne vibration include discernible movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Vibration related problems generally occur due to resonances in the structural components of a building because structures amplify groundborne vibration. Within the "soft" sedimentary surfaces of much of Southern California, ground vibration is quickly damped out. Groundborne vibration is almost never annoying to people who are outdoors (FTA 2006).

Groundborne vibrations from construction activities rarely reach levels that can damage structures. Because vibration is typically not an issue, very few jurisdictions have adopted vibration significance thresholds. Vibration thresholds have been adopted for major public works construction projects, but these relate mostly to structural protection (cracking foundations or stucco) rather than to human annoyance.

The City of San Bernardino Development Code, Section 19.20.030[28] indicates: *No vibration associated with any use shall be permitted which is discernible beyond the boundary line of the property*. However, the City does not identify specific construction vibration level limits.

A vibration descriptor commonly used to determine structural damage is the peak particle velocity (ppv) which is defined as the maximum instantaneous positive or negative peak of the vibration signal, usually measured in in/sec. The range of such vibration is as follows in Table 1:

Table 1
Human Response To Transient Vibration

Average Human Response	ppv (in/sec)
Severe	2.00
Strongly perceptible	0.90
Distinctly perceptible	0.24
Barely perceptible	0.03

Source: Caltrans Transportation and Construction Vibration Guidance Manual, 2013.

Over the years, numerous vibration criteria and standards have been suggested by researchers, organizations, and governmental agencies. As shown in Table 2**,** according to Caltrans and the FTA, the threshold for structural vibration damage for modern structures is 0.5 in/sec for intermittent sources, which include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Older structures have a 0.3 in/sec threshold. Below this level there is virtually no risk of building damage.

Table 2
FTA and Caltrans Guideline Vibration Damage Potential Threshold Criteria

Building Type	PPV (in/sec)
FTA Criteria	
Reinforced concrete, steel or timber (no plaster)	0.5
Engineered concrete and masonry (no plaster)	0.3
Non-engineered timber and masonry buildings	0.2
Buildings extremely susceptible to vibration damage	0.12
Caltrans Criteria	
Modern industrial/commercial buildings	0.5
New residential structures	0.5
Older residential structures	0.3
Historic old buildings	0.25
Fragile Buildings	0.1
Extremely fragile ruins, ancient monuments	0.08

To be conservative, the damage threshold of 0.3 in/sec for older fragile structures was used in this analysis. The predicted vibration levels generated by construction equipment anticipated for use are shown below in Table 3.

Table 3
Estimated Vibration Levels During Project Construction

Equipment	PPV at 18 feet (in/sec)	PPV at 25 ft (in/sec)	PPV at 50 ft (in/sec)	PPV at 100 ft (in/sec)
Large Bulldozer	0.146	0.089	0.031	0.013
Jackhammer	0.057	0.035	0.012	0.005
Small Bulldozer	0.005	0.003	<0.001	<0.001

Source: FHWA Transit Noise and Vibration Impact Assessment

Building “C” is setback 18 feet from the shared animal services property line. As seen in Table 3, if a large bulldozer operated 18 feet from the property line the predicted vibration level would be far below the structural damage threshold of older structures (i.e., 0.3 in/sec). However, the City of San Bernardino code states that vibration levels should not be discernible.

A small dozer has a much lower vibration signature that a large dozer. To ensure no discernible vibration is observed at the adjacent animal shelter property line, a large dozer should not be used within 50 feet of the shared property line. Although all project vibration will be well below any damage threshold, a separation distance of 50 feet for a large dozer would ensure that vibration be within the barely perceptible range. Therefore, the following measure is recommended to ensure no discernible vibration occur at any shared property line:

- Only small dozers be used within 50 feet of any property line.

PROJECT-RELATED VEHICULAR NOISE IMPACTS

According to the project traffic analysis, the project will generate 344 daily trips from both the office and warehousing uses. Of the 344 daily trips 196 are office related and 148 are warehouse related. Of the warehousing trips, 72 will be passenger vehicles (SUV's, pick-up trucks, and vans), and 66 will be 4-axle trucks (flatbed trucks and dump/water trucks). These were assumed to be all heavy-duty diesel trucks.

The daily CNEL calculated with this vehicle mix would be 54.6 dBA. Because of the logarithmic nature of sound, the addition of 54.6 dBA CNEL to existing noise levels of 65-70 dBA CNEL as determined through noise monitoring would yield less than a +0.4 dBA project related noise increase. Project traffic would not create a perceptible noise increase on area roadways.

PROJECT OPERATIONAL NOISE

There are no adjacent sensitive uses to the project site. Nevertheless, the primary noise associated with the project will be vehicular travel. According to the project traffic analysis, a peak hour would contain 133 vehicular movements (ins and outs). Of these 133 vehicles, 17 might be a heavy duty truck and the remaining 98 vehicles would be light duty vehicles such as passenger cars, SUV's or pick-up trucks. The associated hourly noise level would be 62 dBA at 50 feet. However, most parking is along the E Street frontage with a much greater setback than 50 feet. Nevertheless, this would be less than the 64 dBA Leq observed at the property line with the animal shelter. The net noise increase resulting from adding 62 dBA to 64 dBA is +2.0 dBA. Therefore, project operational noise will not create a substantial impact at any adjacent uses.

NOISE IMPACT MITIGATION AND SUMMARY

The allowable hours of construction are between the hours of 7:00 AM and 8:00 PM. Construction activities will not be audible at the closest sensitive use because of distance separation and the intervening 215 freeway. Nevertheless, such noise could be a temporary nuisance at the adjacent animal shelter. Therefore, the following measures are recommended:

- Locate stationary construction equipment away from the adjacent animal shelter; and
- Shut off construction equipment that is not in use; and
- Ensure construction vehicles and equipment (fixed or mobile) be equipped with properly operating and maintained mufflers.

Construction vibration will not cause building damage at any surrounding structures. If adherence to the Code is required, no discernible vibration impact should be observed at any adjacent property line. However, no thresholds are provided. This is an unusual requirement. Using Caltrans and FTA guidance, to ensure no discernible vibration at any off-site use the following measure is required:

- Only small dozers be used within 50 feet of any property line.

The project noise impact study indicates a less-than-significant noise impact from project-related traffic on project vicinity receptors.

Project operational noise will not create a substantial noise increase over background levels. The worst-case peak hour is in the afternoon with an estimated 98 passenger vehicles and 17 heavy trucks.

APPENDIX 7a

San Bernardino Municipal Water Department Water Facilities Relocation

TRAFFIC ANALYSIS (REVISED)

CITY OF SAN BERNARDINO

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CHARLENE HWANG SO
Charlene So
No. TR 2414

SEPTEMBER 20, 2021

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CCI	Construction Cost Index
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
PCE	Passenger Car Equivalents
PHF	Peak Hour Factor
Project	San Bernardino Municipal Water Department Water Facilities Relocation
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
TA	Traffic Analysis
V/C	Volume to Capacity

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1 INTRODUCTION

This report presents the results of the traffic analysis (TA) for the proposed San Bernardino Municipal Water Department Water Facilities Relocation (SBMWD) development (**Project**), which is located at 397 Chandler Place in the City of San Bernardino, as shown on Exhibit 1-1. The purpose of this TA is to evaluate the potential deficiencies related to traffic and circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to resolve identified deficiencies and to achieve acceptable circulation system operational conditions. This traffic study has been prepared in accordance with the City of San Bernardino's Public Works Department Traffic Impact Analysis Guidelines (**TA guidelines**) (August 2020 and through consultation with the City of San Bernardino staff during the scoping process. (1) The Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA, which has been approved by the City of San Bernardino.

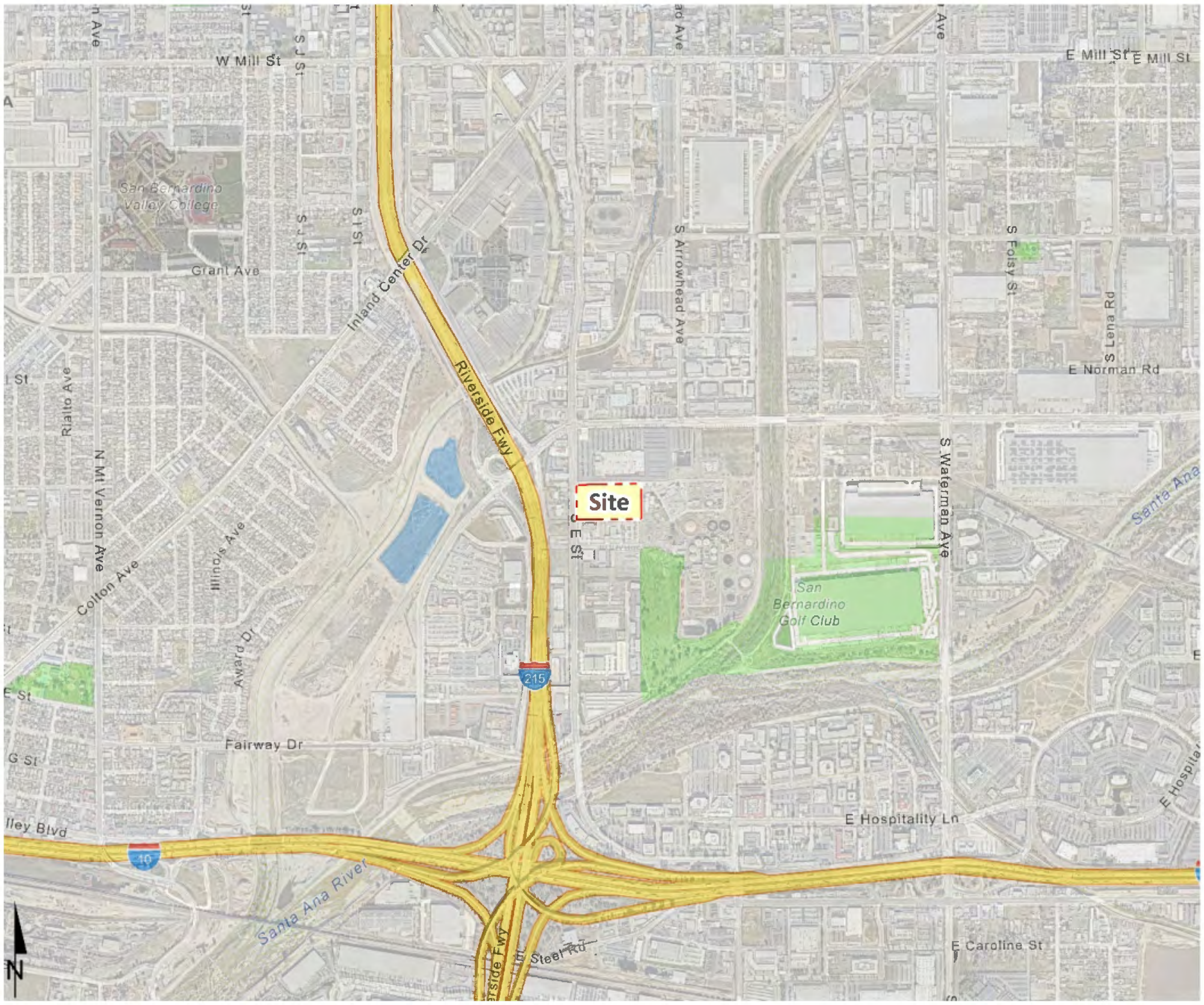
1.1 SUMMARY OF FINDINGS

The Project is proposing to construct the following improvements as design features in conjunction with development of the site:

- Project to restripe and accommodate a minimum of 150-feet for the southbound left turn lane at E Street and Chandler Place.
- The Project should implement sidewalk improvements along the Project frontages on E Street and Chandler Place and provide curb cuts to accommodate proposed driveway locations for site access.
- All driveways are to be controlled with a stop sign control for vehicles exiting the Project. All driveways are proposed to allow for full access on Chandler Place with right-in/right-out only access along E Street (controlled by the existing raised median along E Street).

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations* of this report.

EXHIBIT 1-1: LOCATION MAP



1.2 PROJECT OVERVIEW

The proposed Project consists of the development of a 27,812 square foot (SF) one-story structural steel administrative office building (New Building A) and a 13,500 SF one-story tilt-up concrete warehouse with loading docks (New Warehouse B). Just east of the New Building A, administration building, the Project proposes to install a 17,921 SF demonstration garden. The proposed Project would also include renovations of the existing 26,055.6 SF concrete block operations building (Building C) that is located toward the eastern boundary of the site. This building will house vehicle maintenance in the existing service bays and administrative offices in the two-story office section of the building. Additionally, the Project includes the development of a 13,500 SF one-story tilt-up concrete warehouse with loading docks (New Warehouse B) along the easternmost boundary of the site, to the east of the existing building. The preliminary site plan is shown on Exhibit 1-2.

The new SBMWD Administrative Headquarters will employ fewer than 100 persons, with no new positions created as a result of this Project. Hours of operations are Monday through Thursday (6:30 AM to 4:00/4:30 PM) and on Fridays (6:30 AM to 3:00 PM), except in an emergency. Most employees depart at 4:00, however, Water Quality office staff (2 employees) departs at 4:30 PM. Dump trucks and approximately half of the utility trucks are to operate during the off-peak times (11:00 AM to 2:00 PM). There are existing staff from the Water Utility Division (which comprises of an Administration Section, a Distribution Section, an Operations Section, Fleet) along with the Water Quality Section from another division will be relocated to the 397 Chandler Place campus (from 195 D Street or Downtown Yards location):

- Administration = 2 employees
- Water Utility Distribution = 46 employees
- Water Utility Operations = 35 employees
- Water Quality = 10 employees
- Fleet = 5 employees
- **Total of 98 employees to be relocated.**

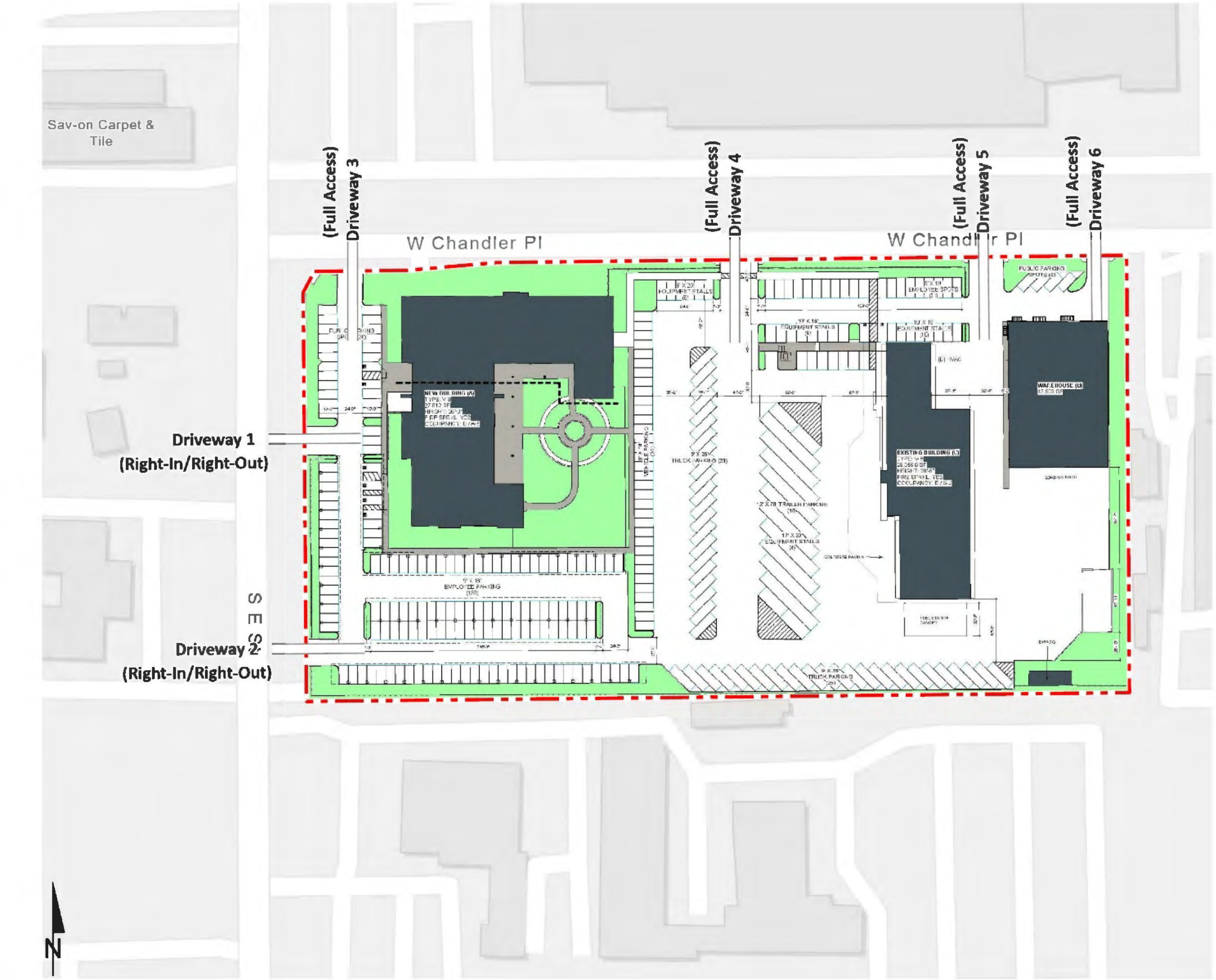
Swing shift for Water Utility Operations presently starts at 3:30 PM and ends at 11:00 PM with less than 4 employees/vehicles during this shift.

1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2021) Conditions
- Existing plus Project (E+P) Conditions
- Opening Year Cumulative (2022) Without Project Conditions
- Opening Year Cumulative (2022) With Project Conditions

EXHIBIT 1-2: PRELIMINARY SITE PLAN



1.3.1 EXISTING (2021) CONDITIONS

Information for Existing (2021) conditions is disclosed to represent the baseline traffic conditions. Traffic counts were collected at the existing study area intersections, however, due to the currently ongoing COVID-19 pandemic, new traffic counts were compared to historic counts (2015) and adjusted accordingly. Additional details are provided in Section 3.5. Traffic counts were collected based on vehicle classification and were converted to passenger car equivalent (PCE). Use of PCE accounts for the effects of large trucks present within the existing study area. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is also much longer than for passenger cars and varies depending on the type of vehicle and number of axles.

1.3.2 EXISTING PLUS PROJECT CONDITIONS

The E+P conditions analysis determine the potential circulation system deficiencies based on a comparison of the E+P to Existing traffic conditions. The roadway network is similar to Existing conditions except for new connections to be constructed by the Project. Project traffic has been added to the adjusted Existing (2021) traffic volumes.

1.3.3 OPENING YEAR CUMULATIVE (2022) CONDITIONS

The Opening Year Cumulative (2022) Without and With Project traffic conditions analysis determines the potential cumulative near-term circulation system deficiencies. The roadway network is similar to Existing conditions except for new connections to be constructed by the Project. To account for background traffic growth, an ambient growth factor of 3.0% from Existing conditions are included for Opening Year Cumulative (2022) Without and With Project traffic conditions.

Conservatively, the TA estimates the area ambient traffic growth and then adds traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed 3.0% of ambient growth; and some of these related projects may not be implemented and operational within the 2022 Opening Year time frame assumed for the Project. The resulting traffic growth utilized in the TA (3.0% ambient growth factor plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2022 conditions.

1.4 STUDY AREA

To ensure that this TA satisfies the City of San Bernardino's traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by City of San Bernardino staff prior to the preparation of this report (also reviewed and accepted by the City of Highland).

1.4.1 STUDY AREA INTERSECTIONS

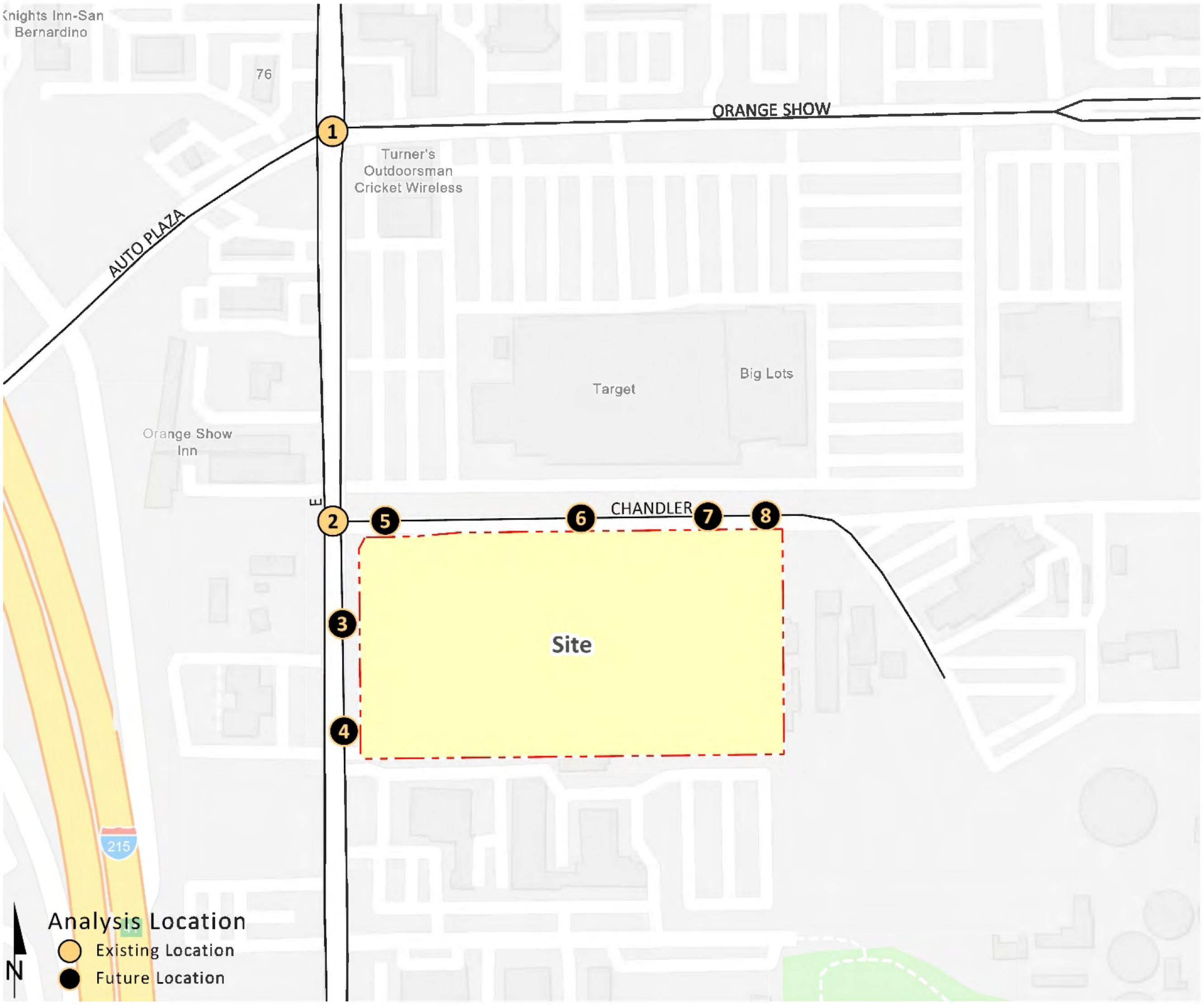
The 8 study area intersections listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of San Bernardino staff. Exhibit 1-3 shows the study area intersections. The study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the City of San Bernardino's TA Guidelines. (1) The "50 peak hour trip" criterion represents a minimum number of trips at which a typical intersection would have the potential to be substantively affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and widely used within San Bernardino County for estimating a potential area of influence (i.e., study area).

The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. Study area intersections that are identified as CMP facilities in the County of San Bernardino per the San Bernardino County Transportation Authority (SBCTA) CMP are indicated on Table 1-1 (E Street and Orange Show Road). (2)

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	E St. & Orange Show Rd.	San Bernardino	Yes
2	E. St. & Chandler Pl.	San Bernardino	No
3	E St. & Driveway 1	San Bernardino	No
4	E St. & Driveway 2	San Bernardino	No
5	Driveway 3 & Chandler Pl.	San Bernardino	No
6	Driveway 4 & Chandler Pl.	San Bernardino	No
7	Driveway 5 & Chandler Pl.	San Bernardino	No
8	Driveway 6 & Chandler Pl.	San Bernardino	No

EXHIBIT 1-3: STUDY AREA



1.5 SUMMARY OF ANALYSIS RESULTS

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *Existing plus Project Traffic Conditions* and Section 6 *Opening Year Cumulative (2022) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Table 1-2.

TABLE 1-2: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing		E+P		2022 Without Project		2022 With Project	
		AM	PM	AM	PM	AM	PM	AM	PM
1	E St. & Orange Show Rd.	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
2	E. St. & Chandler Pl.	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
3	E St. & Driveway 1	N/A	N/A	🟢	🟢	N/A	N/A	🟢	🟢
4	E St. & Driveway 2	N/A	N/A	🟢	🟢	N/A	N/A	🟢	🟢
5	Driveway 3 & Chandler Pl.	N/A	N/A	🟢	🟢	N/A	N/A	🟢	🟢
6	Driveway 4 & Chandler Pl.	N/A	N/A	🟢	🟢	N/A	N/A	🟢	🟢
7	Driveway 5 & Chandler Pl.	N/A	N/A	🟢	🟢	N/A	N/A	🟢	🟢
8	Driveway 6 & Chandler Pl.	N/A	N/A	🟢	🟢	N/A	N/A	🟢	🟢

🟢 = A - D 🟡 = E 🔴 = F

1.5.1 E+P CONDITIONS

The study area intersections are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for E+P traffic conditions, consistent with Existing traffic conditions. In addition, the addition of Project traffic is not anticipated to increase the volume to capacity (v/c) at the intersection of E Street at Orange Show Road by more than 0.02. As such, improvements have not been recommended for this location to reduce the change in v/c from the pre-project conditions.

1.5.2 OPENING YEAR CUMULATIVE (2022) WITHOUT AND WITH PROJECT CONDITIONS

The study area intersections are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Opening Year Cumulative (2022) Without Project traffic conditions. The addition of Project traffic is not anticipated to increase the volume to capacity (v/c) at the intersection of E Street at Orange Show Road by more than 0.02. As such, improvements have not been recommended for this location to reduce the change in v/c from the pre-project conditions.

1.6 RECOMMENDATIONS

1.6.1 SITE ADJACENT AND SITE ACCESS RECOMMENDATIONS

The following recommendations are based on the improvements needed to accommodate site access. Exhibit 1-4 shows the site adjacent recommendations. Minimum turn pocket storage and intersection spacing have been evaluated in a queuing evaluation of the site adjacent intersections and Project driveways and has been utilized for the recommendations below (see Appendix 1.2).

E Street & Chandler Place (#2) – The following improvements are necessary to accommodate site access:

- Project to restripe and extend the southbound left turn pocket to accommodate a minimum of 150-feet of storage.

E Street & Driveway 1 (#3) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the westbound approach with a right turn lane.

E Street & Driveway 2 (#4) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the westbound approach with a right turn lane.

Driveway 3 & Chandler Place (#5) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the northbound approach with a shared left-right turn lane.

Driveway 4 & Chandler Place (#6) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the northbound approach with a shared left-right turn lane.

Driveway 5 & Chandler Place (#7) – The following improvements are necessary to accommodate site access:

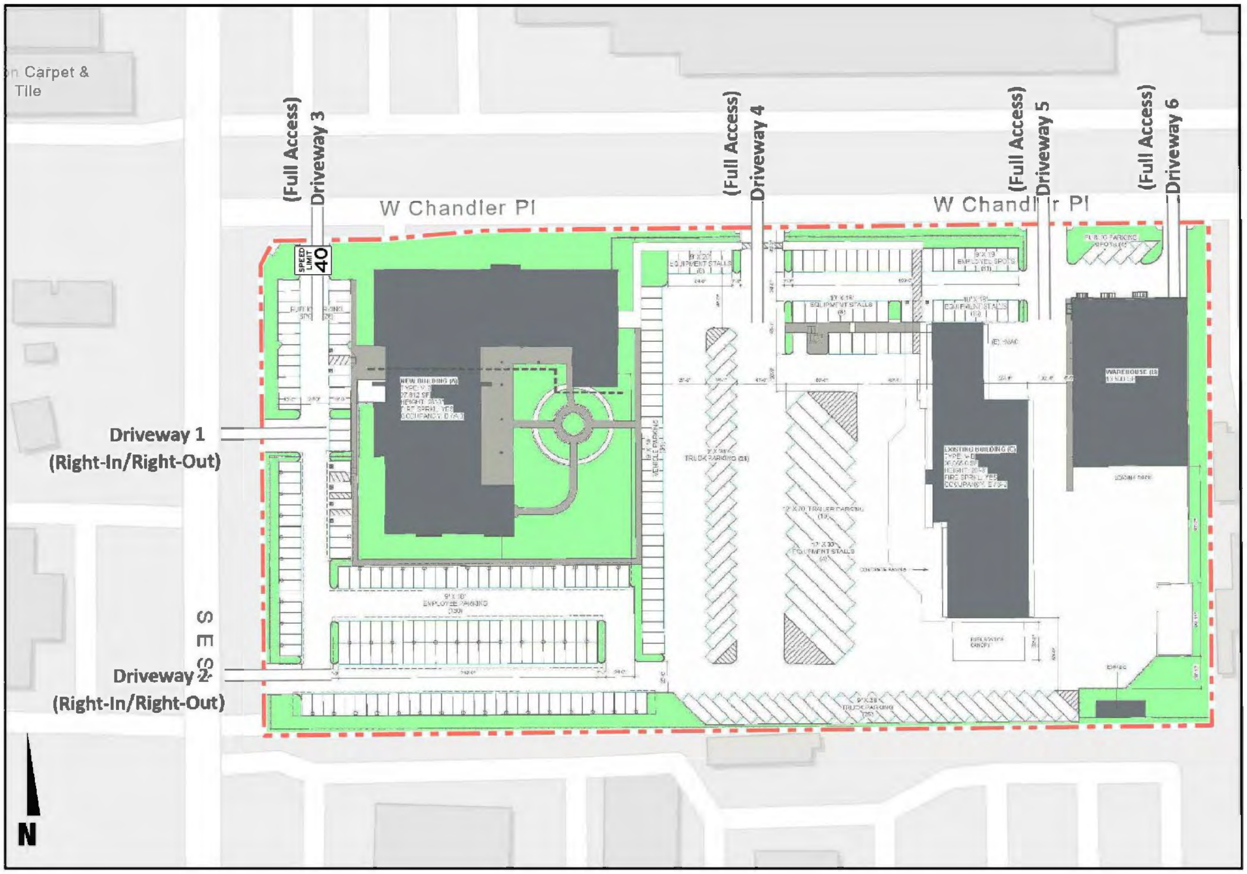
- Project to install a stop control on the northbound approach with a shared left-right turn lane.

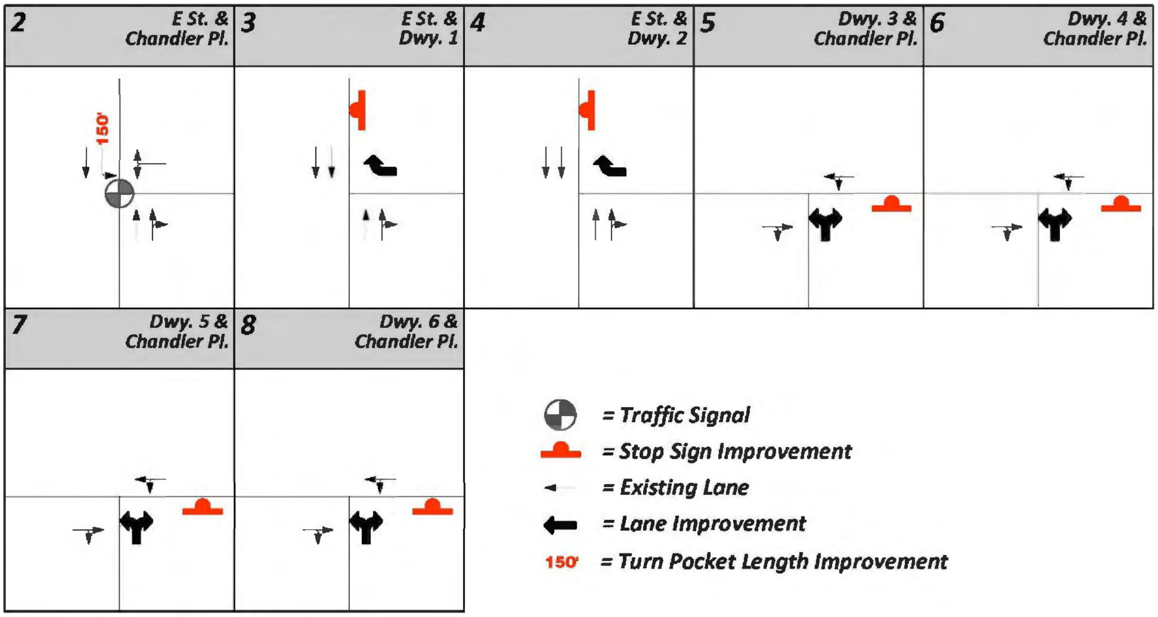
Driveway 6 & Chandler Place (#8) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the northbound approach with a shared left-right turn lane.

E Street and Chandler Place have curb and gutter improvements in place. The Project should implement sidewalk improvements along the Project frontages on E Street and Chandler Place and provide curb cuts to accommodate proposed driveway locations for site access.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS





On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of San Bernardino sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

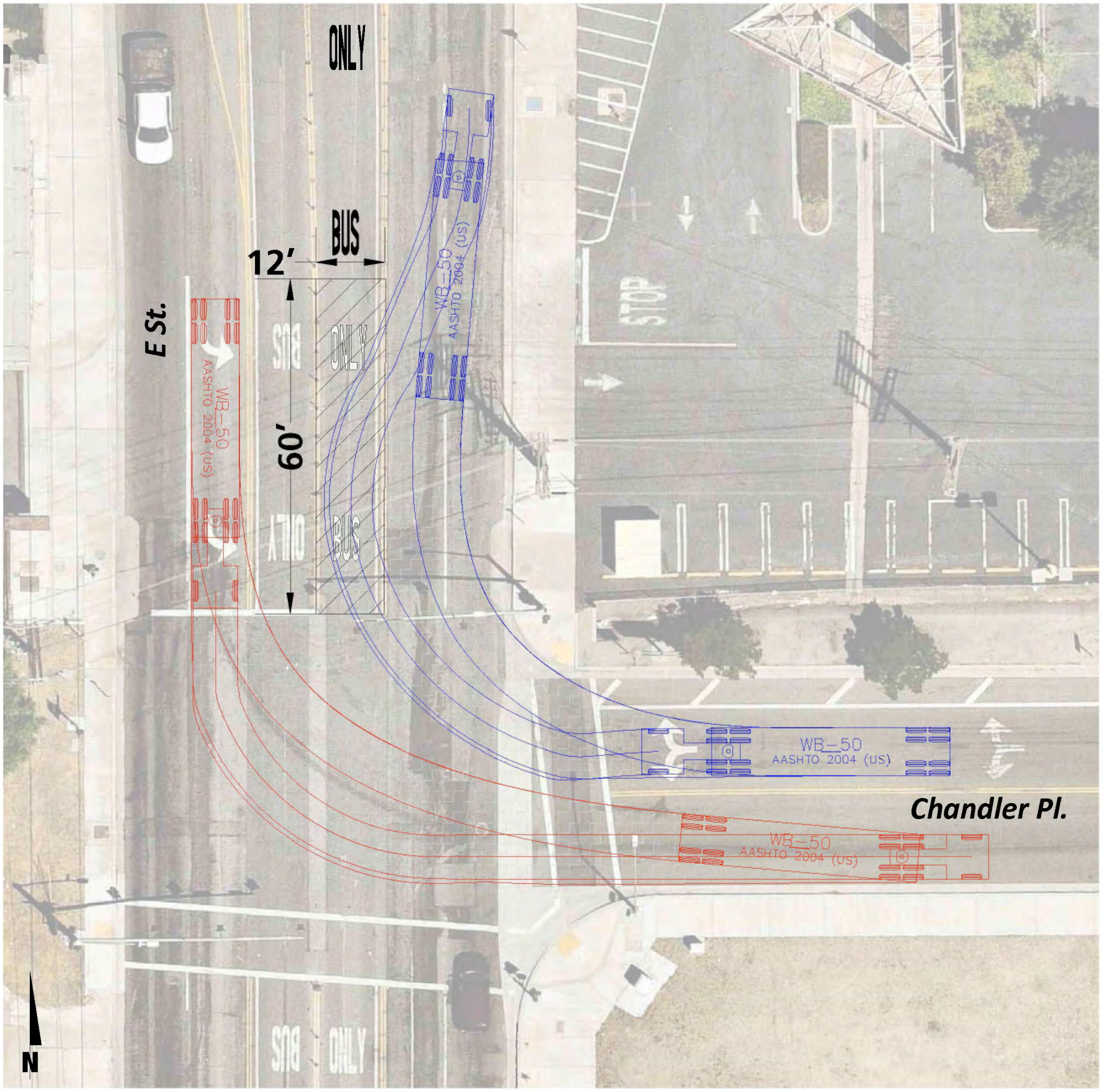
1.6.2 OFF-SITE RECOMMENDATIONS

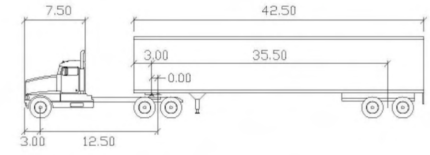
There are no recommended off-site improvements. However, the Project Applicant would be required to pay requisite Development Impact (DIF) consistent with the City's requirements (see Section 7 *Local and Regional Funding Mechanisms*).

1.7 TRUCK ACCESS AND CIRCULATION

Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid at the intersection of E Street and Chandler Place in order to determine verify the existing curb radii could accommodate turning trucks. It should be noted that there are existing 4+-axle trucks making the westbound right turn maneuver (albeit limited as there were only 2 in the AM peak hour observed and 1 in the PM peak hour). A WB-50 truck turn template has been utilized to determine the turning radius and the improvements needed to the intersection to accommodate westbound right turns for heavy trucks. As shown on Exhibit 1-5, it is recommended the Bus Only lane be restriped (60-feet north of its current location) in order to accommodate the turning radius.

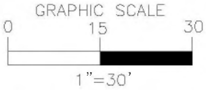
EXHIBIT 1-5: TRUCK ACCESS





WB-50

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 17.7
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		



2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of San Bernardino traffic study guidelines. (1)

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term Level of Service (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (3) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of San Bernardino requires signalized intersection operations analysis based on the methodology described in the HCM (6th Edition). Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro (Version 10) analysis software package.

The traffic modeling and signal timing optimization software package Synchro (Version 11) is utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

Signal timing obtained from the City which has been utilized for the existing signalized intersections in the Synchro analysis.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up	F	F

Source: HCM, 6th Edition

The peak hour traffic volumes are adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (3)

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of San Bernardino requires the operations of unsignalized intersections be evaluated using the methodology described the HCM. (3) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole while the LOS associated with the highest delay for the minor street movements is reported for side-street stop-controlled intersections.

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM, 6th Edition

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices *(*CA MUTCD*)*. (4)

The signal warrant criteria for Existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The Caltrans CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (4) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing study area intersections for all analysis scenarios. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics (e.g., located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Traffic signal warrant analyses were performed for the following unsignalized study area intersection shown in Table 2-3:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
5	Driveway 3 & Chandler Pl.	San Bernardino
6	Driveway 4 & Chandler Pl.	San Bernardino
7	Driveway 5 & Chandler Pl.	San Bernardino
8	Driveway 6 & Chandler Pl.	San Bernardino

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *Existing plus Project Traffic Conditions* and Section 6 *Opening Year Cumulative (2022) Traffic Conditions* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 MINIMUM LEVEL OF SERVICE (LOS)

2.4.1 CITY OF SAN BERNARDINO

The definition of an intersection deficiency in the City of San Bernardino is based on the City of San Bernardino General Plan Circulation Element. The City of San Bernardino General Plan states that target LOS D be maintained at City intersections wherever possible.

2.4.2 SAN BERNARDINO COUNTY CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document.

2.5 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies. The following deficiency criteria has been utilized for the City of San Bernardino and City of Highland. To determine whether the addition of project-related traffic at a study intersection would result in a deficiency, the following will be utilized:

The City of San Bernardino TIA Guidelines identifies a traffic deficiency at an intersection when any of the following changes in the v/c ratios occur between the Without Project and the With Project conditions:

LOS Without Project	V/C Difference
C	> 0.0400
D	> 0.0200
E, F	> 0.0100

Improvement recommendations for Project deficiencies identified under Existing plus Project conditions would only mitigate the Project’s proportional change in delay or v/c ratio to pre-Project conditions or better. Improvement recommendations will be identified for intersections that show a cumulative deficiency per the above changes in v/c and operate at LOS E or worse under Opening Year Cumulative (2022) traffic conditions. The LOS with improvements must be improved to LOS D or better for intersections.

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3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of San Bernardino General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the scoping agreement with City of San Bernardino staff (Appendix 1.1), the study area includes a total of 16 existing and future intersections as shown previously on Exhibit 1-3, where the Project is anticipated to contribute 50 or more peak hour trips or has been added at the direction of City staff. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 GENERAL PLAN CIRCULATION ELEMENTS

As noted previously, the Project site is located within the City of San Bernardino. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on City of San Bernardino General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of San Bernardino General Plan Circulation Element.

Secondary Arterials can accommodate four lanes, providing two lanes in each direction. These facilities carry traffic along the perimeters of major developments, provide support to the major arterials, and are also through streets enabling traffic to travel uninterrupted for longer distances through the City. The following roadways are classified as a Secondary Arterial within the study area:

- Orange Show Road
- E Street

Chandler Place is classified as a local street.

3.3 BICYCLE & PEDESTRIAN FACILITIES

In an effort to promote alternative modes of transportation, the City of San Bernardino also includes a trails system. The trails system, shown on Exhibit 3-3, shows the proposed trails connected with major features within the City. There are planned Class II bike lanes along E Street and there is an existing regional multi-purpose trail to the south of the study area (Santa Ana River Trail). Existing pedestrian facilities are shown on Exhibit 3-4.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

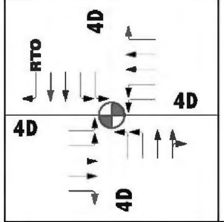
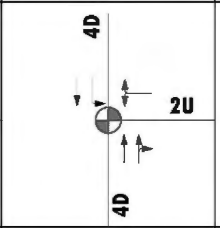
1 E St. & Auto Plz./ Orange Show Rd.	**2** E St. & Chandler Pl.	**3** E St. & Dwy. 1	**4** E St. & Dwy. 2	**5** Dwy. 3 & Chandler Pl.
		Future Intersection	Future Intersection	Future Intersection
6 Dwy. 4 & Chandler Pl.	**7** Dwy. 5 & Chandler Pl.	**8** Dwy. 6 & Chandler Pl.		
Future Intersection	Future Intersection	Future Intersection		

EXHIBIT 3-2: CITY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

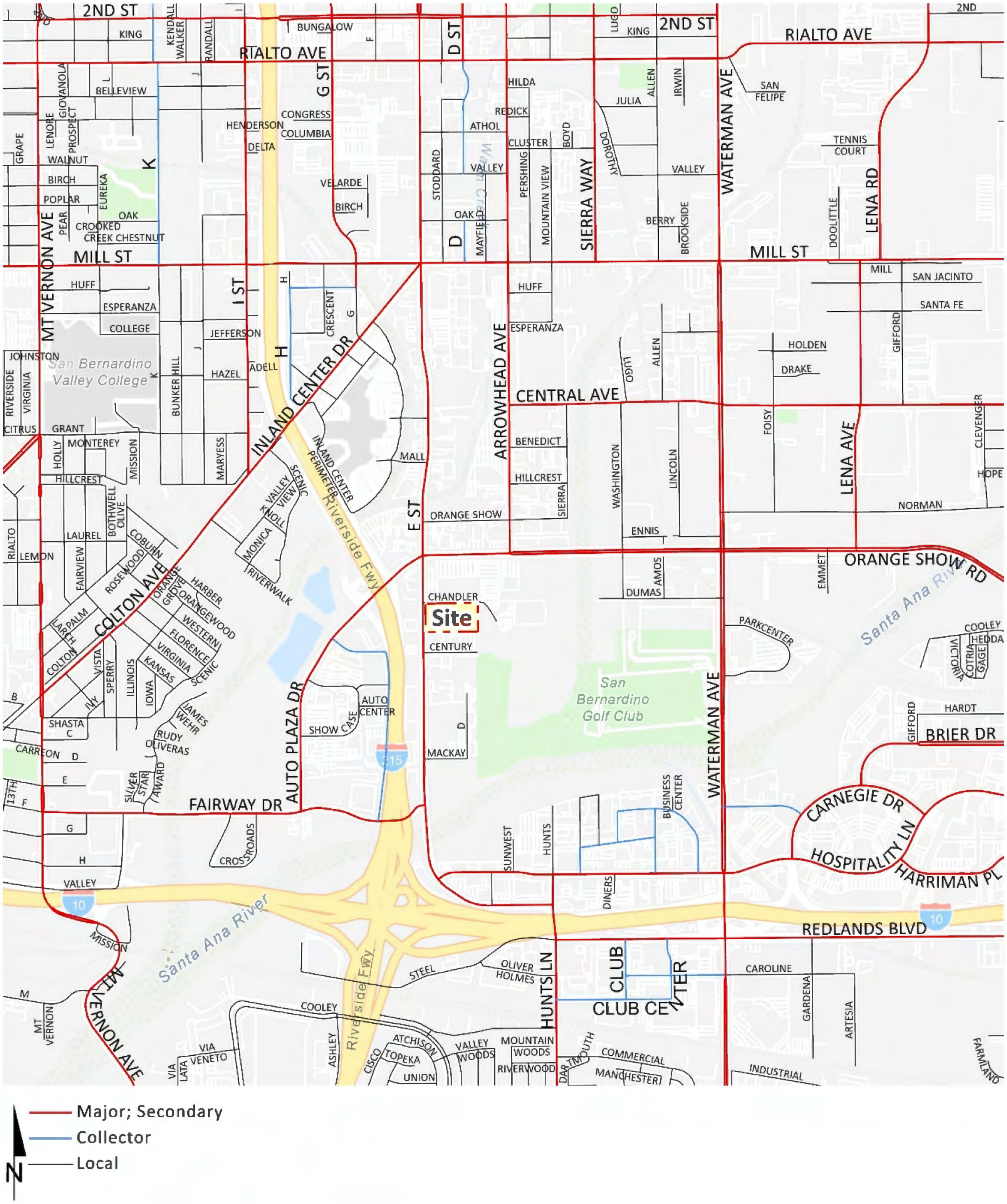


EXHIBIT 3-3: CITY OF SAN BERNARDINO CONCEPTUAL TRAIL SYSTEM

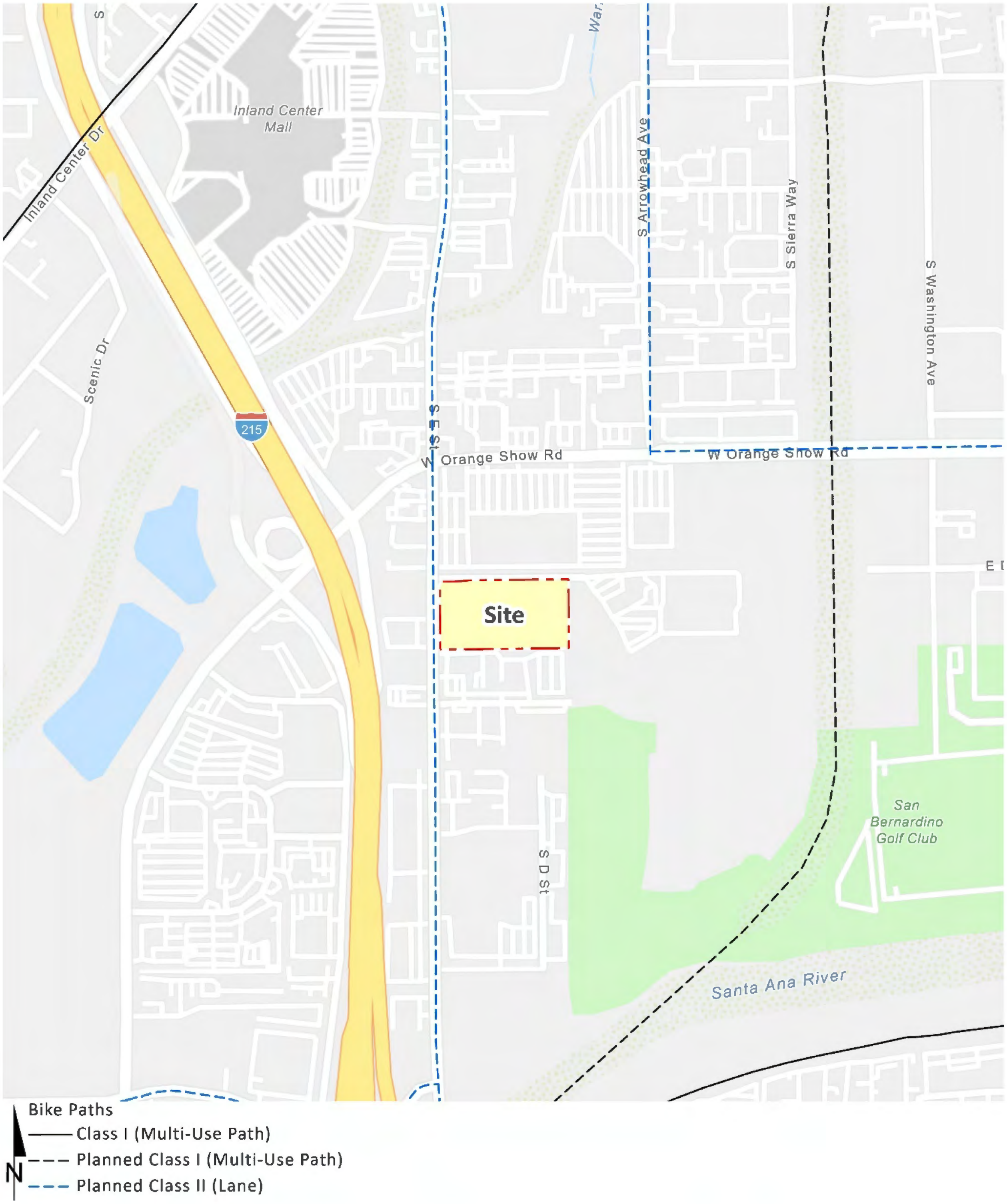


EXHIBIT 3-4: EXISTING PEDESTRIAN FACILITIES

3.4 TRANSIT SERVICE

The study area within the City of San Bernardino is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County. The Project site could be served by Omnitrans Route 202, which currently runs along E Street. The sbX Green Line also runs along E Street every 20-30 minutes and has a stop at Hospitality/Hunts Lane to the south and E Street/Inland Center to the north. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. The existing transit routes in the vicinity of the study area are illustrated on Exhibit 3-5.

3.5 EXISTING TRAFFIC COUNTS

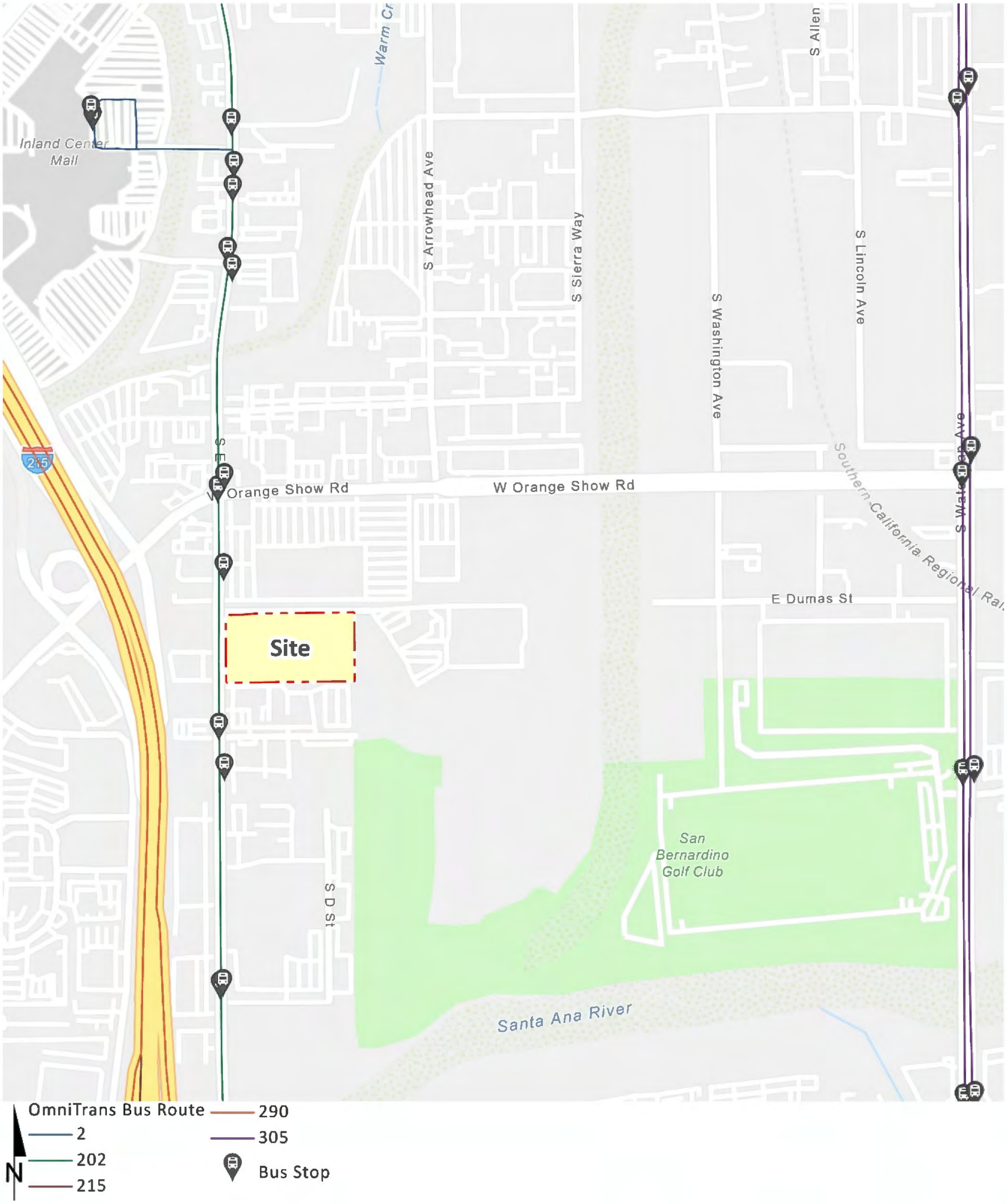
Considering the current economic conditions and social-distancing practices in effect, Urban Crossroads has used historic data obtained from other traffic studies in conjunction with new traffic counts. Counts older than the current calendar year (2021) were brought to current conditions through the application of a growth factor of 3% per year (compounded annually), consistent with the City's ambient growth factor for future traffic conditions. A comparison of the adjusted historic 2015 traffic counts (adjusted to 2021) compared to the current 2021 counts collected at the intersection of E Street and Orange Show Road showed adjustments were necessary to the AM peak hour counts, but that PM peak hour volumes showed an increase of approximately 4.5% per year between 2015 to 2021 without any adjustments. As such, 2021 traffic counts collected at E Street and Chandler Place were adjusted in the AM peak hour only using the same factor observed when comparing the 2015 (adjusted to 2021) and 2021 traffic count data. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

Adjustments include manual adjustments to the 2021 data in conjunction with flow conservation adjustments. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access, and where there are currently no uses generating traffic. The traffic counts collected in 2015 and 2021 include the vehicle classifications as shown below:

- Passenger Cars
- 2-Axle Trucks
- 3-Axle Trucks
- 4 or More Axle Trucks

EXHIBIT 3-5: EXISTING TRANSIT ROUTES



To represent the effect large trucks, buses, and recreational vehicles have on traffic flow, all trucks were converted into passenger car equivalent (PCE). By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is also much longer than for passenger cars and varies depending on the type of vehicle and number of axles. For this analysis, the following PCE factors have been used to estimate each turning movement: 2.0 for 2-axle trucks, 2.5 for 3-axle trucks, and 3.0 for 4+-axle trucks. These factors are consistent with the City's TA Guidelines.

Existing weekday ADT volumes on arterial highways throughout the study area are shown on Exhibit 3-6. Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 10.61 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 9.43 percent. As such, the above equation utilizing a factor of 10.61 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 9.43 percent (i.e., 1/0.0943 = 10.61) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes are also shown on Exhibit 3-6.

3.6 EXISTING (2021) INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that all the study area intersections are currently operating at an acceptable LOS during the peak hours (i.e., LOS D or better). The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

EXHIBIT 3-6: EXISTING (2021) TRAFFIC VOLUMES (IN PCE)

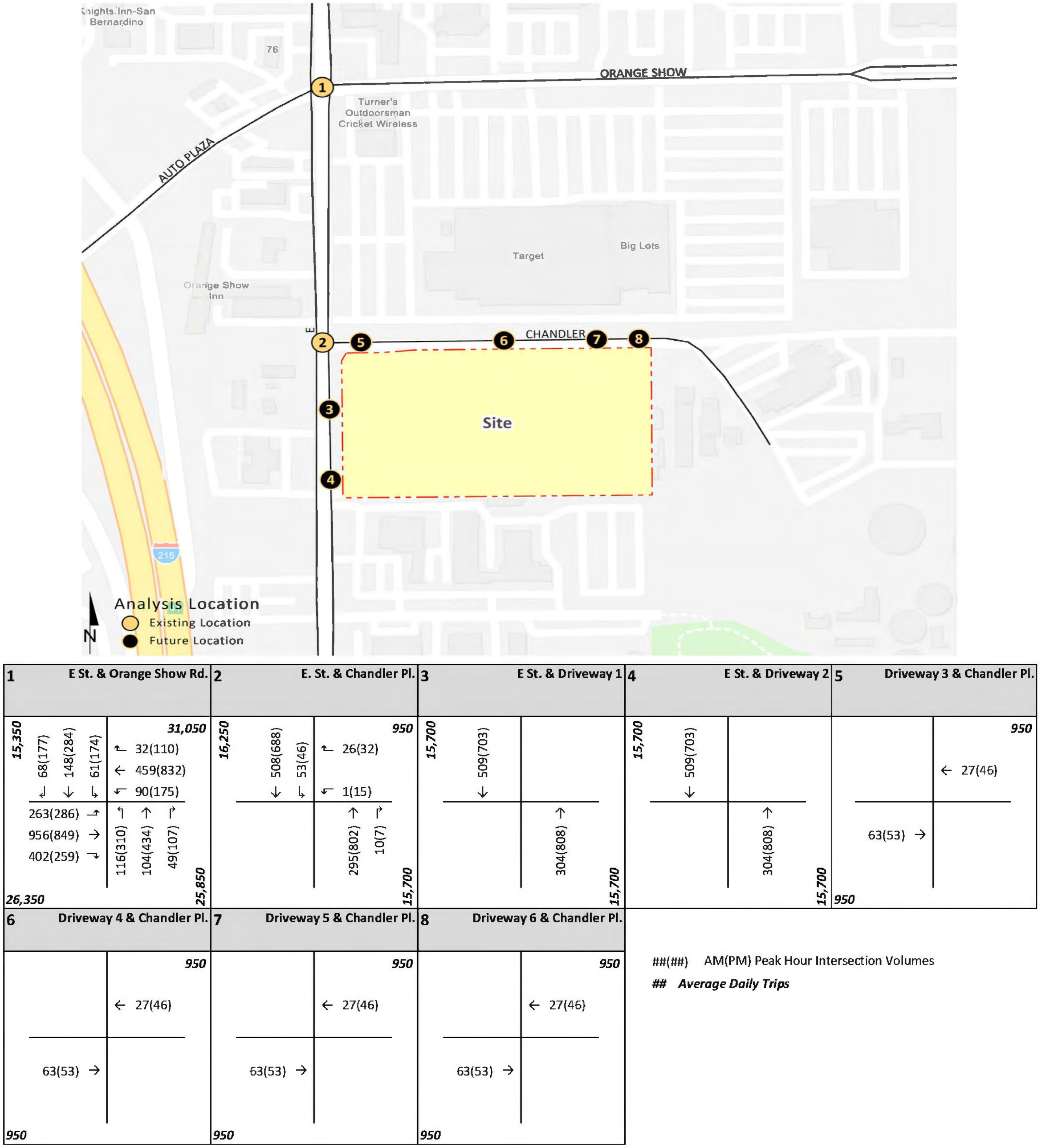


TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2021) CONDITIONS

#	Intersection	Traffic Control[2]	Delay[1] (secs.) AM	Delay[1] (secs.) PM	Level of Service AM	Level of Service PM
1	E St. & Orange Show Rd.	TS	25.1	36.5	C	D
2	E. St. & Chandler Pl.	TS	5.6	8.3	A	A
3	E St. & Driveway 1		Future Intersection			
4	E St. & Driveway 2		Future Intersection			
5	Driveway 3 & Chandler Pl.		Future Intersection			
6	Driveway 4 & Chandler Pl.		Future Intersection			
7	Driveway 5 & Chandler Pl.		Future Intersection			
8	Driveway 6 & Chandler Pl.		Future Intersection			

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM

[2] TS = Traffic Signal

3.7 EXISTING (2021) TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no unsignalized study area intersections. As such, traffic signal warrant analysis has not been performed for Existing (2021) traffic conditions.

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project's trip assignment onto the study area roadway network. The Project consists of the development of a 27,812 square foot one-story structural steel administrative office building (New Building A) and a 13,500 square foot one-story tilt-up concrete warehouse with loading docks (New Warehouse B). Just east of the New Building A, administration building, the Project proposes to install a 17,921 SF demonstration garden. The proposed Project would also include renovations of the existing 26,055.6 SF concrete block operations building (Building C) that is located toward the eastern boundary of the site. This building will house vehicle maintenance in the existing service bays and administrative offices in the two-story office section of the building. Additionally, the Project includes the development of a 13,500 SF one-story tilt-up concrete warehouse with loading docks (New Warehouse B) along the easternmost boundary of the site, to the east of the existing building.

The anticipated Project opening year is 2022. Access to the proposed Project would be provided via E Street and Chandler Place. The driveways on E Street would be restricted to right-in/right-out access only and the driveways on Chandler Place would have full access. Regional access to the Project site is available from the I-215 Freeway via Orange Show Road/Auto Center Drive.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development and is based upon the specific land uses planned for a given project. The trip generation used for this analysis are based upon user-specific information provided by the SBMWD. The resulting trip generation for the proposed Project is shown on Table 4-1. Based on the information provided by SBMWD, it has been conservatively assumed that approximately 50% of the employees would arrive to the site in the morning peak hour (7-9 AM) and depart in the evening peak hour (4-6 PM) although most would arrive before 6:30 AM. Employees are assumed to leave the site for field assignments (typically within 30-60 minutes from the beginning of shift) and will return before the end of the day.

The department has 74 vehicles ranging from sport utility vehicles (SUV)/pick-up trucks to Crane Trucks, Dump Trucks, and Water Trucks. Based on the list of department vehicles, there are approximately 48% pick-up truck, van, or SUV with 45% flatbed or utility trucks (large 2-axle trucks), and 7% larger 3-axle trucks such as dump trucks and water truck. Dump trucks and approximately half of the utility trucks are to operate during the off-peak times (11:00 AM to 2:00 PM). As such, the trip generation analysis conservatively assumes that approximately 50% of the pick-up trucks/SUV/vans and utility department vehicles will depart during the morning peak hour and return in the evening peak hour (dump/water trucks assumed to depart and return during off-peak hours).

TABLE 4-1: PROPOSED PROJECT TRIP GENERATION SUMMARY

	AM Peak Hour			PM Peak Hour			
Land Use	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**Daily**
SBMWD Water Facilities Relocation							
Employees	49	0	49	0	98	98	196
Department Vehicle: Pick-Up Trucks/SUV/Vans	0	18	18	18	0	18	72
Department Vehicle: Flat-Bed/Utility Trucks	0	17	17	17	0	17	66
Department Vehicle: Dump/Water Trucks	0	0	0	0	0	0	10
Total Proposed Project (Actual Vehicles)	**49**	**35**	**84**	**35**	**98**	**133**	**344**
SBMWD Water Facilities Relocation							
Employees	49	0	49	0	98	98	196
Department Vehicle: Pick-Up Trucks/SUV/Vans	0	18	18	18	0	18	72
Department Vehicle: Flat-Bed/Utility Trucks	0	33	33	33	0	33	132
Department Vehicle: Dump/Water Trucks	0	0	0	0	0	0	26
Total Proposed Project (PCE)	**49**	**51**	**100**	**51**	**98**	**149**	**426**

As shown on Table 4-1, the proposed Project is anticipated to generate 344 two-way trips per day, with 84 AM peak hour trips and 133 PM peak hour trips. The City's Guidelines require that truck intensive uses translate heavy truck trips to PCE. As shown on Table 4-1, the Project is anticipated to generate 426 two-way PCE trips per day, with 100 PCE AM peak hour trips and 149 PCE PM peak hour trips.

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. In addition, truck routes for neighboring agencies have been taken into consideration in the development of the trip distribution patterns for heavy trucks. Exhibits 4-1 and 4-2 show the Project employee and department vehicle trip distribution patterns.

4.3 MODAL SPLIT

The traffic reducing potential of public transit, walking, or bicycling have not been considered in this TA. Essentially, the traffic projections are "conservative" in that these alternative travel modes might be able to reduce the forecasted traffic volumes (employee trips only).

EXHIBIT 4-1: PROJECT (EMPLOYEE) TRIP DISTRIBUTION

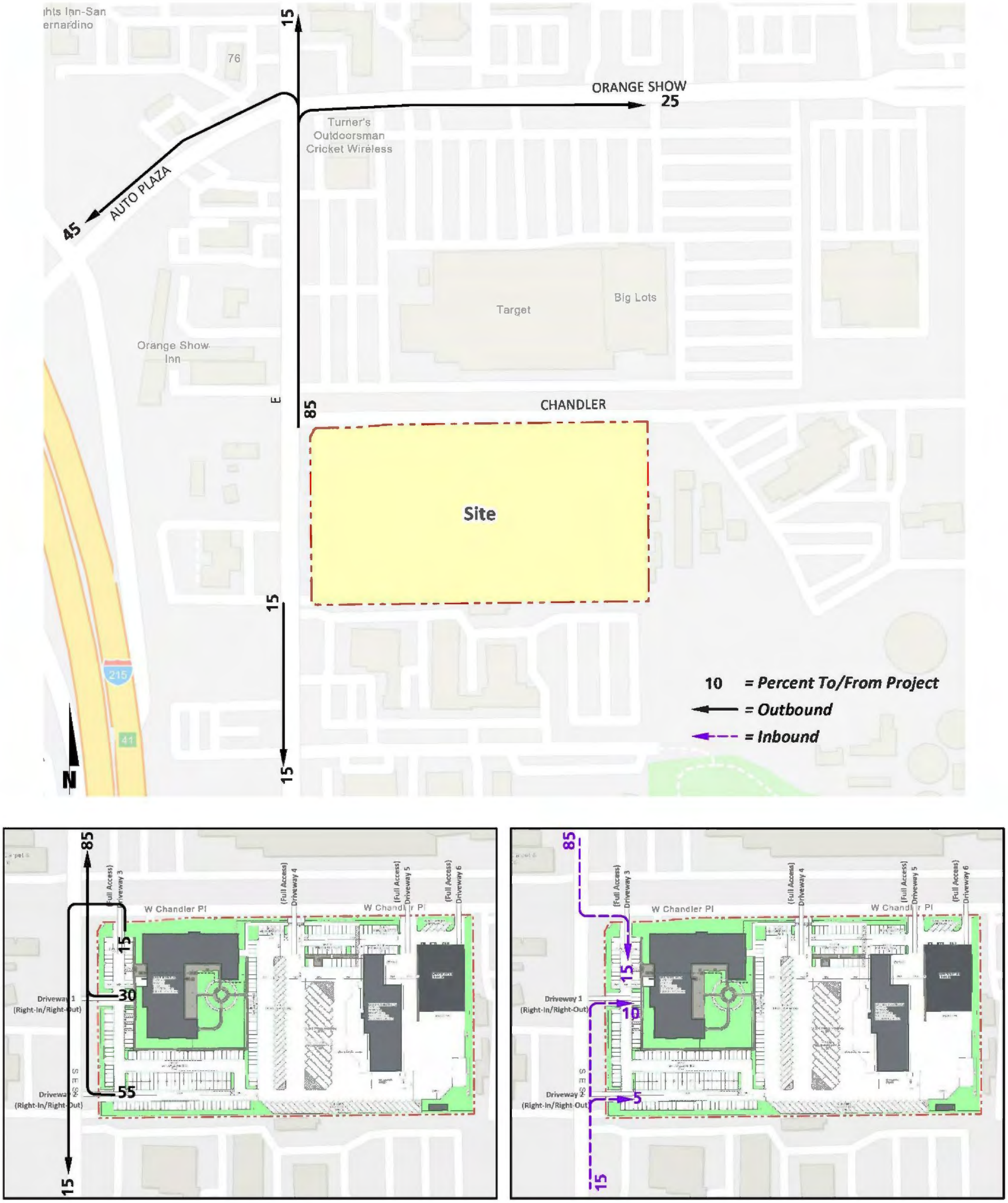
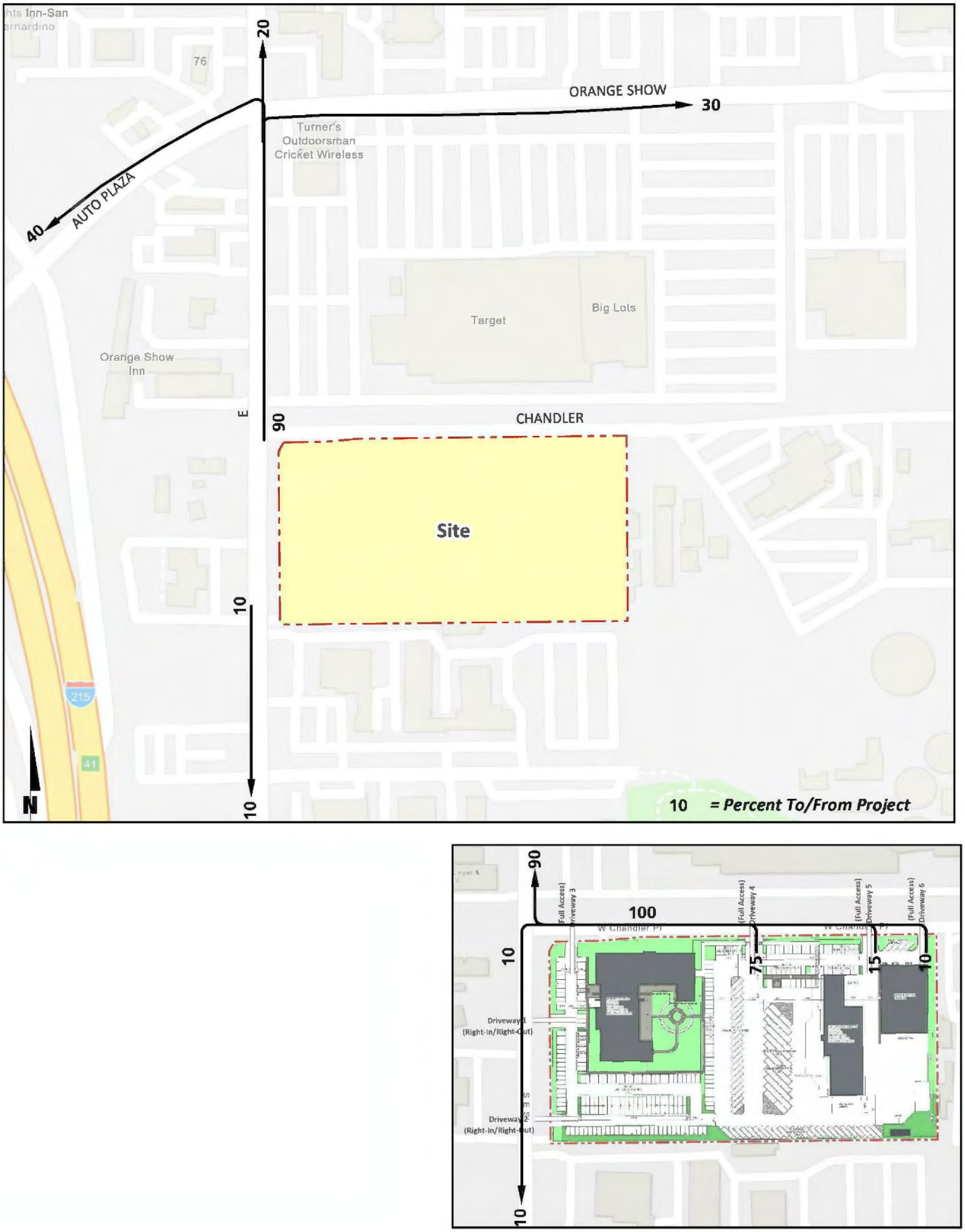


EXHIBIT 4-2: PROJECT (DEPARTMENT VEHICLES) TRIP DISTRIBUTION



4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes is shown on Exhibit 4-3.

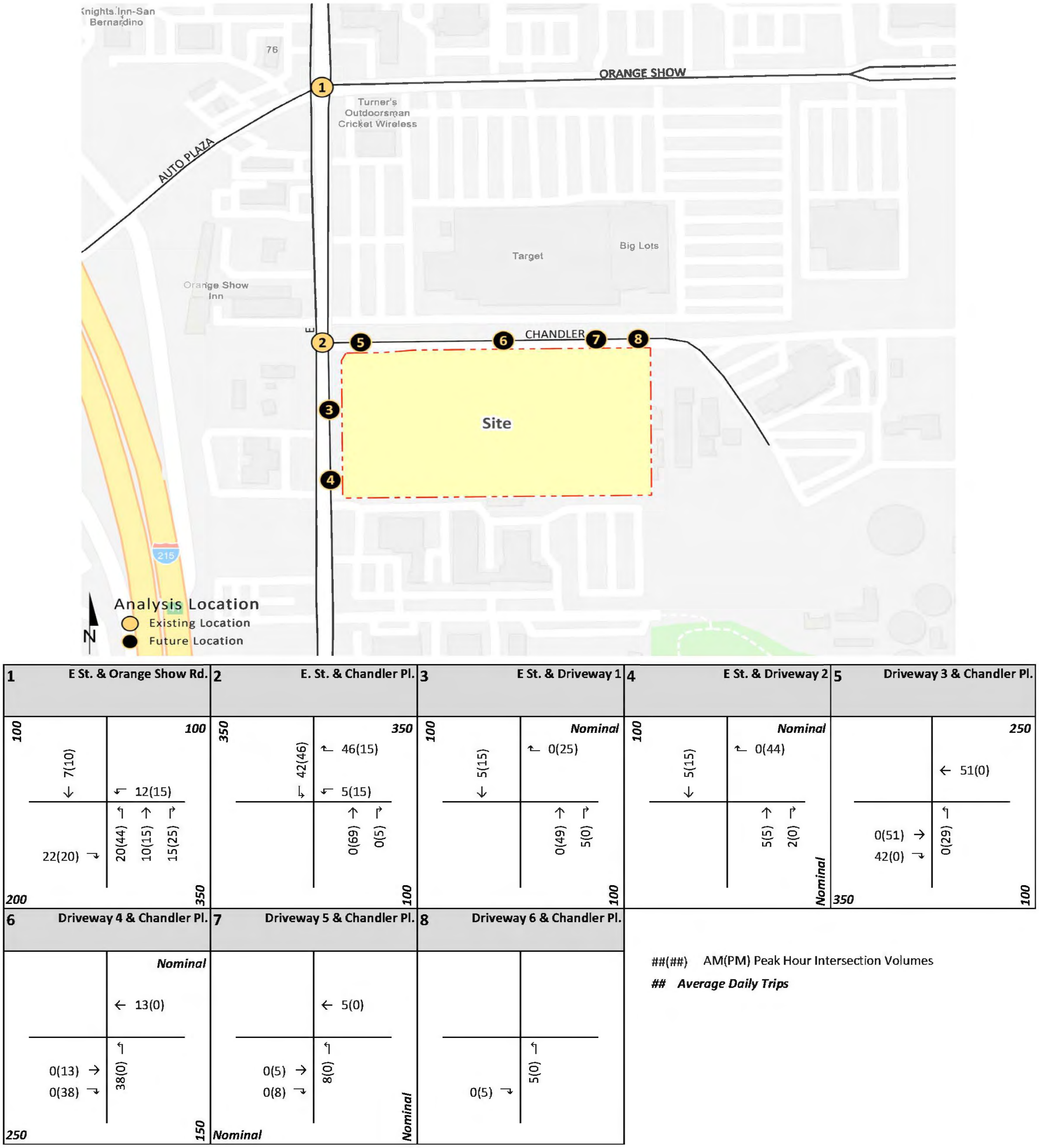
4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon a background (ambient) growth factor of 3% for 2022 traffic conditions. The ambient growth factor is intended to approximate traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects.

Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

The currently adopted Southern California Association of Governments (SCAG) 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) growth forecasts for the City of San Bernardino identifies projected growth in population of 216,300 in 2016 to 230,500 in 2045, or a 6.56 percent increase over the 29-year period. (5) The change in population equates to roughly a 0.22 percent growth rate, compounded annually. Similarly, growth over the same 29-year period in households is projected to increase by 15.24 percent, or 0.49 percent annual growth rate. Finally, growth in employment over the same 29-year period is projected to increase by 23.99 percent, or a 0.74 percent annual growth rate. This results in an average of 0.48 percent annual growth rate. As such, the 3.0 percent per year ambient growth rate utilized in this TA in conjunction with traffic associated with other development projects would appear to conservatively estimate future traffic growth and overstate as opposed to understate future traffic forecasts.

EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES (IN PCE)



4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning staff from the City of San Bernardino. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. Where applicable, cumulative projects anticipated to contribute measurable traffic (i.e., 50 or more peak hour trips) to study area intersections have been manually added to the study area network to generate Opening Year Cumulative (2022) forecasts. In other words, this list of cumulative development projects has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project). For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-4, listed in Table 4-2, and have been considered for inclusion. Cumulative traffic volumes are shown on Exhibit 4-5.

Although it is unlikely that all these cumulative projects would be fully built and occupied by Year 2022, they have been included in an effort to conduct a conservative analysis and overstate as opposed to understate potential traffic deficiencies. Any other cumulative projects located beyond the cumulative study area that are not expected to contribute measurable traffic to study area intersections have not been included since the traffic would dissipate due to the distance from the Project site and study area intersections. Any additional traffic generated by other projects not on the cumulative projects list is accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*.

TABLE 4-2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

No.	Project Name/Case Number	Address/Location	Land Use[1]	Quantity	Units[2]
SB1	CUP 17-15 & NL 18-02	895 W. Mill St.	Super Gas Station w/ Market	16	VFP
SB2	CUP 18-05 & NL 18-04	NWC of Central Av. & Tippecanoe Av.	Super Gas Station w/ Market	20	VFP
			Diesel Station	12	VFP
			Express Car Wash	140	LF
			Retail	1.900	TSF
			Fast-Food Restaurant	3.750	TSF
SB3	CUP 18-17	S of Mill St. & W of Waterman Av.	Truck Repair/Storage	8.0	Acres
SB4	CUP 18-21	1150 & 1250 S. Tippecanoe Av.	Transfer Station	1,500	TPD
SB5	CUP 17-29 & NL 18-03	1195 S. Waterman Av.	Gas Station w/ Market	12	VFP
			Diesel Station	6	VFP
SB6	DP (Type-P) 18-02	S of Inland Center Dr. & N of Riverwalk Dr.	Warehousing	101.464	TSF
SB7	GPA 16-07, DCA 16-08, CUP 16-17 & NL 17-01	841 S. Inland Center Dr.	Gas Station w/ Market	12	VFP
SB8	GPA 19-01, DCA 19-05, TPM 20062 & CUP 19-10	230 S. Waterman Av. (Parcel 1)	Charter School	89.890	TSF
SB9	GPA 19-03, DCA 19-08, TPM 20189 & DP 19-13	SEC of Foisy St. & E. Central Av.	Warehousing	467.125	TSF
SB10	TPM 19921	SWC of Central Av. & S. Lena Rd.	Warehousing	135.287	TSF
SB11	TPM 20000, TPM 20002 & DP 18-04	E of Washington Av. & S of Central Av.	Warehousing	287.184	TSF
SB12	TPM 19999, TPM 20001 & DP 18-05	W of Washington Av. & S of Central Av.	Warehousing	287.800	TSF

[1] DU = Dwelling Units; TSF = Thousand Square Feet; VFP = Vehicle Fueling Position; LF = Linear Feet; TPD = Tons Per Day

EXHIBIT 4-4: CUMULATIVE DEVELOPMENT LOCATION MAP

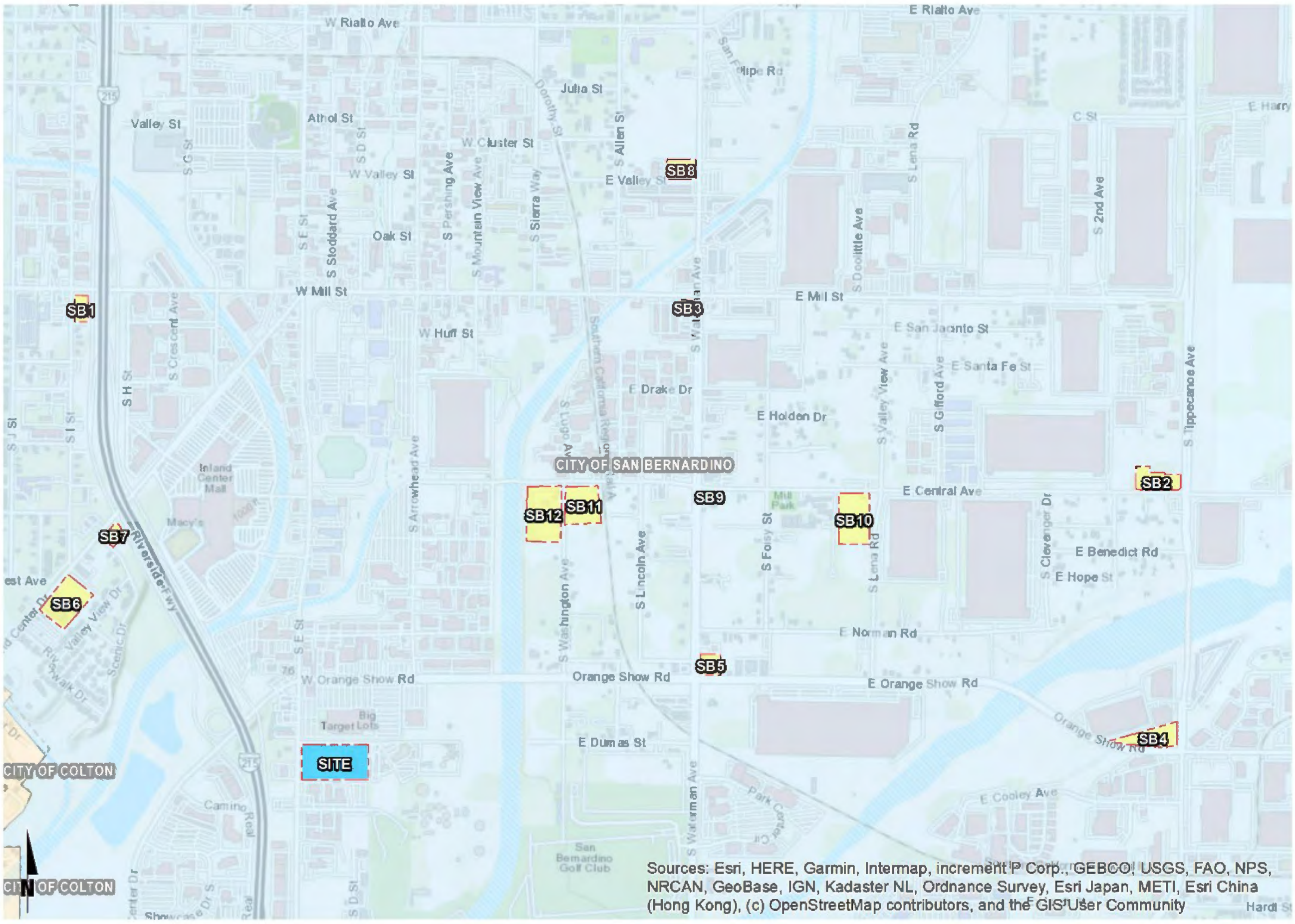
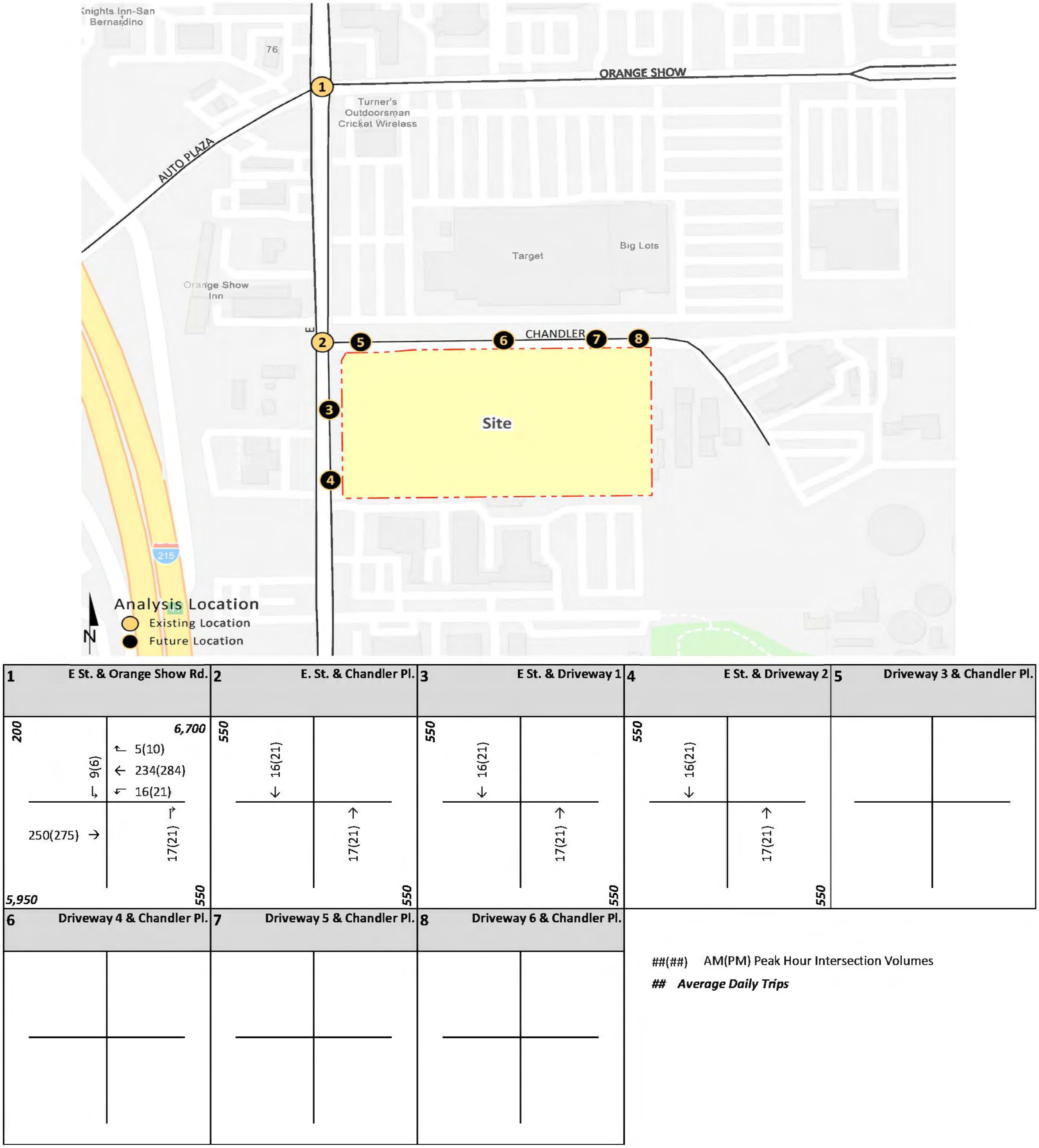


EXHIBIT 4-5: CUMULATIVE DEVELOPMENT PROJECTS ONLY TRAFFIC VOLUMES (IN PCE)



4.7 NEAR-TERM TRAFFIC CONDITIONS

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast Opening Year Cumulative (2022) traffic conditions. An ambient growth factor of 3.0% accounts for background (area-wide) traffic increases that occur over time up to the year 2022 from the year 2021. Traffic volumes generated by the Project are then added to assess the near-term cumulative traffic conditions. The 2022 roadway network is similar to the Existing conditions roadway network. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2022) Without Project
    - Adjusted Existing 2021 counts
    - Ambient growth traffic (3.0%)
    - Cumulative Development traffic
- Opening Year Cumulative (2022) With Project
    - Adjusted Existing 2020 counts
    - Ambient growth traffic (3.0%)
    - Cumulative Development traffic
    - Project traffic

5 EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This section discusses the methods used to develop E+P traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 TRAFFIC VOLUME FORECASTS

This scenario includes adjusted Existing (2021) traffic volumes and the addition of Project traffic. The weekday ADT volumes and peak hour volumes which can be expected for E+P traffic conditions are shown on Exhibit 5-1.

5.3 INTERSECTION OPERATIONS ANALYSIS

LOS calculations were conducted for the study intersections to evaluate their operations under EAP conditions with roadway and intersection geometrics consistent with Section 5.1 *Roadway Improvements*. As shown in Table 5-1, all study area intersections are anticipated to operate at an acceptable LOS during the peak hours for E+P traffic conditions, consistent with Existing traffic conditions. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TA.

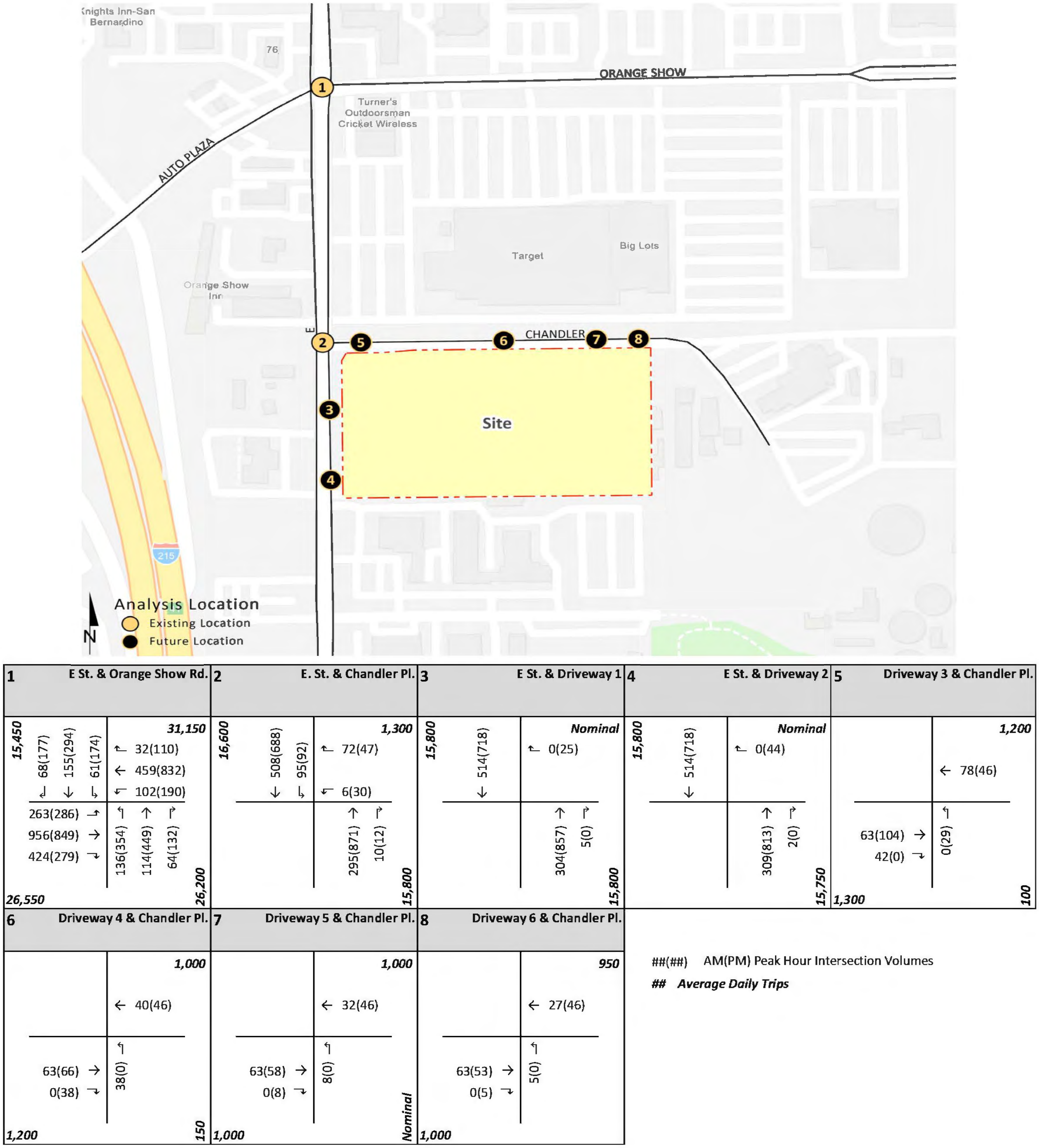
TABLE 5-1: INTERSECTION ANALYSIS FOR E+P CONDITIONS

			Existing (2021)						**E+P**					
		Traffic	**Delay[1] (secs.)**		**Volume-to-Capacity (V/C)**		**Level of Service**		**Delay[1] (secs.)**		**Volume-to-Capacity (V/C)**		**Level of Service**	
#	**Intersection**	**Control[2]**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
1	E St. & Orange Show Rd.	TS	25.1	36.5	0.77	0.85	C	D	27.6	40.4	0.79	0.86	C	D
2	E. St. & Chandler Pl.	TS	5.6	8.3	--	--	A	A	9.2	11.8	--	--	A	B
3	E St. & Driveway 1	CSS	Future Intersection						0.0	11.9	--	--	A	B
4	E St. & Driveway 2	CSS	Future Intersection						0.0	11.9	--	--	A	B
5	Driveway 3 & Chandler Pl.	CSS	Future Intersection						0.0	9.5	--	--	A	A
6	Driveway 4 & Chandler Pl.	CSS	Future Intersection						9.2	0.0	--	--	A	A
7	Driveway 5 & Chandler Pl.	CSS	Future Intersection						9.0	0.0	--	--	A	A
8	Driveway 6 & Chandler Pl.	CSS	Future Intersection						9.0	0.0	--	--	A	A

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

[2] TS = Traffic Signal; CSS = Cross-street Stop; CSS = Improvement

EXHIBIT 5-1: E+P TRAFFIC VOLUMES (IN PCE)



5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants have been performed (based on CA MUTCD) for E+P traffic conditions based on daily traffic volumes for the full access intersections along Chandler Place. There are no unsignalized study area intersections that are anticipated to meet a planning-level ADT traffic signal warrant under E+P traffic conditions (see Appendix 5.2).

5.5 RECOMMENDED IMPROVEMENTS

The study area intersections are anticipated to operate at an acceptable LOS for E+P traffic conditions. As such, intersection improvements have not been recommended.

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6 OPENING YEAR CUMULATIVE (2022) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2022) traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative (2022) conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative (2022) conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages).

6.2 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes adjusted Existing (2021) traffic volumes plus an ambient growth factor of 3.0%, and the addition of traffic generated by cumulative development projects. The weekday ADT volumes and peak hour volumes which can be expected for Opening Year Cumulative (2022) Without Project traffic conditions are shown on Exhibit 6-1.

6.3 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes adjusted Existing (2021) traffic volumes plus an ambient growth factor of 3.0%, the addition of traffic generated by cumulative development projects, and the addition of Project traffic. The weekday ADT volumes and peak hour volumes which can be expected for Opening Year Cumulative (2022) With Project traffic conditions are shown on Exhibit 6-2.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

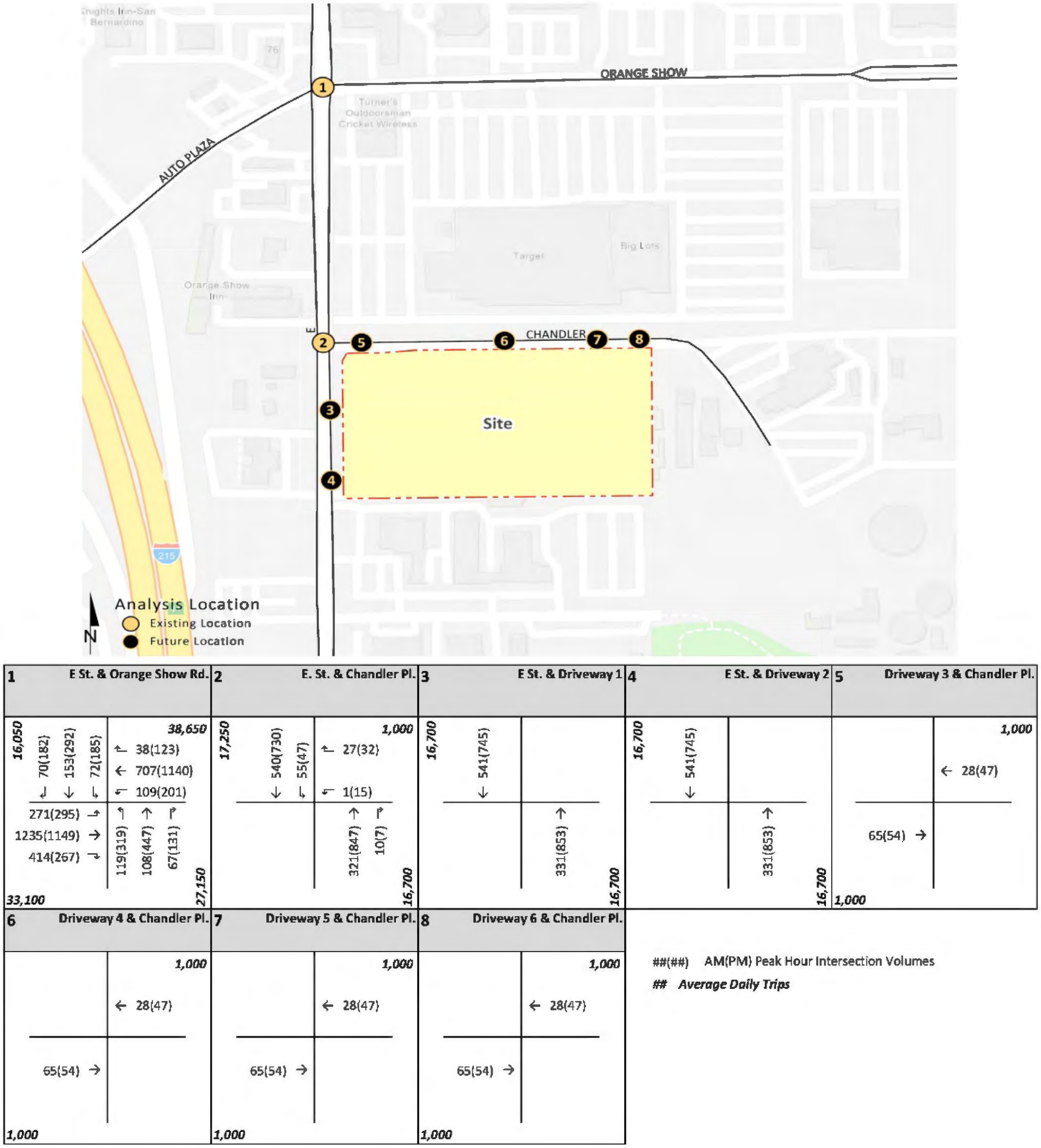
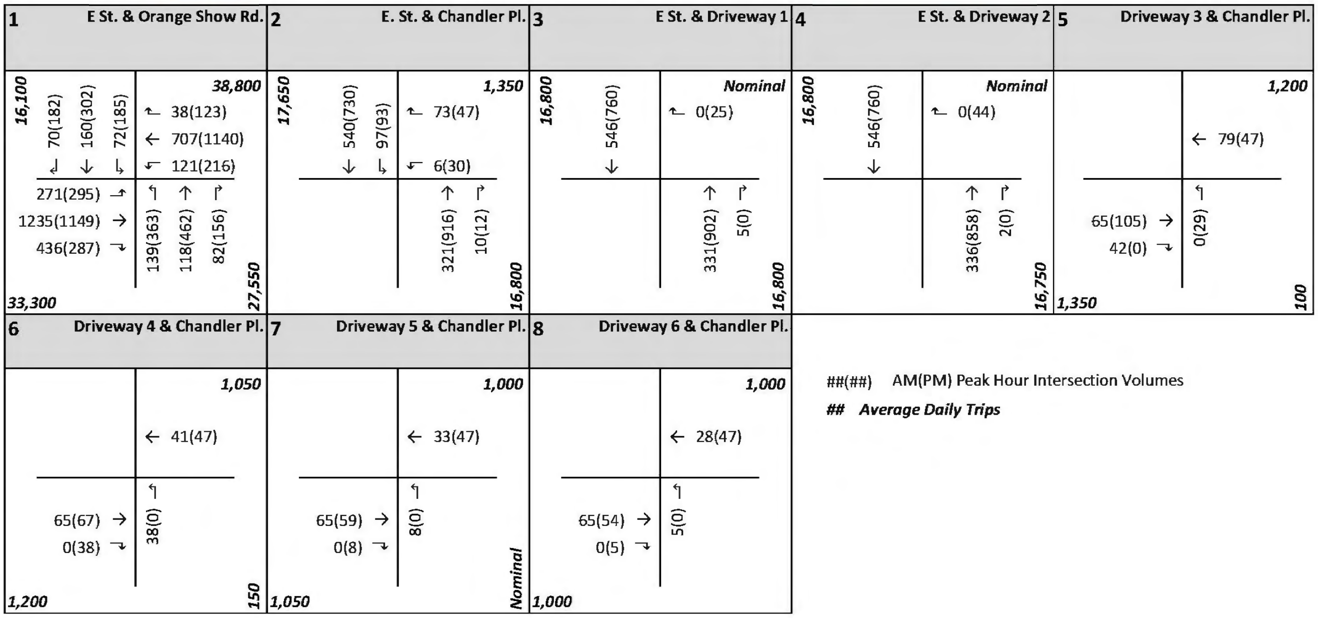


EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



6.4 INTERSECTION OPERATIONS ANALYSIS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2022) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown in Table 6-1, all study area intersections are anticipated to operate at an acceptable LOS during the peak hours for Opening Year Cumulative (2022) Without Project traffic conditions. The addition of Project traffic is not anticipated to increase the v/c at the intersection of E Street at Orange Show Road by more than 0.02. As such, there are no project-related deficiencies. The intersection operations analysis worksheets for Opening Year Cumulative (2022) Without and With Project traffic conditions are included in Appendix 6.1 and Appendix 6.2 of this TA.

TABLE 6-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2022) CONDITIONS

			2022 Without Project						2022 With Project					
		Traffic	Delay[1] (secs.)		Volume-to-Capacity (V/C)		Level of Service		Delay[1] (secs.)		Volume-to-Capacity (V/C)		Level of Service	
#	Intersection	Control[2]	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	E St. & Orange Show Rd.	TS	29.4	44.1	0.79	0.86	C	D	29.8	49.0	0.79	0.87	C	D
2	E. St. & Chandler Pl.	TS	5.8	8.5	--	--	A	A	9.4	12.0	--	--	A	B
3	E St. & Driveway 1	CSS	Future Intersection						0.0	12.2	--	--	A	B
4	E St. & Driveway 2	CSS	Future Intersection						0.0	12.2	--	--	A	B
5	Driveway 3 & Chandler Pl.	CSS	Future Intersection						0.0	9.5	--	--	A	A
6	Driveway 4 & Chandler Pl.	CSS	Future Intersection						9.3	0.0	--	--	A	A
7	Driveway 5 & Chandler Pl.	CSS	Future Intersection						9.1	0.0	--	--	A	A
8	Driveway 6 & Chandler Pl.	CSS	Future Intersection						9.0	0.0	--	--	A	A

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

[2] TS = Traffic Signal; CSS = Cross-street Stop; CSS = Improvement

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants have been performed (based on CA MUTCD) for Opening Year Cumulative (2022) With Project traffic conditions only based on daily traffic volumes. There are no unsignalized intersection for Opening Year Cumulative (2022) Without Project traffic conditions. As such, traffic signal warrant analysis has not been performed. There is no additional unsignalized study area intersections anticipated to meet planning-level ADT traffic signal warrants under Opening Year Cumulative (2022) With Project traffic conditions (see Appendix 6.3).

6.6 RECOMMENDED IMPROVEMENTS

The study area intersections are anticipated to operate at an acceptable LOS for E+P traffic conditions. As such, intersection improvements have not been recommended.

7 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of San Bernardino are funded through a combination of improvements constructed by the Project, development impact fee programs or fair share contributions. Fee programs applicable to the Project are described below.

7.1 CITY OF SAN BERNARDINO DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The City of San Bernardino has created its own local Development Impact Fee (DIF) program to impose and collect fees from new residential, commercial, and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF includes a Regional Circulation System Fee to comply with Measure "I" and a Local Circulation System Fee to address transportation improvements which are locally significant. The fee schedule was recently updated in June 2014 and is adjusted annually based upon changes in the construction cost index (CCI). Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program. The City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds.

The Project Applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect. The Project Applicant's payment of the requisite DIF fees at the rates then in effect pursuant to the DIF Program will mitigate its impacts to DIF-funded facilities. After the City's DIF fees are collected, they are placed in a separate interest-bearing account pursuant to the requirements of Government Code § 66000 *et seq*. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department.

7.2 MEASURE "I"

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by the SBCTA and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in March 2019. (6) Revenues collected through these programs are used in tandem with the City's DIF funds to deliver projects identified in the Nexus Study. While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past and will continue to fund new transportation facilities in San Bernardino County.

8 REFERENCES

1. **Fehr & Peers for City of San Bernardino.** *Traffic Impact Analysis Guidelines.* City of San Bernardino : s.n., August 2020.
2. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
3. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.
4. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2017.
5. **Southern California Association of Governments (SCAG).** *2020 Regional Transportation Plan / Sustainable Communities Strategy.* May 7, 2020 (to be adopted September 2020).
6. **San Bernardino County Transportation Authority (SBCTA).** *10-Year Delivery Plan.* City of San Bernardino : s.n., March 31, 2019.

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APPENDIX 1.1:

APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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City of San Bernardino Public Works / Traffic Engineering Department
Traffic Scope Approval Form

To be completed by applicant consultant and approved by Public Works prior to start of study

---

Project Name: San Bernardino Municipal Water Department Water Facilities Relocation
Project Address: 397 Chandler Place, City of San Bernardino
Project Description: 27,812 SF one-story office building and 13,500 SF one-story warehouse
Developer's Name: Project Sponsor: San Bernardino Municipa Water Department
Address: 1350 S. E Street, San Bernardino, CA 92408
Telephone No. ________ **Email address:** ________

Trip Generation Rates from ITE Latest Edition

Land Use (1) User-Supplied Data
Development Sq Ft ________
ITE Land Use Code ________
Daily Trips 426(PCE)
AM Peak Hour Trips
Inbound 49
Outbound 51
Total 100 (PCE)
PM Peak Hour Trips
Inbound 51
Outbound 98
Total 149 (PCE)

Land Use (2) ________
Development Sq Ft ________
ITE Land Use Code ________
Daily Trips ________
AM Peak Hour Trips
Inbound ________
Outbound ________
Total ________
PM Peak Hour Trips
Inbound ________
Outbound ________
Total ________

(Use Additional Sheet(s), if necessary)

Pass-by Trips (%), if applicable: N/A %

Land Use (1) ________
ITE Land Use Code ________
Daily Trips ________
AM Peak Hour Trips
Inbound ________
Outbound ________
Total ________
PM Peak Hour Trips:
Inbound ________
Outbound ________
Total ________

Land Use (2) ________
ITE Land Use Code ________
Daily Trips ________
AM Peak Hour Trips
Inbound ________
Outbound ________
Total ________
PM Peak Hour Trips:
Inbound ________
Outbound ________
Total ________

Project Opening Year: 2022 **Build-out Year:** ________

Study Intersections:

See Exhibit 2

1. E. St. & Orange Show Rd.
2. E. St. & Chandler Pl.
3. E. St. & Driveway 1
4. E St. & Driveway 2
5. Driveway 3 & Chandler Pl.
6. Driveway 4 & Chandler Pl.
7. Driveway 5 & Chandler Pl
8. Driveway 6 & Chandler Pl
9. ________
10. ________

(Use Additional Sheet(s) and Maps to show project Boundaries & Attach memo for project Description)

City of San Bernardino Public Works / Traffic Engineering Department

Traffic Scope Approval Form

To be completed by applicant consultant and approved by Public Works prior to start of study

---

Study Roadway Segments: 1 Not Applicable 2 ______
3 ______ 4 ______
5 ______ 6 ______

Proposed Development Use: ☐ Residential ☐ Commercial ☐ Mixed Use ☒ Other

Software Methodology: ☒ Synchro ☐ HCS

Additional issues to be considered: ☐ Traffic calming measures ☒ Queuing Analysis
☐ Bike/Ped Accommodations ☐ Merge Analysis ☐ Gap Analysis
☐ Actuation/Coordination ☐ Safety Analysis ☐ Sight Distance Analysis

Is the project screened from VMT assessment? ☒ Yes ☐ No

VMT Screening Justification: VMT Screening Memo prepared - Project Type Screening met

Ambient Growth Rate: 3.0 %

Trip Distribution: East Varies % West Varies % North Varies % South Varies %

Consultant Preparer's Name: Charlene So, Urban Crossroads, Inc.

Address: 1133 Camelback St. #8329, Newport Beach, CA 92658

Telephone No. 949-861-0177 **PE / TE License #:** TR2414

Email Address: cso@urbanxroads.com

Signature: Charlene So **Date:** March 11, 2021

Approved By (Public Works Department):

Signature: ______ **Date:** 3/16/2021

Name: AZZam Jabsheh **Title:** Traffic Engineer

Analysis Scenarios:

1. Existing
2. Existing plus Project
3. Opening Year Cumulative Without Project
4. Opening Year Cumulative With Project

Attached:
Exhibit 1: Preliminary Site Plan
Exhibit 2: Study Area Analysis Locations
Exhibit 3: Project (Employee) Trip Distribution
Exhibit 4: Project (Department Veh.) Trip Distribution
Table 1: Project Trip Generation

It is requested the City provide current cumulative projects for inclusion in the traffic analysis.

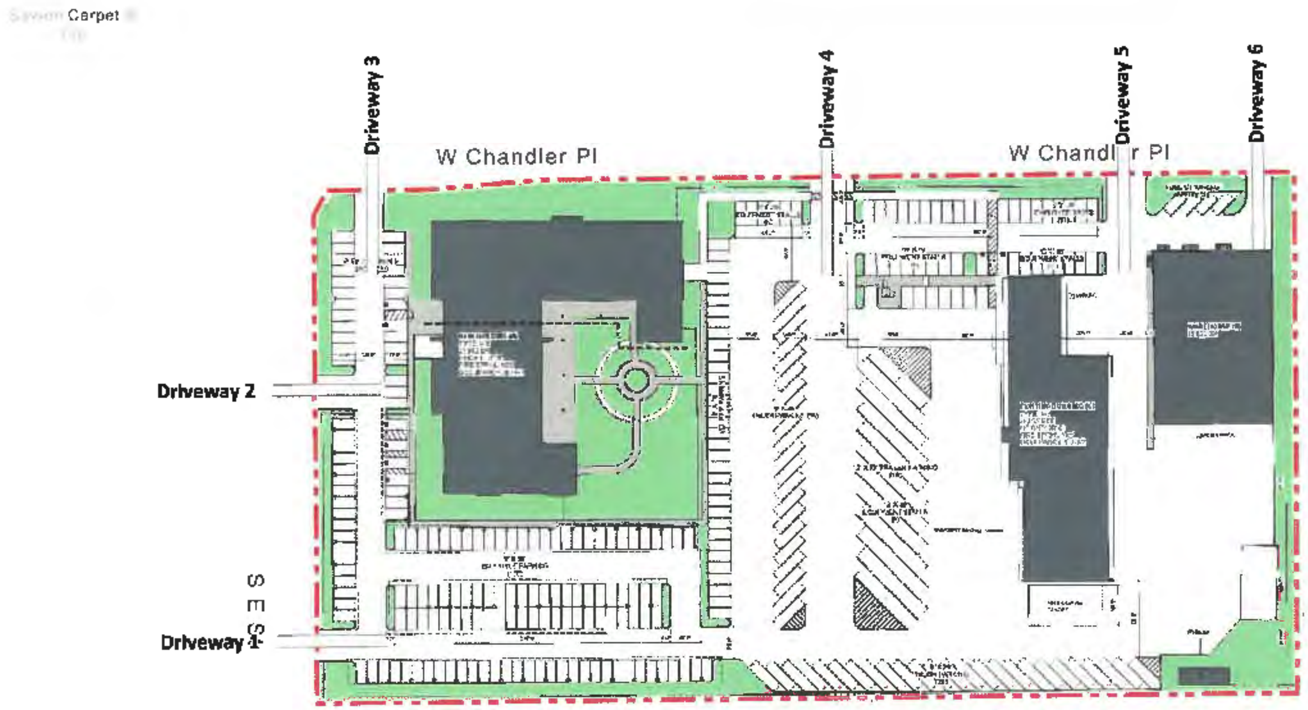
Table 1

Project Trip Generation Summary

	AM Peak Hour			PM Peak Hour			
Land Use	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**Daily**
SBMWD Water Facilities Relocation							
Employees	49	0	49	0	98	98	196
Department Vehicle: Pick-Up Trucks/SUV/Vans	0	18	18	18	0	18	72
Department Vehicle: Flat-Bed/Utility Trucks	0	17	17	17	0	17	66
Department Vehicle: Dump/Water Trucks	0	0	0	0	0	0	10
Total Proposed Project (Actual Vehicles)	**49**	**35**	**84**	**35**	**98**	**133**	**344**

EXHIBIT 2: STUDY AREA ANALYSIS LOCATIONS

EXHIBIT 1: PRELIMINARY SITE PLAN



Note: All driveways are Full Access

EXHIBIT 4: PROJECT (DEPARTMENT VEHICLES) TRIP DISTRIBUTION

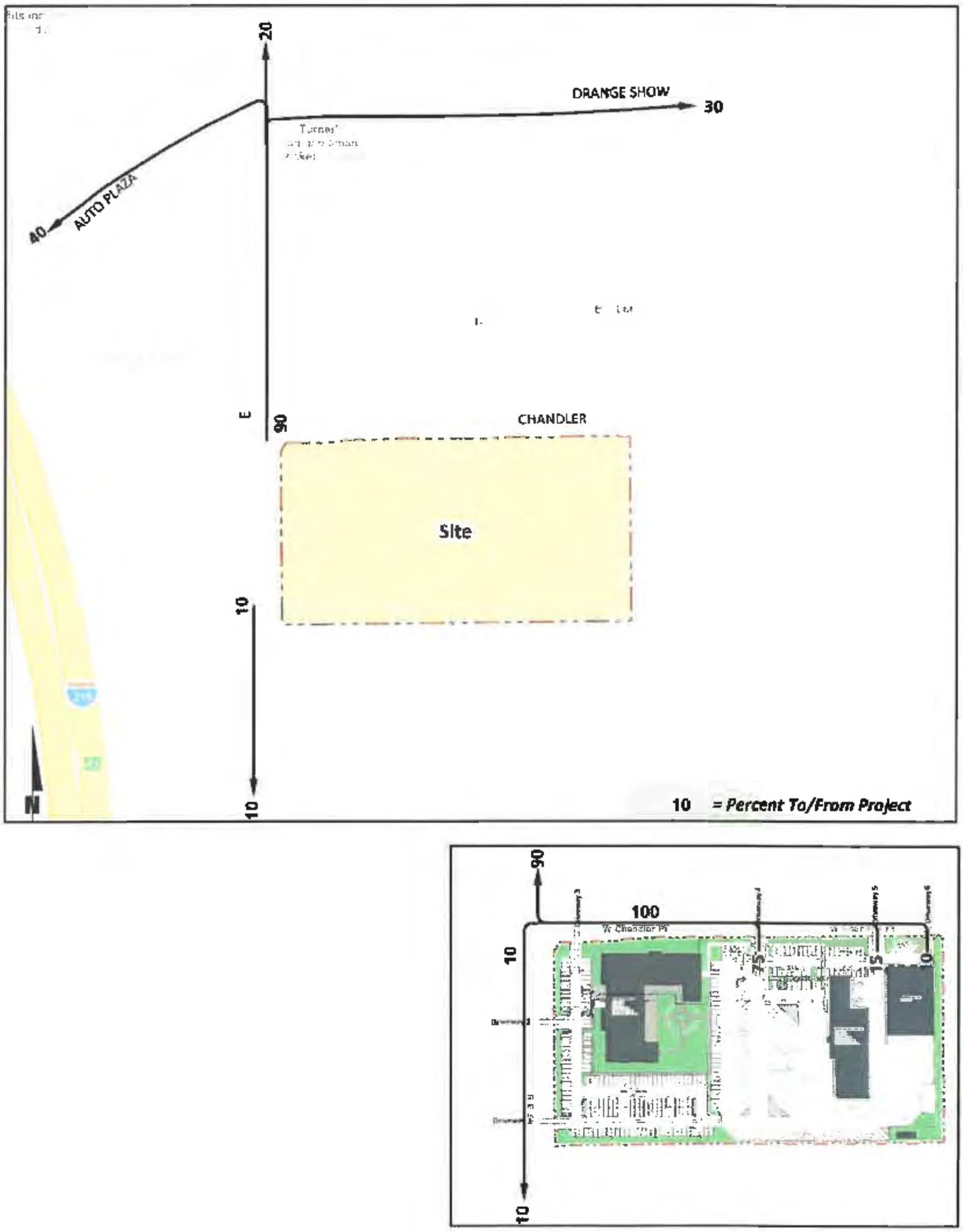
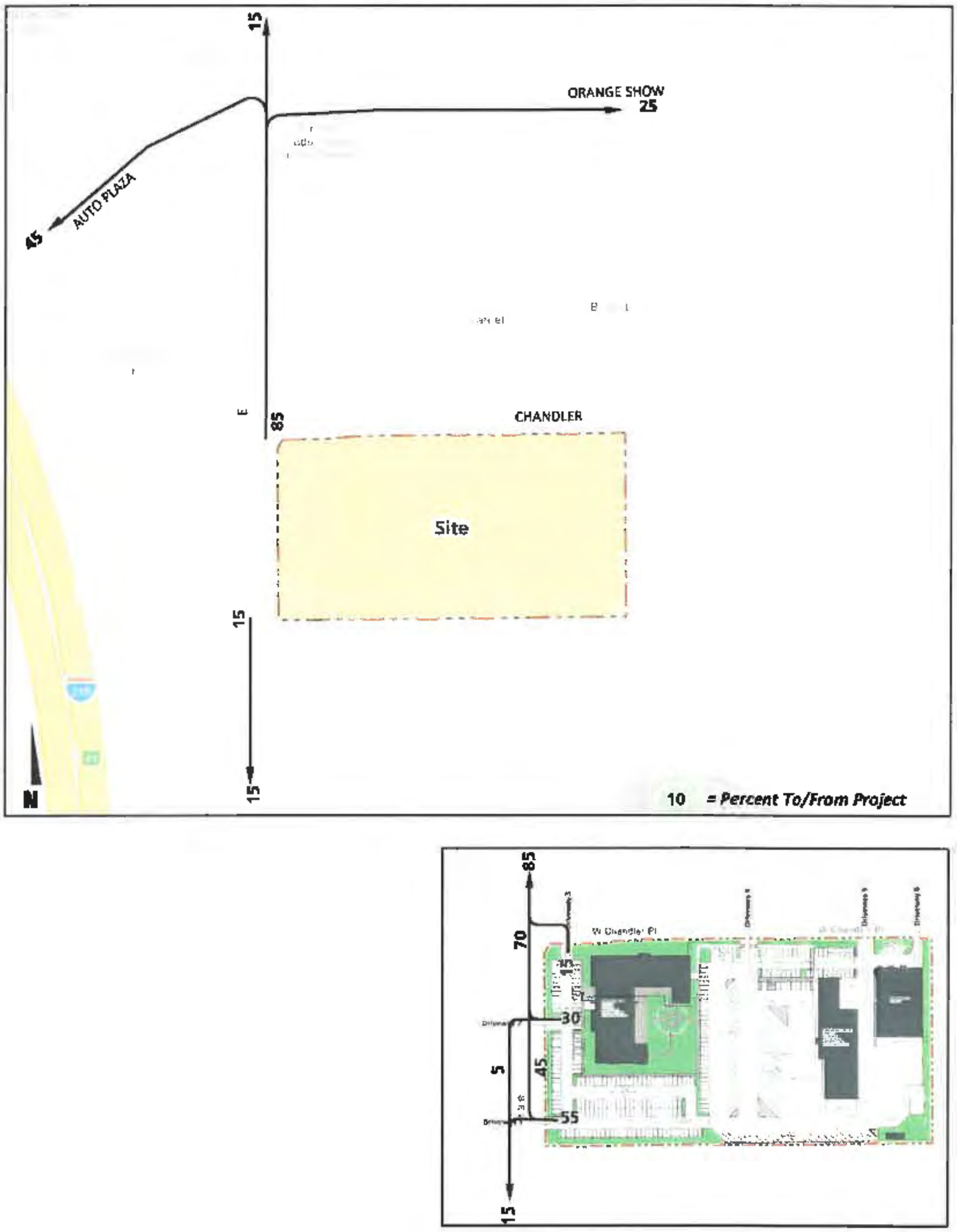


EXHIBIT 3: PROJECT (EMPLOYEE) TRIP DISTRIBUTION



APPENDIX 1.2:

SITE ADJACENT QUEUES

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Intersection: 2: E St. & Chandler Pl.

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	L	T
Maximum Queue (ft)	53	130	118	139	402
Average Queue (ft)	32	79	47	56	151
95th Queue (ft)	54	131	94	118	299
Link Distance (ft)	51	120	120		618
Upstream Blk Time (%)	1	3	0		
Queuing Penalty (veh)	1	5	0		
Storage Bay Dist (ft)				60	
Storage Blk Time (%)				4	19
Queuing Penalty (veh)				21	18

Intersection: 3: E St. & Driveway 1

Movement	NB	NB
Directions Served	T	TR
Maximum Queue (ft)	74	20
Average Queue (ft)	7	1
95th Queue (ft)	40	18
Link Distance (ft)	143	143
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: E St. & Driveway 2

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 5: Driveway 3 & Chandler Pl.

Movement	WB
Directions Served	LT
Maximum Queue (ft)	44
Average Queue (ft)	2
95th Queue (ft)	18
Link Distance (ft)	245
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Driveway 4 & Chandler Pl.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	49
Average Queue (ft)	22
95th Queue (ft)	47
Link Distance (ft)	101
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Driveway 5 & Chandler Pl.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	8
95th Queue (ft)	29
Link Distance (ft)	118
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Driveway 6 & Chandler Pl.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	29
Average Queue (ft)	5
95th Queue (ft)	22
Link Distance (ft)	43
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 46

Intersection: 2: E St. & Chandler Pl.

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	L	T
Maximum Queue (ft)	54	137	139	140	523
Average Queue (ft)	33	114	93	73	243
95th Queue (ft)	62	157	144	145	465
Link Distance (ft)	51	120	120		618
Upstream Blk Time (%)	5	14	5		
Queuing Penalty (veh)	4	65	25		
Storage Bay Dist (ft)				60	
Storage Blk Time (%)				5	22
Queuing Penalty (veh)				38	21

Intersection: 3: E St. & Driveway 1

Movement	WB	NB	NB
Directions Served	R	T	TR
Maximum Queue (ft)	66	158	143
Average Queue (ft)	17	65	26
95th Queue (ft)	51	157	101
Link Distance (ft)	50	143	143
Upstream Blk Time (%)	2	5	0
Queuing Penalty (veh)	0	21	1
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: E St. & Driveway 2

Movement	WB	NB	NB
Directions Served	R	T	TR
Maximum Queue (ft)	73	176	166
Average Queue (ft)	21	28	6
95th Queue (ft)	54	116	55
Link Distance (ft)	127	432	432
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Driveway 3 & Chandler Pl.

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	31	53
Average Queue (ft)	2	17
95th Queue (ft)	12	44
Link Distance (ft)	245	96
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Driveway 4 & Chandler Pl.

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 7: Driveway 5 & Chandler Pl.

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 8: Driveway 6 & Chandler Pl.

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Zone Summary

Zone wide Queuing Penalty: 174

APPENDIX 3.1:

EXISTING TRAFFIC COUNTS – 2015 & 2021

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Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

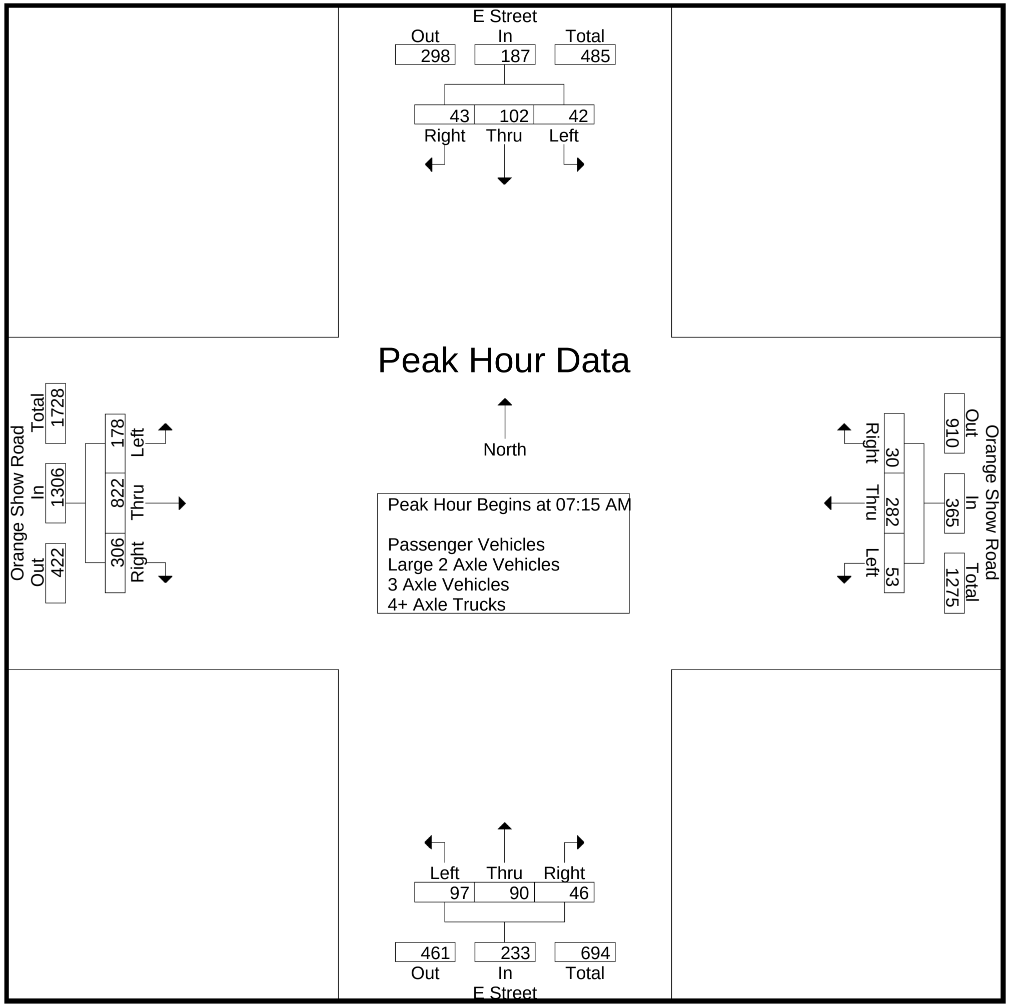
Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	E Street					Orange Show Road					E Street					Orange Show Road							
	Southbound					Westbound					Northbound					Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	6	23	4	1	33	4	56	3	2	63	14	20	6	1	40	32	160	68	19	260	23	396	419
07:15 AM	8	23	11	7	42	14	57	5	2	76	18	22	8	5	48	35	188	95	42	318	56	484	540
07:30 AM	7	21	8	3	36	15	56	9	5	80	28	21	11	5	60	37	174	73	26	284	39	460	499
07:45 AM	15	27	10	8	52	15	85	12	3	112	20	20	15	2	55	58	254	75	46	387	59	606	665
Total	36	94	33	19	163	48	254	29	12	331	80	83	40	13	203	162	776	311	133	1249	177	1946	2123
08:00 AM	12	31	14	8	57	9	84	4	3	97	31	27	12	5	70	48	206	63	26	317	42	541	583
08:15 AM	9	21	20	12	50	10	84	5	3	99	20	20	11	6	51	37	148	66	35	251	56	451	507
08:30 AM	14	27	19	16	60	9	80	9	3	98	19	34	13	4	66	39	151	54	31	244	54	468	522
08:45 AM	19	26	20	13	65	6	103	10	7	119	27	24	9	3	60	51	127	48	22	226	45	470	515
Total	54	105	73	49	232	34	351	28	16	413	97	105	45	18	247	175	632	231	114	1038	197	1930	2127
Grand Total	90	199	106	68	395	82	605	57	28	744	177	188	85	31	450	337	1408	542	247	2287	374	3876	4250
Apprch %	22.8	50.4	26.8			11	81.3	7.7			39.3	41.8	18.9			14.7	61.6	23.7					
Total %	2.3	5.1	2.7		10.2	2.1	15.6	1.5		19.2	4.6	4.9	2.2		11.6	8.7	36.3	14		59	8.8	91.2	
Passenger Vehicles	83	181	99		429	75	461	53		614	137	168	77		411	325	1243	526		2334	0	0	3788
% Passenger Vehicles	92.2	91	93.4	97.1	92.7	91.5	76.2	93	89.3	79.5	77.4	89.4	90.6	93.5	85.4	96.4	88.3	97	97.2	92.1	0	0	89.1
Large 2 Axle Vehicles	4	12	7		25	5	57	3		67	28	11	6		46	10	45	8		67	0	0	205
% Large 2 Axle Vehicles	4.4	6	6.6	2.9	5.4	6.1	9.4	5.3	7.1	8.7	15.8	5.9	7.1	3.2	9.6	3	3.2	1.5	1.6	2.6	0	0	4.8
3 Axle Vehicles	3	6	0		9	1	35	1		38	2	7	0		9	0	26	1		28	0	0	84
% 3 Axle Vehicles	3.3	3	0	0	1.9	1.2	5.8	1.8	3.6	4.9	1.1	3.7	0	0	1.9	0	1.8	0.2	0.4	1.1	0	0	2
4+ Axle Trucks	0	0	0		0	1	52	0		53	10	2	2		15	2	94	7		105	0	0	173
% 4+ Axle Trucks	0	0	0	0	0	1.2	8.6	0	0	6.9	5.6	1.1	2.4	3.2	3.1	0.6	6.7	1.3	0.8	4.1	0	0	4.1

	E Street				Orange Show Road				E Street				Orange Show Road				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	8	23	11	42	14	57	5	76	18	22	8	48	35	188	**95**	318	484
07:30 AM	7	21	8	36	**15**	56	9	80	28	21	11	60	37	174	73	284	460
07:45 AM	**15**	27	10	52	15	**85**	**12**	**112**	20	20	**15**	55	**58**	**254**	75	**387**	**606**
08:00 AM	12	**31**	**14**	**57**	9	84	4	97	**31**	**27**	12	**70**	48	206	63	317	541
Total Volume	42	102	43	187	53	282	30	365	97	90	46	233	178	822	306	1306	2091
% App. Total	22.5	54.5	23		14.5	77.3	8.2		41.6	38.6	19.7		13.6	62.9	23.4		
PHF	.700	.823	.768	.820	.883	.829	.625	.815	.782	.833	.767	.832	.767	.809	.805	.844	.863

City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 2



City of San Bernardino
N/S: E Street
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Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 3

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	08:00 AM				08:00 AM				08:00 AM				07:15 AM				
+0 mins.	12	**31**	14	57	9	84	4	97	**31**	27	12	**70**	35	188	**95**	318	
+15 mins.	9	21	**20**	50	**10**	84	5	99	20	20	11	51	37	174	73	284	
+30 mins.	14	27	19	60	9	80	9	98	19	**34**	**13**	66	**58**	**254**	75	**387**	
+45 mins.	**19**	26	20	**65**	6	**103**	**10**	**119**	27	24	9	60	48	206	63	317	
Total Volume	54	105	73	232	34	351	28	413	97	105	45	247	178	822	306	1306	
% App. Total	23.3	45.3	31.5		8.2	85	6.8		39.3	42.5	18.2		13.6	62.9	23.4		
PHF	.711	.847	.913	.892	.850	.852	.700	.868	.782	.772	.865	.882	.767	.809	.805	.844	

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City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- Passenger Vehicles

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	6	22	4	1	32	3	43	3	2	49	12	17	6	1	35	31	137	66	19	234	23	350	373
07:15 AM	7	21	11	7	39	14	40	5	2	59	12	19	7	5	38	34	180	94	41	308	55	444	499
07:30 AM	7	20	8	3	35	13	41	7	3	61	21	19	10	4	50	35	151	72	25	258	35	404	439
07:45 AM	14	24	10	8	48	13	67	11	3	91	14	19	12	2	45	57	234	75	46	366	59	550	609
Total	34	87	33	19	154	43	191	26	10	260	59	74	35	12	168	157	702	307	131	1166	172	1748	1920
08:00 AM	10	28	13	8	51	7	74	4	3	85	27	23	12	5	62	47	171	59	25	277	41	475	516
08:15 AM	8	19	17	11	44	10	66	5	3	81	14	18	11	6	43	36	126	65	34	227	54	395	449
08:30 AM	12	24	18	16	54	9	58	8	2	75	15	32	11	3	58	37	133	52	30	222	51	409	460
08:45 AM	19	23	18	12	60	6	72	10	7	88	22	21	8	3	51	48	111	43	20	202	42	401	443
Total	49	94	66	47	209	32	270	27	15	329	78	94	42	17	214	168	541	219	109	928	188	1680	1868
Grand Total	83	181	99	66	363	75	461	53	25	589	137	168	77	29	382	325	1243	526	240	2094	360	3428	3788
Apprch %	22.9	49.9	27.3			12.7	78.3	9			35.9	44	20.2			15.5	59.4	25.1					
Total %	2.4	5.3	2.9		10.6	2.2	13.4	1.5		17.2	4	4.9	2.2		11.1	9.5	36.3	15.3		61.1	9.5	90.5	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	7	21	11	39	**14**	40	5	59	12	19	7	38	34	180	**94**	308	444
07:30 AM	7	20	8	35	13	41	7	61	21	19	10	50	35	151	72	258	404
07:45 AM	**14**	24	10	48	13	67	**11**	**91**	14	19	**12**	45	**57**	**234**	75	**366**	**550**
08:00 AM	10	**28**	**13**	**51**	7	**74**	4	85	**27**	**23**	12	**62**	47	171	59	277	475
Total Volume	38	93	42	173	47	222	27	296	74	80	41	195	173	736	300	1209	1873
% App. Total	22	53.8	24.3		15.9	75	9.1		37.9	41	21		14.3	60.9	24.8		
PHF	.679	.830	.808	.848	.839	.750	.614	.813	.685	.870	.854	.786	.759	.786	.798	.826	.851

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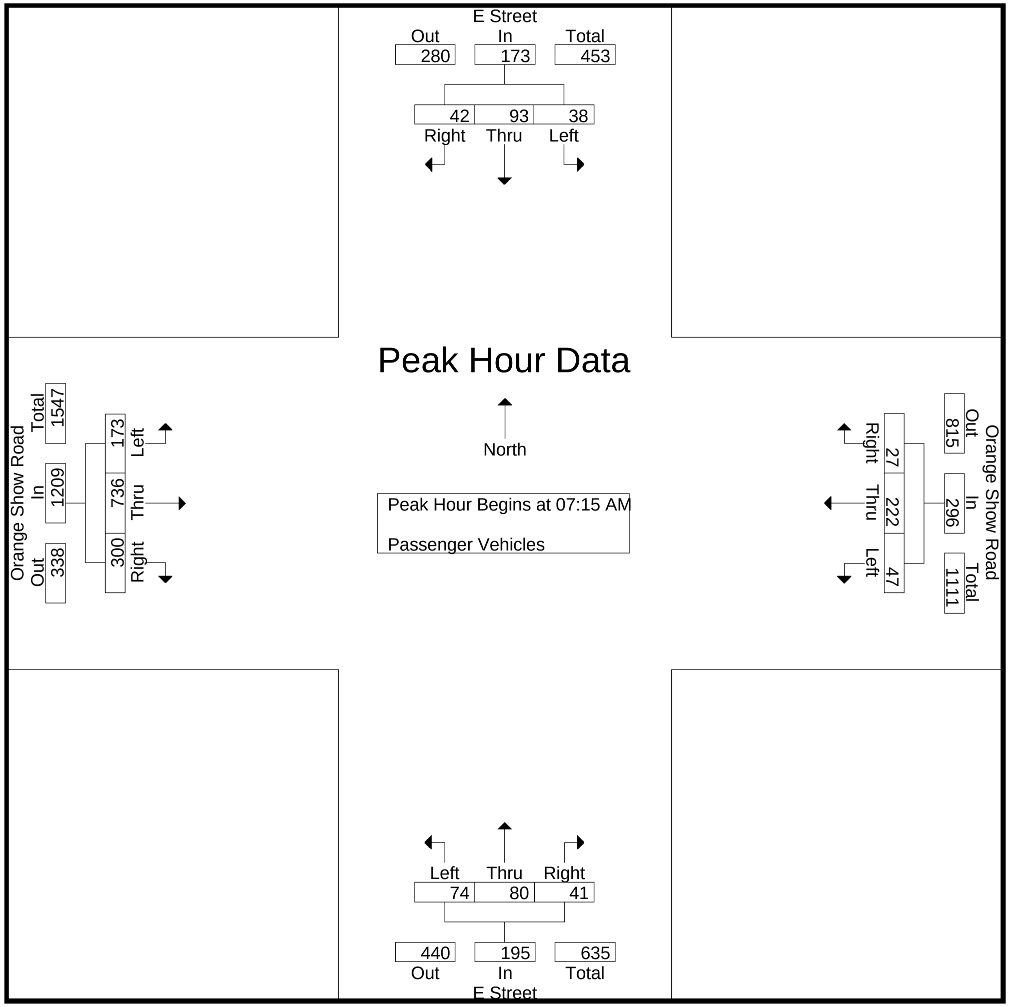
City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 2



City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 3

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	7	21	11	39	**14**	40	5	59	12	19	7	38	34	180	**94**	308	
+15 mins.	7	20	8	35	13	41	7	61	21	19	10	50	35	151	72	258	
+30 mins.	**14**	24	10	48	13	67	**11**	**91**	14	19	**12**	45	**57**	**234**	75	**366**	
+45 mins.	10	**28**	**13**	**51**	7	**74**	4	85	**27**	**23**	12	**62**	47	171	59	277	
Total Volume	38	93	42	173	47	222	27	296	74	80	41	195	173	736	300	1209	
% App. Total	22	53.8	24.3		15.9	75	9.1		37.9	41	21		14.3	60.9	24.8		
PHF	.679	.830	.808	.848	.839	.750	.614	.813	.685	.870	.854	.786	.759	.786	.798	.826	

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City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	1	3	0	0	4	1	1	0	0	2	1	8	0	0	9	0	15	15
07:15 AM	0	1	0	0	1	0	5	0	0	5	5	2	1	0	8	1	1	0	0	2	0	16	16
07:30 AM	0	1	0	0	1	2	7	1	1	10	5	1	0	0	6	1	8	1	1	10	2	27	29
07:45 AM	0	2	0	0	2	1	9	1	0	11	5	1	3	0	9	1	5	0	0	6	0	28	28
Total	0	4	0	0	4	4	24	2	1	30	16	5	4	0	25	4	22	1	1	27	2	86	88
08:00 AM	1	2	1	0	4	1	2	0	0	3	2	1	0	0	3	1	6	3	1	10	1	20	21
08:15 AM	1	1	3	1	5	0	7	0	0	7	6	2	0	0	8	1	4	0	0	5	1	25	26
08:30 AM	2	2	1	0	5	0	11	1	1	12	2	1	1	1	4	1	10	2	1	13	3	34	37
08:45 AM	0	3	2	1	5	0	13	0	0	13	2	2	1	0	5	3	3	2	1	8	2	31	33
Total	4	8	7	2	19	1	33	1	1	35	12	6	2	1	20	6	23	7	3	36	7	110	117
Grand Total	4	12	7	2	23	5	57	3	2	65	28	11	6	1	45	10	45	8	4	63	9	196	205
Apprch %	17.4	52.2	30.4			7.7	87.7	4.6			62.2	24.4	13.3			15.9	71.4	12.7					
Total %	2	6.1	3.6		11.7	2.6	29.1	1.5		33.2	14.3	5.6	3.1		23	5.1	23	4.1		32.1	4.4	95.6	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	1	0	1	0	5	0	5	**5**	**2**	1	8	**1**	1	0	2	16
07:30 AM	0	1	0	1	**2**	7	**1**	10	5	1	0	6	1	**8**	1	**10**	27
07:45 AM	0	**2**	0	2	1	**9**	1	**11**	5	1	**3**	**9**	1	5	0	6	**28**
08:00 AM	**1**	2	**1**	**4**	1	2	0	3	2	1	0	3	1	6	**3**	10	20
Total Volume	1	6	1	8	4	23	2	29	17	5	4	26	4	20	4	28	91
% App. Total	12.5	75	12.5		13.8	79.3	6.9		65.4	19.2	15.4		14.3	71.4	14.3		
PHF	.250	.750	.250	.500	.500	.639	.500	.659	.850	.625	.333	.722	1.00	.625	.333	.700	.813

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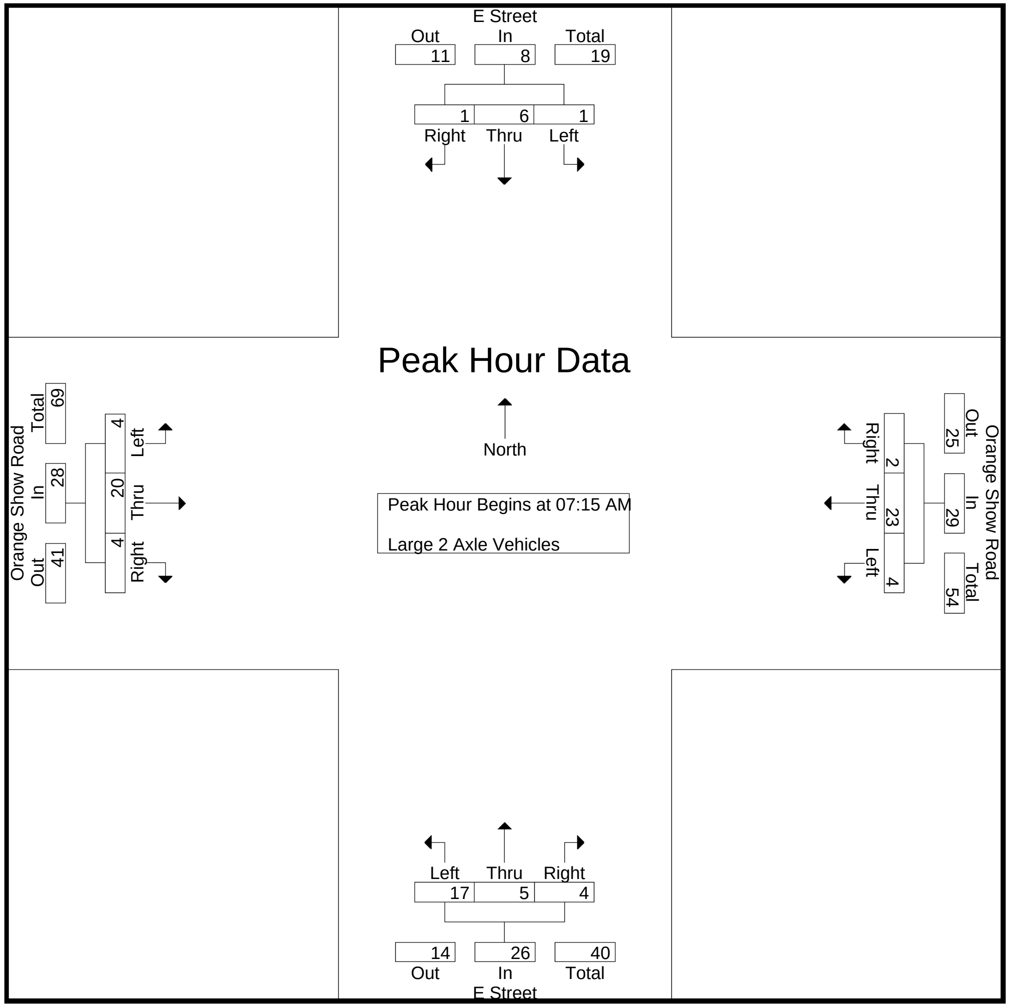
City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 2



City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 3

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	1	0	1	0	5	0	5	**5**	**2**	1	8	**1**	1	0	2	
+15 mins.	0	1	0	1	**2**	7	**1**	10	5	1	0	6	1	**8**	1	**10**	
+30 mins.	0	**2**	0	2	1	**9**	1	**11**	5	1	**3**	**9**	1	5	0	6	
+45 mins.	**1**	2	**1**	**4**	1	2	0	3	2	1	0	3	1	6	**3**	10	
Total Volume	1	6	1	8	4	23	2	29	17	5	4	26	4	20	4	28	
% App. Total	12.5	75	12.5		13.8	79.3	6.9		65.4	19.2	15.4		14.3	71.4	14.3		
PHF	.250	.750	.250	.500	.500	.639	.500	.659	.850	.625	.333	.722	1.000	.625	.333	.700	

City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- 3 Axle Vehicles

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	0	1	0	5	0	0	5	1	2	0	0	3	0	4	0	0	4	0	13	13
07:15 AM	1	1	0	0	2	0	6	0	0	6	0	1	0	0	1	0	2	0	0	2	0	11	11
07:30 AM	0	0	0	0	0	0	3	1	1	4	1	1	0	0	2	0	4	0	0	4	1	10	11
07:45 AM	1	1	0	0	2	1	3	0	0	4	0	0	0	0	0	0	2	0	0	2	0	8	8
Total	2	3	0	0	5	1	17	1	1	19	2	4	0	0	6	0	12	0	0	12	1	42	43
08:00 AM	1	1	0	0	2	0	3	0	0	3	0	1	0	0	1	0	7	0	0	7	0	13	13
08:15 AM	0	1	0	0	1	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4	0	9	9
08:30 AM	0	1	0	0	1	0	5	0	0	5	0	1	0	0	1	0	1	0	0	1	0	8	8
08:45 AM	0	0	0	0	0	0	6	0	0	6	0	1	0	0	1	0	2	1	1	3	1	10	11
Total	1	3	0	0	4	0	18	0	0	18	0	3	0	0	3	0	14	1	1	15	1	40	41
Grand Total	3	6	0	0	9	1	35	1	1	37	2	7	0	0	9	0	26	1	1	27	2	82	84
Apprch %	33.3	66.7	0			2.7	94.6	2.7			22.2	77.8	0			0	96.3	3.7					
Total %	3.7	7.3	0		11	1.2	42.7	1.2		45.1	2.4	8.5	0		11	0	31.7	1.2		32.9	2.4	97.6	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**1**	**1**	0	**2**	0	**6**	0	**6**	0	**1**	0	1	0	2	0	2	11
07:30 AM	0	0	0	0	0	3	**1**	4	**1**	1	0	**2**	0	4	0	4	10
07:45 AM	1	1	0	2	**1**	3	0	4	0	0	0	0	0	2	0	2	8
08:00 AM	1	1	0	2	0	3	0	3	0	1	0	1	0	**7**	0	**7**	**13**
Total Volume	3	3	0	6	1	15	1	17	1	3	0	4	0	15	0	15	42
% App. Total	50	50	0		5.9	88.2	5.9		25	75	0		0	100	0		
PHF	.750	.750	.000	.750	.250	.625	.250	.708	.250	.750	.000	.500	.000	.536	.000	.536	.808

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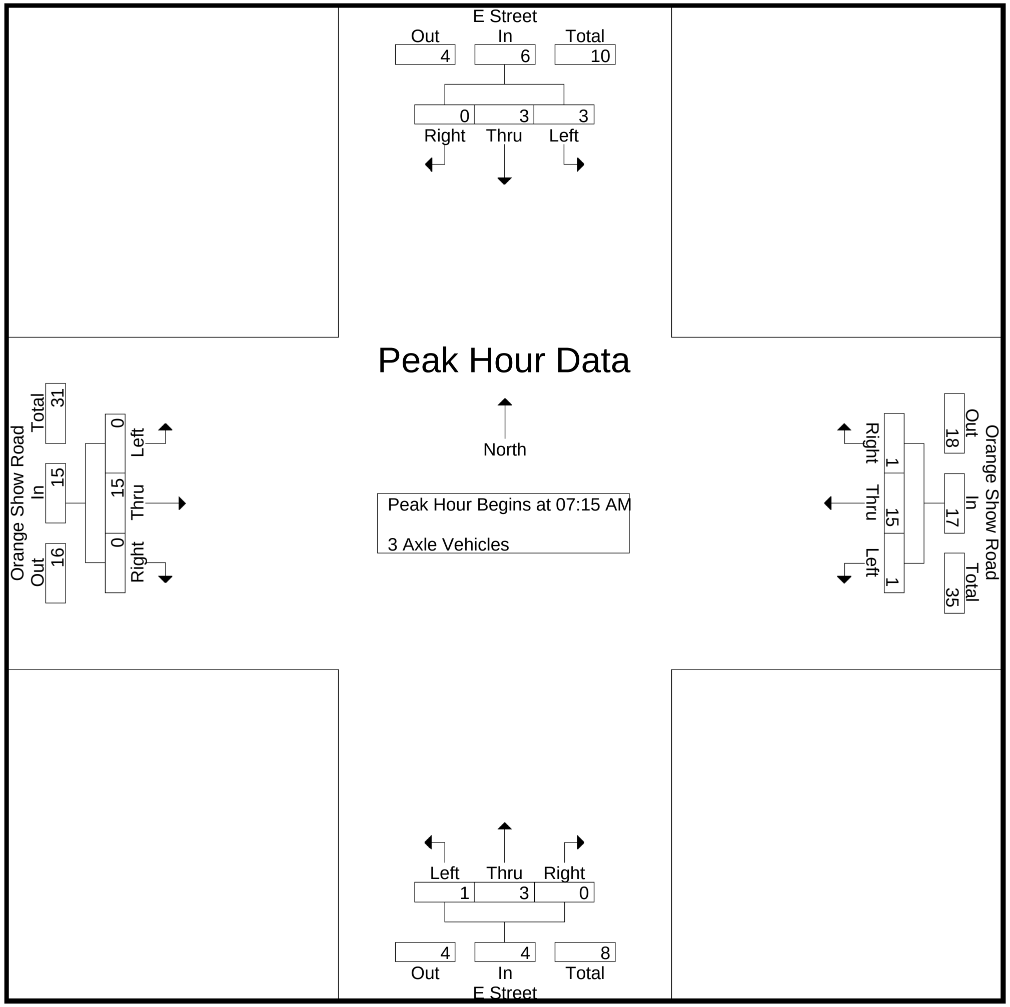
City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 2



City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 3

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	**1**	**1**	0	**2**	0	**6**	0	**6**	0	**1**	0	1	0	2	0	2	
+15 mins.	0	0	0	0	0	3	**1**	4	**1**	1	0	**2**	0	4	0	4	
+30 mins.	1	1	0	2	**1**	3	0	4	0	0	0	0	0	2	0	2	
+45 mins.	1	1	0	2	0	3	0	3	0	1	0	1	0	**7**	0	**7**	
Total Volume	3	3	0	6	1	15	1	17	1	3	0	4	0	15	0	15	
% App. Total	50	50	0		5.9	88.2	5.9		25	75	0		0	100	0		
PHF	.750	.750	.000	.750	.250	.625	.250	.708	.250	.750	.000	.500	.000	.536	.000	.536	

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City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- 4+ Axle Trucks

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	11	2	0	13	0	18	18
07:15 AM	0	0	0	0	0	0	6	0	0	6	1	0	0	0	1	0	5	1	1	6	1	13	14
07:30 AM	0	0	0	0	0	0	5	0	0	5	1	0	1	1	2	1	11	0	0	12	1	19	20
07:45 AM	0	0	0	0	0	0	6	0	0	6	1	0	0	0	1	0	13	0	0	13	0	20	20
Total	0	0	0	0	0	0	22	0	0	22	3	0	1	1	4	1	40	3	1	44	2	70	72
08:00 AM	0	0	0	0	0	1	5	0	0	6	2	2	0	0	4	0	22	1	0	23	0	33	33
08:15 AM	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	14	1	1	15	1	22	23
08:30 AM	0	0	0	0	0	0	6	0	0	6	2	0	1	0	3	1	7	0	0	8	0	17	17
08:45 AM	0	0	0	0	0	0	12	0	0	12	3	0	0	0	3	0	11	2	0	13	0	28	28
Total	0	0	0	0	0	1	30	0	0	31	7	2	1	0	10	1	54	4	1	59	1	100	101
Grand Total	0	0	0	0	0	1	52	0	0	53	10	2	2	1	14	2	94	7	2	103	3	170	173
Apprch %	0	0	0			1.9	98.1	0			71.4	14.3	14.3			1.9	91.3	6.8					
Total %	0	0	0		0	0.6	30.6	0		31.2	5.9	1.2	1.2		8.2	1.2	55.3	4.1		60.6	1.7	98.3	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	**6**	0	**6**	1	0	0	1	0	5	**1**	6	13
07:30 AM	0	0	0	0	0	5	0	5	1	0	**1**	2	**1**	11	0	12	19
07:45 AM	0	0	0	0	0	6	0	6	1	0	0	1	0	13	0	13	20
08:00 AM	0	0	0	0	**1**	5	0	6	**2**	**2**	0	**4**	0	**22**	1	**23**	**33**
Total Volume	0	0	0	0	1	22	0	23	5	2	1	8	1	51	2	54	85
% App. Total	0	0	0		4.3	95.7	0		62.5	25	12.5		1.9	94.4	3.7		
PHF	.000	.000	.000	.000	.250	.917	.000	.958	.625	.250	.250	.500	.250	.580	.500	.587	.644

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City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

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Site Code : 05121147
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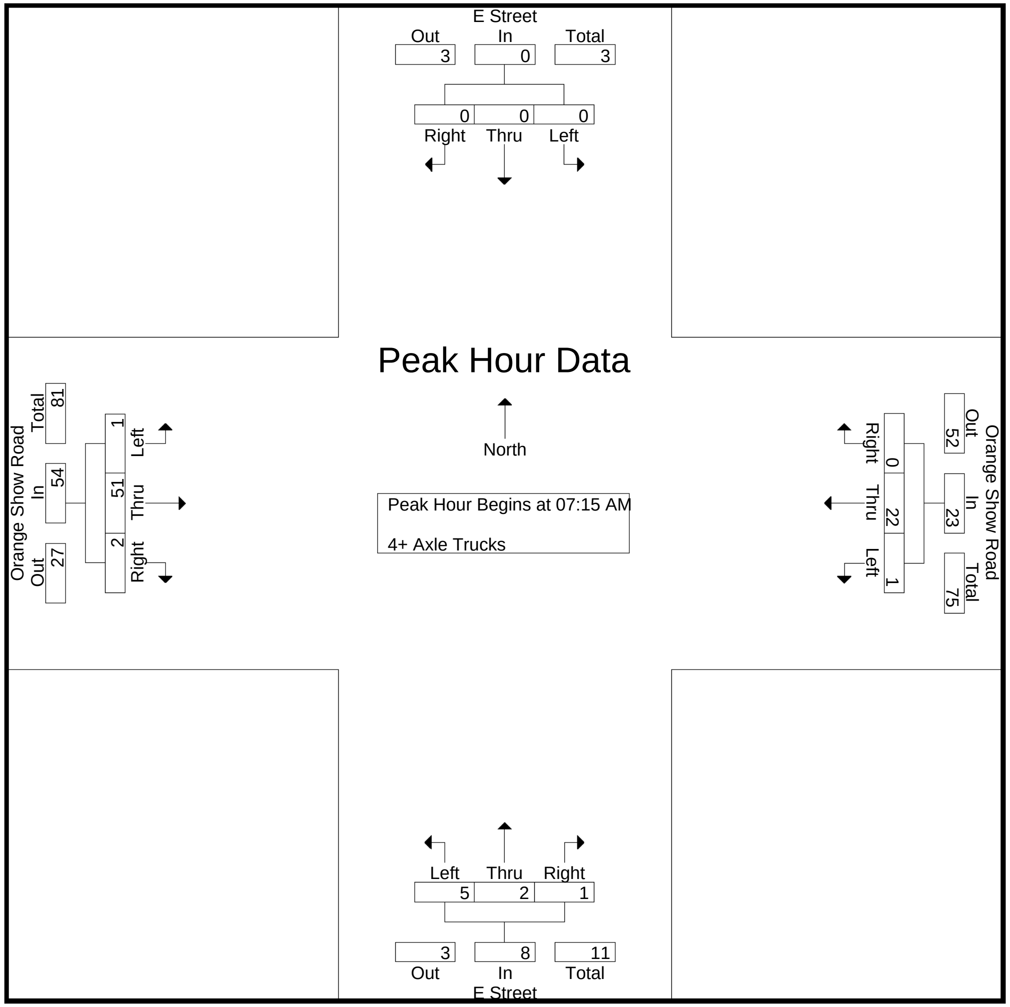

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	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	0	0	0	0	**6**	0	**6**	1	0	0	1	0	5	**1**	6	
+15 mins.	0	0	0	0	0	5	0	5	1	0	**1**	2	**1**	11	0	12	
+30 mins.	0	0	0	0	0	6	0	6	1	0	0	1	0	13	0	13	
+45 mins.	0	0	0	0	**1**	5	0	6	**2**	**2**	0	**4**	0	**22**	1	**23**	
Total Volume	0	0	0	0	1	22	0	23	5	2	1	8	1	51	2	54	
% App. Total	0	0	0		4.3	95.7	0		62.5	25	12.5		1.9	94.4	3.7		
PHF	.000	.000	.000	.000	.250	.917	.000	.958	.625	.250	.250	.500	.250	.580	.500	.587	

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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	44	98	60	29	202	40	162	29	8	231	73	98	23	7	194	58	196	55	29	309	73	936	1009
04:15 PM	51	66	52	25	169	41	146	30	8	217	65	88	18	1	171	52	191	61	36	304	70	861	931
04:30 PM	37	61	48	23	146	38	183	21	10	242	80	96	25	6	201	60	195	66	44	321	83	910	993
04:45 PM	43	71	29	11	143	52	175	34	17	261	59	77	14	2	150	77	201	76	40	354	70	908	978
Total	175	296	189	88	660	171	666	114	43	951	277	359	80	16	716	247	783	258	149	1288	296	3615	3911
05:00 PM	41	67	48	22	156	36	179	26	10	241	86	128	33	6	247	70	165	51	24	286	62	930	992
05:15 PM	52	80	51	21	183	39	204	29	12	272	78	128	34	8	240	75	169	61	30	305	71	1000	1071
05:30 PM	48	61	50	25	159	26	165	35	18	226	60	77	15	2	152	66	183	52	27	301	72	838	910
05:45 PM	40	51	39	23	130	26	169	25	12	220	58	70	15	2	143	63	199	50	19	312	56	805	861
Total	181	259	188	91	628	127	717	115	52	959	282	403	97	18	782	274	716	214	100	1204	261	3573	3834
Grand Total	356	555	377	179	1288	298	1383	229	95	1910	559	762	177	34	1498	521	1499	472	249	2492	557	7188	7745
Apprch %	27.6	43.1	29.3			15.6	72.4	12			37.3	50.9	11.8			20.9	60.2	18.9					
Total %	5	7.7	5.2		17.9	4.1	19.2	3.2		26.6	7.8	10.6	2.5		20.8	7.2	20.9	6.6		34.7	7.2	92.8	
Passenger Vehicles	351	543	372		1444	287	1266	229		1877	553	751	175		1513	513	1317	460		2532	0	0	7366
% Passenger Vehicles	98.6	97.8	98.7	99.4	98.4	96.3	91.5	100	100	93.6	98.9	98.6	98.9	100	98.8	98.5	87.9	97.5	97.2	92.4	0	0	95.1
Large 2 Axle Vehicles	3	5	3		12	4	21	0		25	2	5	2		9	5	59	6		73	0	0	119
% Large 2 Axle Vehicles	0.8	0.9	0.8	0.6	0.8	1.3	1.5	0	0	1.2	0.4	0.7	1.1	0	0.6	1	3.9	1.3	1.2	2.7	0	0	1.5
3 Axle Vehicles	2	7	0		9	2	28	0		30	0	6	0		6	1	34	4		42	0	0	87
% 3 Axle Vehicles	0.6	1.3	0	0	0.6	0.7	2	0	0	1.5	0	0.8	0	0	0.4	0.2	2.3	0.8	1.2	1.5	0	0	1.1
4+ Axle Trucks	0	0	2		2	5	68	0		73	4	0	0		4	2	89	2		94	0	0	173
% 4+ Axle Trucks	0	0	0.5	0	0.1	1.7	4.9	0	0	3.6	0.7	0	0	0	0.3	0.4	5.9	0.4	0.4	3.4	0	0	2.2

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	37	61	48	146	38	183	21	242	80	96	25	201	60	195	66	321	910
04:45 PM	43	71	29	143	**52**	175	**34**	261	59	77	14	150	**77**	**201**	**76**	**354**	908
05:00 PM	41	67	48	156	36	179	26	241	**86**	**128**	33	**247**	70	165	51	286	930
05:15 PM	**52**	**80**	**51**	**183**	39	**204**	29	**272**	78	128	**34**	240	75	169	61	305	**1000**
Total Volume	173	279	176	628	165	741	110	1016	303	429	106	838	282	730	254	1266	3748
% App. Total	27.5	44.4	28		16.2	72.9	10.8		36.2	51.2	12.6		22.3	57.7	20.1		
PHF	.832	.872	.863	.858	.793	.908	.809	.934	.881	.838	.779	.848	.916	.908	.836	.894	.937

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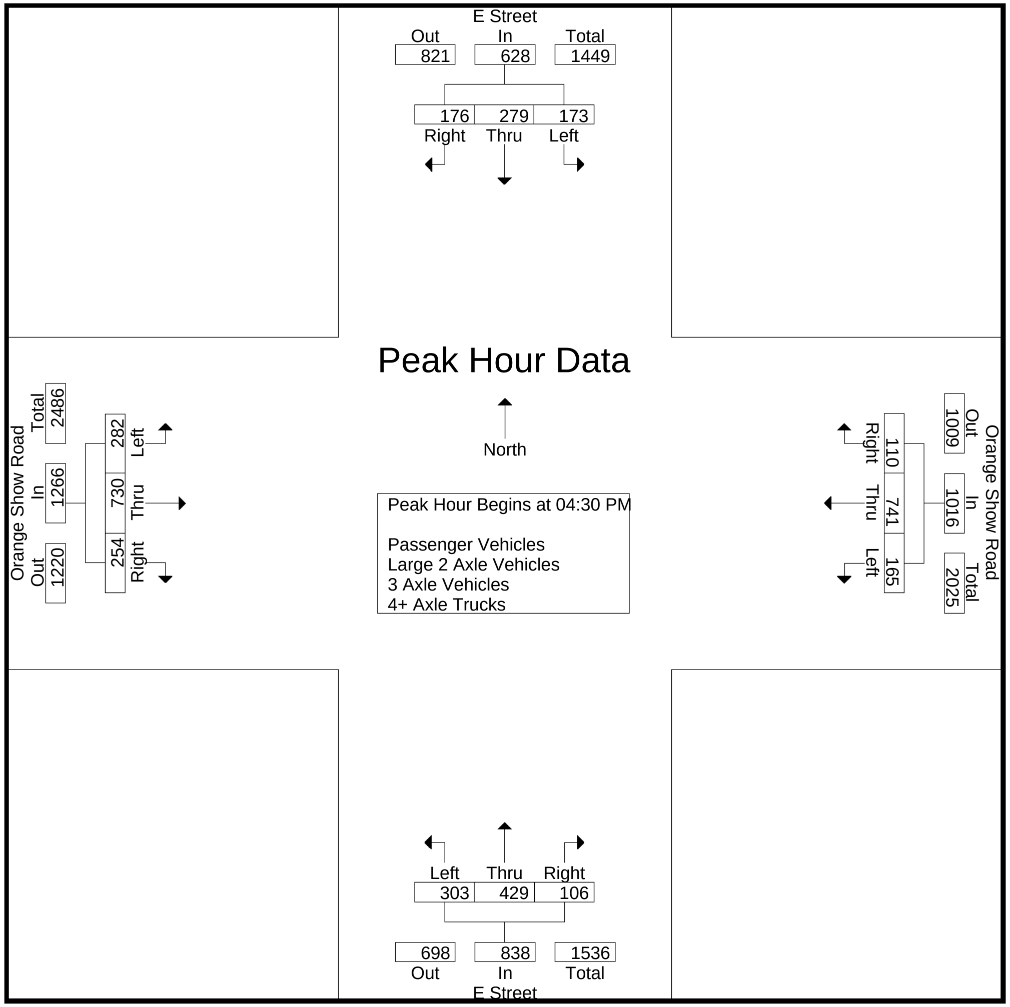

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	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:00 PM				04:30 PM				04:30 PM				04:00 PM				
+0 mins.	44	**98**	**60**	**202**	38	183	21	242	80	96	25	201	58	196	55	309	
+15 mins.	**51**	66	52	169	**52**	175	**34**	261	59	77	14	150	52	191	61	304	
+30 mins.	37	61	48	146	36	179	26	241	**86**	**128**	33	**247**	60	195	66	321	
+45 mins.	43	71	29	143	39	**204**	29	**272**	78	128	**34**	240	**77**	**201**	**76**	**354**	
Total Volume	175	296	189	660	165	741	110	1016	303	429	106	838	247	783	258	1288	
% App. Total	26.5	44.8	28.6		16.2	72.9	10.8		36.2	51.2	12.6		19.2	60.8	20		
PHF	.858	.755	.788	.817	.793	.908	.809	.934	.881	.838	.779	.848	.802	.974	.849	.910	

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Groups Printed- Passenger Vehicles

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	42	96	58	28	196	39	147	29	8	215	73	97	23	7	193	55	167	54	28	276	71	880	951
04:15 PM	50	64	51	25	165	40	132	30	8	202	65	86	18	1	169	51	169	60	35	280	69	816	885
04:30 PM	37	60	48	23	145	37	169	21	10	227	79	95	25	6	199	60	163	63	42	286	81	857	938
04:45 PM	43	67	28	11	138	49	159	34	17	242	57	76	13	2	146	76	174	74	40	324	70	850	920
Total	172	287	185	87	644	165	607	114	43	886	274	354	79	16	707	242	673	251	145	1166	291	3403	3694
05:00 PM	41	66	48	22	155	34	166	26	10	226	86	126	33	6	245	68	151	50	24	269	62	895	957
05:15 PM	51	80	51	21	182	37	188	29	12	254	77	126	33	8	236	74	153	61	30	288	71	960	1031
05:30 PM	47	60	49	25	156	26	150	35	18	211	60	76	15	2	151	66	166	51	26	283	71	801	872
05:45 PM	40	50	39	23	129	25	155	25	12	205	56	69	15	2	140	63	174	47	17	284	54	758	812
Total	179	256	187	91	622	122	659	115	52	896	279	397	96	18	772	271	644	209	97	1124	258	3414	3672
Grand Total	351	543	372	178	1266	287	1266	229	95	1782	553	751	175	34	1479	513	1317	460	242	2290	549	6817	7366
Apprch %	27.7	42.9	29.4			16.1	71	12.9			37.4	50.8	11.8			22.4	57.5	20.1					
Total %	5.1	8	5.5		18.6	4.2	18.6	3.4		26.1	8.1	11	2.6		21.7	7.5	19.3	6.7		33.6	7.5	92.5	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	37	60	48	145	37	169	21	227	79	95	25	199	60	163	63	286	857
04:45 PM	43	67	28	138	**49**	159	**34**	242	57	76	13	146	**76**	**174**	**74**	**324**	850
05:00 PM	41	66	48	155	34	166	26	226	**86**	**126**	**33**	**245**	68	151	50	269	895
05:15 PM	**51**	**80**	**51**	**182**	37	**188**	29	**254**	77	126	33	236	74	153	61	288	**960**
Total Volume	172	273	175	620	157	682	110	949	299	423	104	826	278	641	248	1167	3562
% App. Total	27.7	44	28.2		16.5	71.9	11.6		36.2	51.2	12.6		23.8	54.9	21.3		
PHF	.843	.853	.858	.852	.801	.907	.809	.934	.869	.839	.788	.843	.914	.921	.838	.900	.928

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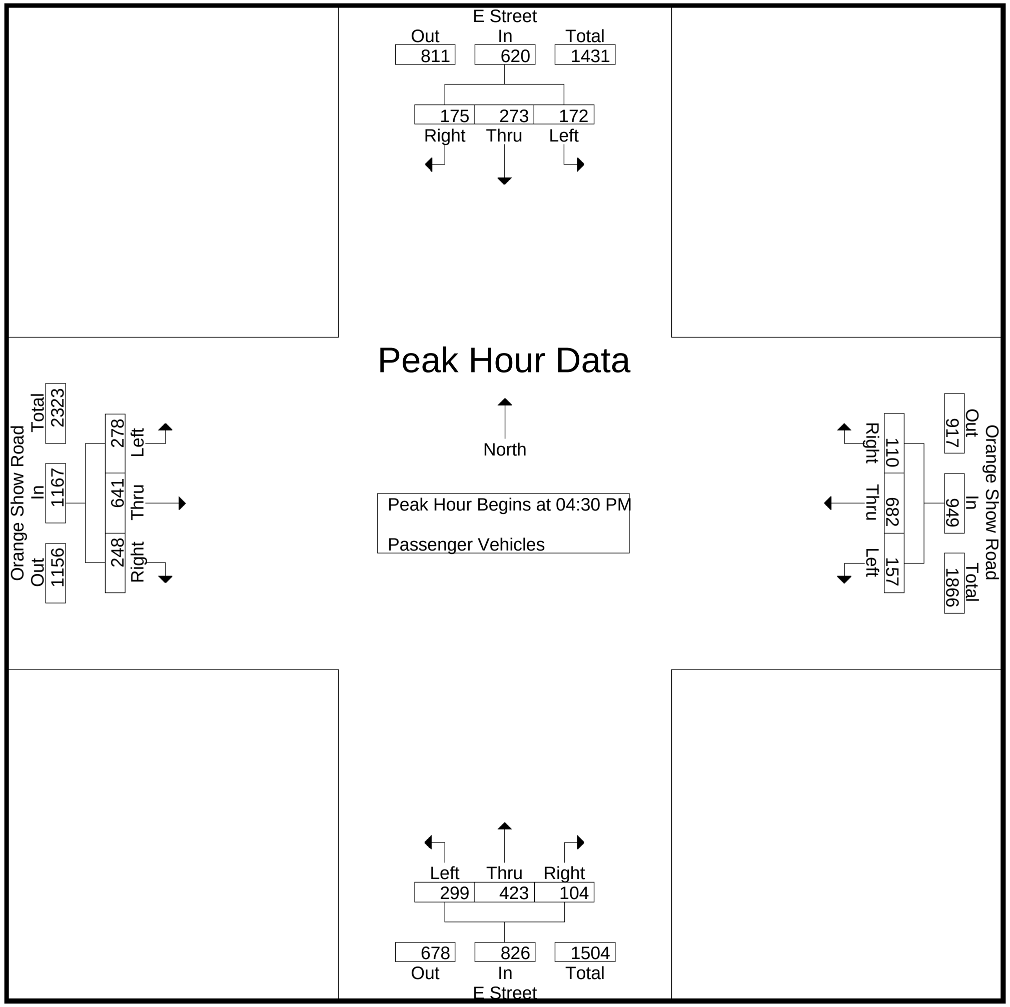

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Groups Printed- Large 2 Axle Vehicles

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	1	1	2	1	4	0	6	0	0	6	0	1	0	0	1	2	10	1	1	13	2	24	26
04:15 PM	1	0	0	0	1	0	2	0	0	2	0	1	0	0	1	1	7	0	0	8	0	12	12
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	11	3	2	14	2	16	18
04:45 PM	0	2	1	0	3	2	2	0	0	4	1	0	1	0	2	1	10	1	0	12	0	21	21
Total	2	4	3	1	9	2	10	0	0	12	1	3	1	0	5	4	38	5	3	47	4	73	77
05:00 PM	0	0	0	0	0	1	2	0	0	3	0	1	0	0	1	1	5	0	0	6	0	10	10
05:15 PM	1	0	0	0	1	0	5	0	0	5	0	1	1	0	2	0	1	0	0	1	0	9	9
05:30 PM	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	7	0	0	7	0	10	10
05:45 PM	0	0	0	0	0	1	2	0	0	3	1	0	0	0	1	0	8	1	0	9	0	13	13
Total	1	1	0	0	2	2	11	0	0	13	1	2	1	0	4	1	21	1	0	23	0	42	42
Grand Total	3	5	3	1	11	4	21	0	0	25	2	5	2	0	9	5	59	6	3	70	4	115	119
Apprch %	27.3	45.5	27.3			16	84	0			22.2	55.6	22.2			7.1	84.3	8.6					
Total %	2.6	4.3	2.6		9.6	3.5	18.3	0		21.7	1.7	4.3	1.7		7.8	4.3	51.3	5.2		60.9	3.4	96.6	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	1	0	1	0	0	0	0	0	**1**	0	1	0	**11**	**3**	**14**	16
04:45 PM	0	**2**	**1**	**3**	**2**	2	0	4	**1**	0	**1**	**2**	**1**	10	1	12	**21**
05:00 PM	0	0	0	0	1	2	0	3	0	1	0	1	1	5	0	6	10
05:15 PM	**1**	0	0	1	0	**5**	0	**5**	0	1	1	2	0	1	0	1	9
Total Volume	1	3	1	5	3	9	0	12	1	3	2	6	2	27	4	33	56
% App. Total	20	60	20		25	75	0		16.7	50	33.3		6.1	81.8	12.1		
PHF	.250	.375	.250	.417	.375	.450	.000	.600	.250	.750	.500	.750	.500	.614	.333	.589	.667

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Groups Printed- 3 Axle Vehicles

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	1	1	0	0	2	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	7	7
04:15 PM	0	2	0	0	2	0	4	0	0	4	0	1	0	0	1	0	3	1	1	4	1	11	12
04:30 PM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	9	0	0	9	0	13	13
04:45 PM	0	2	0	0	2	0	6	0	0	6	0	1	0	0	1	0	3	1	0	4	0	13	13
Total	1	5	0	0	6	0	16	0	0	16	0	2	0	0	2	0	18	2	1	20	1	44	45
05:00 PM	0	1	0	0	1	0	2	0	0	2	0	1	0	0	1	0	2	0	0	2	0	6	6
05:15 PM	0	0	0	0	0	2	2	0	0	4	0	1	0	0	1	1	5	0	0	6	0	11	11
05:30 PM	1	0	0	0	1	0	4	0	0	4	0	1	0	0	1	0	3	1	1	4	1	10	11
05:45 PM	0	1	0	0	1	0	4	0	0	4	0	1	0	0	1	0	6	1	1	7	1	13	14
Total	1	2	0	0	3	2	12	0	0	14	0	4	0	0	4	1	16	2	2	19	2	40	42
Grand Total	2	7	0	0	9	2	28	0	0	30	0	6	0	0	6	1	34	4	3	39	3	84	87
Apprch %	22.2	77.8	0			6.7	93.3	0			0	100	0			2.6	87.2	10.3					
Total %	2.4	8.3	0		10.7	2.4	33.3	0		35.7	0	7.1	0		7.1	1.2	40.5	4.8		46.4	3.4	96.6	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	**9**	0	**9**	**13**
04:45 PM	0	**2**	0	**2**	0	**6**	0	**6**	0	**1**	0	**1**	0	3	**1**	4	13
05:00 PM	0	1	0	1	0	2	0	2	0	1	0	1	0	2	0	2	6
05:15 PM	0	0	0	0	**2**	2	0	4	0	1	0	1	**1**	5	0	6	11
Total Volume	0	3	0	3	2	14	0	16	0	3	0	3	1	19	1	21	43
% App. Total	0	100	0		12.5	87.5	0		0	100	0		4.8	90.5	4.8		
PHF	.000	.375	.000	.375	.250	.583	.000	.667	.000	.750	.000	.750	.250	.528	.250	.583	.827

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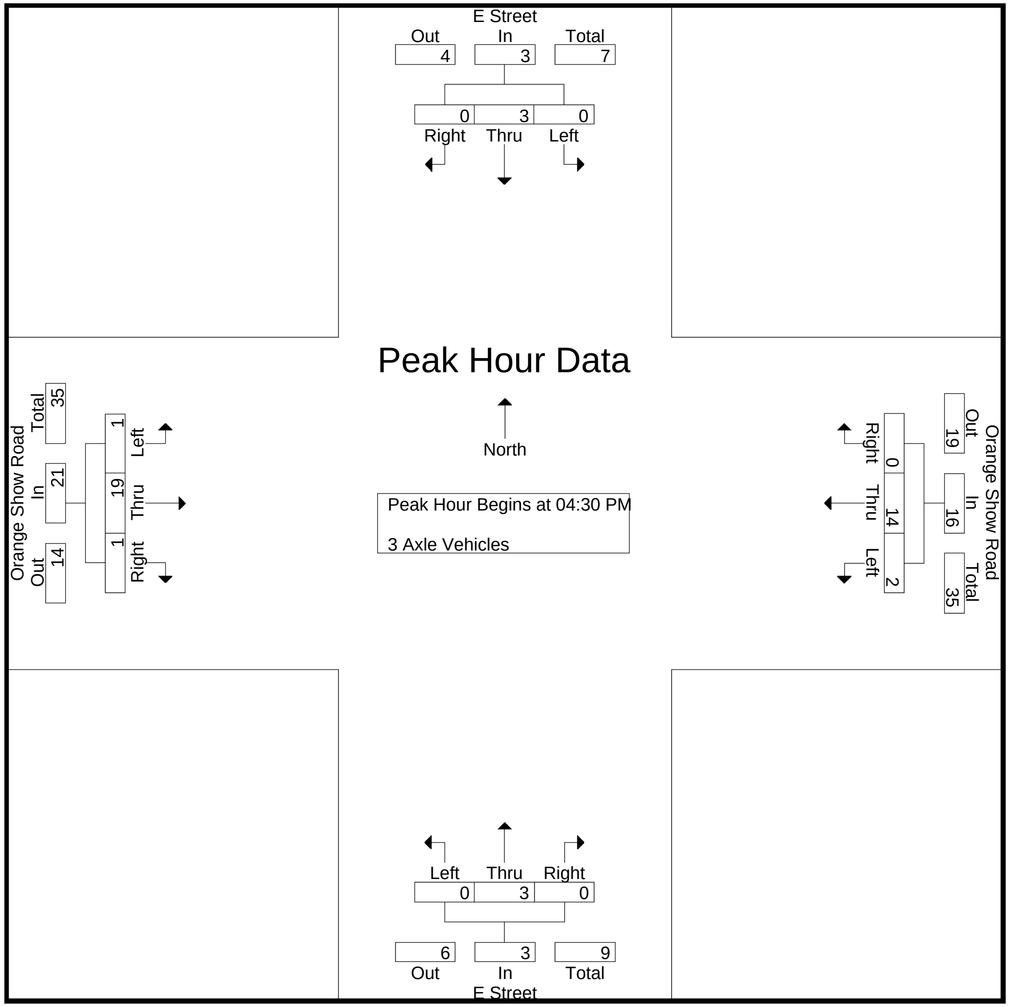
City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : 01_SBC_E_OS PM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 2



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City of San Bernardino
N/S: E Street
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File Name : 01_SBC_E_OS PM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- 4+ Axle Trucks

	E Street Southbound					Orange Show Road Westbound					E Street Northbound					Orange Show Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	1	7	0	0	8	0	0	0	0	0	1	16	0	0	17	0	25	25
04:15 PM	0	0	1	0	1	1	8	0	0	9	0	0	0	0	0	0	12	0	0	12	0	22	22
04:30 PM	0	0	0	0	0	1	10	0	0	11	1	0	0	0	1	0	12	0	0	12	0	24	24
04:45 PM	0	0	0	0	0	1	8	0	0	9	1	0	0	0	1	0	14	0	0	14	0	24	24
Total	0	0	1	0	1	4	33	0	0	37	2	0	0	0	2	1	54	0	0	55	0	95	95
05:00 PM	0	0	0	0	0	1	9	0	0	10	0	0	0	0	0	1	7	1	0	9	0	19	19
05:15 PM	0	0	0	0	0	0	9	0	0	9	1	0	0	0	1	0	10	0	0	10	0	20	20
05:30 PM	0	0	1	0	1	0	9	0	0	9	0	0	0	0	0	0	7	0	0	7	0	17	17
05:45 PM	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	0	11	1	1	12	1	21	22
Total	0	0	1	0	1	1	35	0	0	36	2	0	0	0	2	1	35	2	1	38	1	77	78
Grand Total	0	0	2	0	2	5	68	0	0	73	4	0	0	0	4	2	89	2	1	93	1	172	173
Apprch %	0	0	100			6.8	93.2	0			100	0	0			2.2	95.7	2.2					
Total %	0	0	1.2		1.2	2.9	39.5	0		42.4	2.3	0	0		2.3	1.2	51.7	1.2		54.1	0.6	99.4	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	**1**	**10**	0	**11**	**1**	0	0	**1**	0	12	0	12	**24**
04:45 PM	0	0	0	0	1	8	0	9	1	0	0	1	0	**14**	0	**14**	24
05:00 PM	0	0	0	0	1	9	0	10	0	0	0	0	**1**	7	**1**	9	19
05:15 PM	0	0	0	0	0	9	0	9	1	0	0	1	0	10	0	10	20
Total Volume	0	0	0	0	3	36	0	39	3	0	0	3	1	43	1	45	87
% App. Total	0	0	0		7.7	92.3	0		100	0	0		2.2	95.6	2.2		
PHF	.000	.000	.000	.000	.750	.900	.000	.886	.750	.000	.000	.750	.250	.768	.250	.804	.906

Location: San Bernardino
N/S: E Street
E/W: Orange Show Road

Date: 4/8/2021
Day: Thursday

PEDESTRIANS

	North Leg E Street	East Leg Orange Show Road	South Leg E Street	West Leg Orange Show Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	1	0	1
7:15 AM	0	0	0	1	1
7:30 AM	0	3	2	1	6
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	2	0	0	0	2
8:30 AM	0	0	0	0	0
8:45 AM	0	0	1	2	3
TOTAL VOLUMES:	2	3	4	4	13

	North Leg E Street	East Leg Orange Show Road	South Leg E Street	West Leg Orange Show Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	2	0	1	3
4:15 PM	0	1	2	3	6
4:30 PM	0	2	0	1	3
4:45 PM	1	2	1	2	6
5:00 PM	0	2	1	0	3
5:15 PM	3	2	0	2	7
5:30 PM	1	2	0	3	6
5:45 PM	3	0	0	3	6
TOTAL VOLUMES:	8	13	4	15	40

Location: San Bernardino
N/S: E Street
E/W: Orange Show Road

Date: 4/8/2021
Day: Thursday

BICYCLES

	Southbound E Street			Westbound Orange Show Road			Northbound E Street			Eastbound Orange Show Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	1	0	0	0	1	0	2
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
8:45 AM	0	0	2	0	0	0	0	0	0	1	0	0	3
TOTAL VOLUMES:	0	0	2	0	0	0	1	3	0	1	1	0	8

	Southbound E Street			Westbound Orange Show Road			Northbound E Street			Eastbound Orange Show Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	1	0	0	1	0	0	0	0	0	2	0	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	1	1	0	0	1	0	0	1	0	0	3	0	7

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City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : SBCESORAM
Site Code : 07515438
Start Date : 8/18/2015
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	7	5	5	17	9	54	6	69	16	18	9	43	36	184	44	264	393
07:15 AM	5	15	7	27	6	65	5	76	15	13	16	44	28	195	66	289	436
07:30 AM	8	19	11	38	17	69	7	93	19	16	9	44	64	198	74	336	511
07:45 AM	17	34	12	63	17	67	8	92	28	21	12	61	52	216	96	364	580
Total	37	73	35	145	49	255	26	330	78	68	46	192	180	793	280	1253	1920
08:00 AM	13	31	12	56	16	76	6	98	20	21	13	54	62	225	108	395	603
08:15 AM	13	30	19	62	21	114	6	141	16	20	6	42	39	105	54	198	443
08:30 AM	5	18	24	47	14	92	11	117	26	27	12	65	47	110	58	215	444
08:45 AM	20	29	18	67	50	64	19	133	25	24	3	52	54	120	108	282	534
Total	51	108	73	232	101	346	42	489	87	92	34	213	202	560	328	1090	2024
Grand Total	88	181	108	377	150	601	68	819	165	160	80	405	382	1353	608	2343	3944
Apprch %	23.3	48	28.6		18.3	73.4	8.3		40.7	39.5	19.8		16.3	57.7	25.9		
Total %	2.2	4.6	2.7	9.6	3.8	15.2	1.7	20.8	4.2	4.1	2	10.3	9.7	34.3	15.4	59.4	
Passenger Vehicles	86	145	103	334	112	508	67	687	132	134	74	340	372	1263	536	2171	3532
% Passenger Vehicles	97.7	80.1	95.4	88.6	74.7	84.5	98.5	83.9	80	83.8	92.5	84	97.4	93.3	88.2	92.7	89.6
Large 2 Axle Vehicles	0	24	4	28	36	45	1	82	26	14	5	45	7	28	69	104	259
% Large 2 Axle Vehicles	0	13.3	3.7	7.4	24	7.5	1.5	10	15.8	8.8	6.2	11.1	1.8	2.1	11.3	4.4	6.6
3 Axle Vehicles	2	12	0	14	2	14	0	16	1	12	1	14	1	14	3	18	62
% 3 Axle Vehicles	2.3	6.6	0	3.7	1.3	2.3	0	2	0.6	7.5	1.2	3.5	0.3	1	0.5	0.8	1.6
4+ Axle Trucks	0	0	1	1	0	34	0	34	6	0	0	6	2	48	0	50	91
% 4+ Axle Trucks	0	0	0.9	0.3	0	5.7	0	4.2	3.6	0	0	1.5	0.5	3.5	0	2.1	2.3

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	8	19	11	38	17	69	7	93	19	16	9	44	**64**	198	74	336	511
07:45 AM	**17**	**34**	12	**63**	17	67	**8**	92	**28**	**21**	12	**61**	52	216	96	364	580
08:00 AM	13	31	12	56	16	76	6	98	20	21	**13**	54	62	**225**	**108**	**395**	**603**
08:15 AM	13	30	**19**	62	**21**	**114**	6	**141**	16	20	6	42	39	105	54	198	443
Total Volume	51	114	54	219	71	326	27	424	83	78	40	201	217	744	332	1293	2137
% App. Total	23.3	52.1	24.7		16.7	76.9	6.4		41.3	38.8	19.9		16.8	57.5	25.7		
PHF	.750	.838	.711	.869	.845	.715	.844	.752	.741	.929	.769	.824	.848	.827	.769	.818	.886

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City of San Bernardino
N/S: E Street
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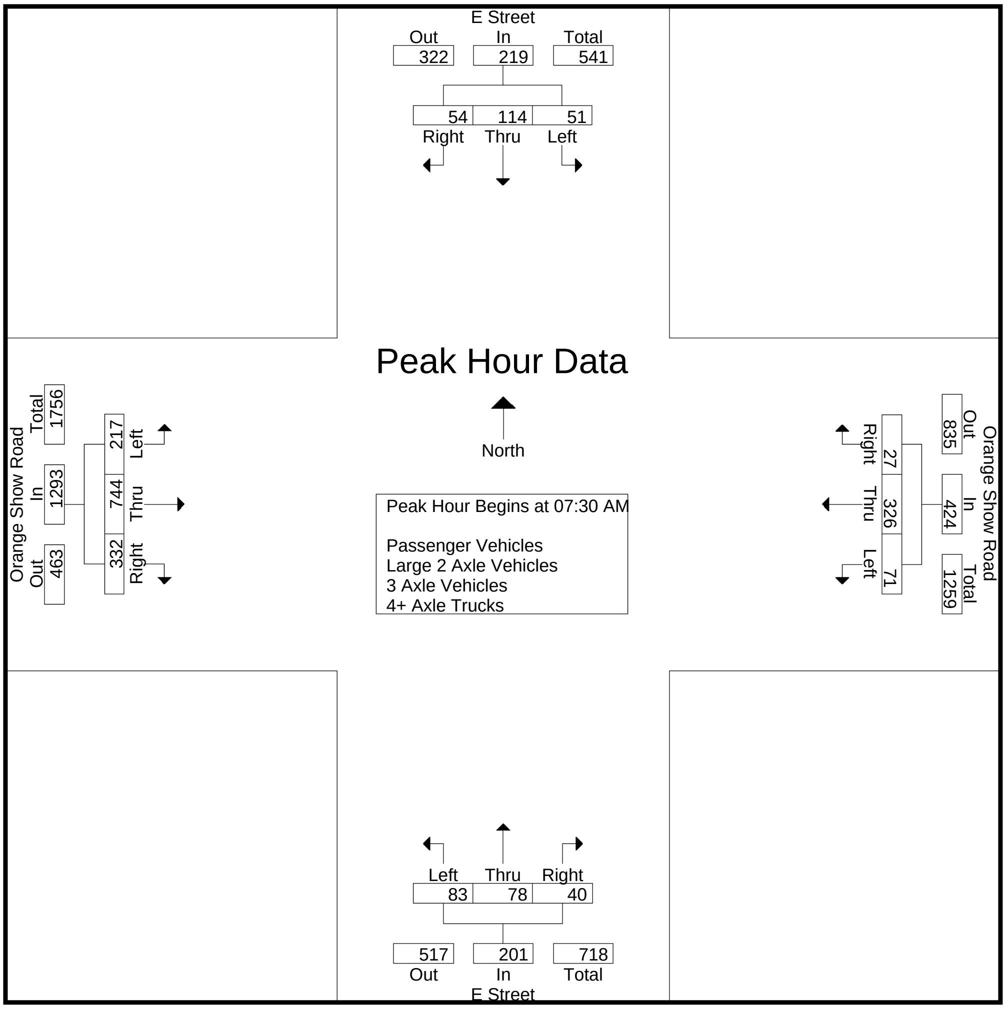
Weather: Clear

File Name : SBCESORAM
Site Code : 07515438
Start Date : 8/18/2015
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				08:00 AM				07:45 AM				07:15 AM			
+0 mins.	13	**31**	12	56	16	76	6	98	**28**	21	12	61	28	195	66	289
+15 mins.	13	30	19	62	21	**114**	6	**141**	20	21	**13**	54	**64**	198	74	336
+30 mins.	5	18	**24**	47	14	92	11	117	16	20	6	42	52	216	96	364
+45 mins.	**20**	29	18	**67**	**50**	64	**19**	133	26	**27**	12	**65**	62	**225**	**108**	**395**
Total Volume	51	108	73	232	101	346	42	489	90	89	43	222	206	834	344	1384
% App. Total	22	46.6	31.5		20.7	70.8	8.6		40.5	40.1	19.4		14.9	60.3	24.9	
PHF	.638	.871	.760	.866	.505	.759	.553	.867	.804	.824	.827	.854	.805	.927	.796	.876

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City of San Bernardino
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Weather: Clear

File Name : SBCESORAM
Site Code : 07515438
Start Date : 8/18/2015
Page No : 1

Groups Printed- Passenger Vehicles

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	5	4	5	14	8	48	6	62	10	12	7	29	35	175	44	254	359
07:15 AM	5	9	6	20	6	48	5	59	12	11	14	37	28	189	66	283	399
07:30 AM	8	17	9	34	16	55	7	78	12	14	8	34	63	187	74	324	470
07:45 AM	17	29	12	58	17	59	8	84	17	15	11	43	50	205	95	350	535
Total	35	59	32	126	47	210	26	283	51	52	40	143	176	756	279	1211	1763
08:00 AM	13	29	12	54	13	67	6	86	19	20	13	52	62	216	104	382	574
08:15 AM	13	26	18	57	18	98	6	122	13	17	6	36	38	94	52	184	399
08:30 AM	5	15	23	43	7	82	11	100	26	24	12	62	45	92	45	182	387
08:45 AM	20	16	18	54	27	51	18	96	23	21	3	47	51	105	56	212	409
Total	51	86	71	208	65	298	41	404	81	82	34	197	196	507	257	960	1769
Grand Total	86	145	103	334	112	508	67	687	132	134	74	340	372	1263	536	2171	3532
Apprch %	25.7	43.4	30.8		16.3	73.9	9.8		38.8	39.4	21.8		17.1	58.2	24.7		
Total %	2.4	4.1	2.9	9.5	3.2	14.4	1.9	19.5	3.7	3.8	2.1	9.6	10.5	35.8	15.2	61.5	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	8	17	9	34	16	55	7	78	12	14	8	34	**63**	187	74	324	470
07:45 AM	**17**	**29**	12	**58**	17	59	**8**	84	17	15	11	43	50	205	95	350	535
08:00 AM	13	29	12	54	13	67	6	86	**19**	**20**	**13**	**52**	62	**216**	**104**	**382**	**574**
08:15 AM	13	26	**18**	57	**18**	**98**	6	**122**	13	17	6	36	38	94	52	184	399
Total Volume	51	101	51	203	64	279	27	370	61	66	38	165	213	702	325	1240	1978
% App. Total	25.1	49.8	25.1		17.3	75.4	7.3		37	40	23		17.2	56.6	26.2		
PHF	.750	.871	.708	.875	.889	.712	.844	.758	.803	.825	.731	.793	.845	.813	.781	.812	.861

City of San Bernardino
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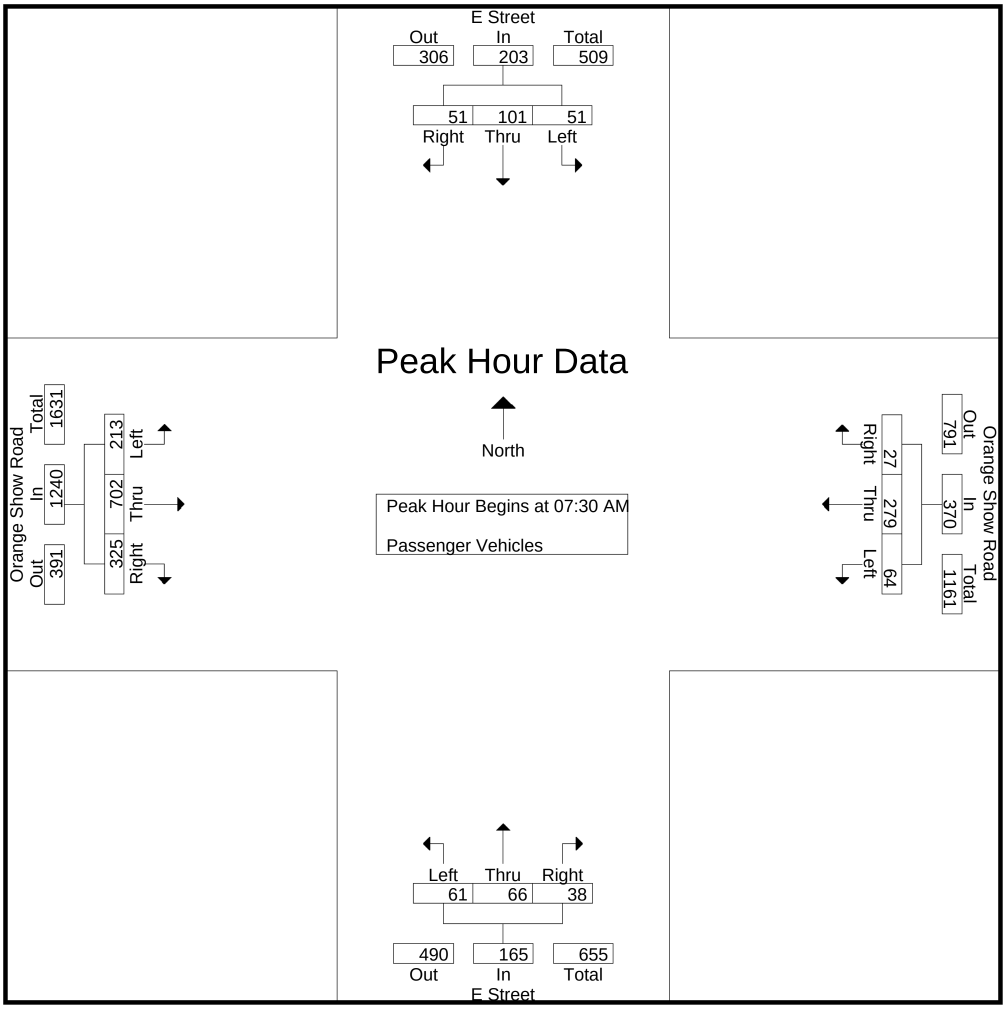

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	8	17	9	34	16	55	7	78	12	14	8	34	**63**	187	74	324
+15 mins.	**17**	**29**	12	**58**	17	59	**8**	84	17	15	11	43	50	205	95	350
+30 mins.	13	29	12	54	13	67	6	86	**19**	**20**	**13**	**52**	62	**216**	**104**	**382**
+45 mins.	13	26	**18**	57	**18**	**98**	6	**122**	13	17	6	36	38	94	52	184
Total Volume	51	101	51	203	64	279	27	370	61	66	38	165	213	702	325	1240
% App. Total	25.1	49.8	25.1		17.3	75.4	7.3		37	40	23		17.2	56.6	26.2	
PHF	.750	.871	.708	.875	.889	.712	.844	.758	.803	.825	.731	.793	.845	.813	.781	.812

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File Name : SBCESORAM
Site Code : 07515438
Start Date : 8/18/2015
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	1	2	0	3	5	6	2	13	1	0	0	1	17
07:15 AM	0	4	1	5	0	9	0	9	1	1	1	3	0	1	0	1	18
07:30 AM	0	1	1	2	0	2	0	2	7	0	1	8	1	3	0	4	16
07:45 AM	0	3	0	3	0	4	0	4	10	4	1	15	2	5	1	8	30
Total	0	8	2	10	1	17	0	18	23	11	5	39	4	9	1	14	81
08:00 AM	0	1	0	1	3	4	0	7	1	0	0	1	0	3	2	5	14
08:15 AM	0	1	1	2	2	9	0	11	2	1	0	3	0	4	2	6	22
08:30 AM	0	2	1	3	7	8	0	15	0	0	0	0	1	5	13	19	37
08:45 AM	0	12	0	12	23	7	1	31	0	2	0	2	2	7	51	60	105
Total	0	16	2	18	35	28	1	64	3	3	0	6	3	19	68	90	178
Grand Total	0	24	4	28	36	45	1	82	26	14	5	45	7	28	69	104	259
Apprch %	0	85.7	14.3		43.9	54.9	1.2		57.8	31.1	11.1		6.7	26.9	66.3		
Total %	0	9.3	1.5	10.8	13.9	17.4	0.4	31.7	10	5.4	1.9	17.4	2.7	10.8	26.6	40.2	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	1	**1**	2	0	2	0	2	7	0	**1**	8	1	3	0	4	16
07:45 AM	0	**3**	0	**3**	0	4	0	4	**10**	**4**	1	**15**	**2**	**5**	1	**8**	**30**
08:00 AM	0	1	0	1	**3**	4	0	7	1	0	0	1	0	3	**2**	5	14
08:15 AM	0	1	1	2	2	**9**	0	**11**	2	1	0	3	0	4	2	6	22
Total Volume	0	6	2	8	5	19	0	24	20	5	2	27	3	15	5	23	82
% App. Total	0	75	25		20.8	79.2	0		74.1	18.5	7.4		13	65.2	21.7		
PHF	.000	.500	.500	.667	.417	.528	.000	.545	.500	.313	.500	.450	.375	.750	.625	.719	.683

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City of San Bernardino
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E/W: Orange Show Road
Weather: Clear

File Name : SBCESORAM
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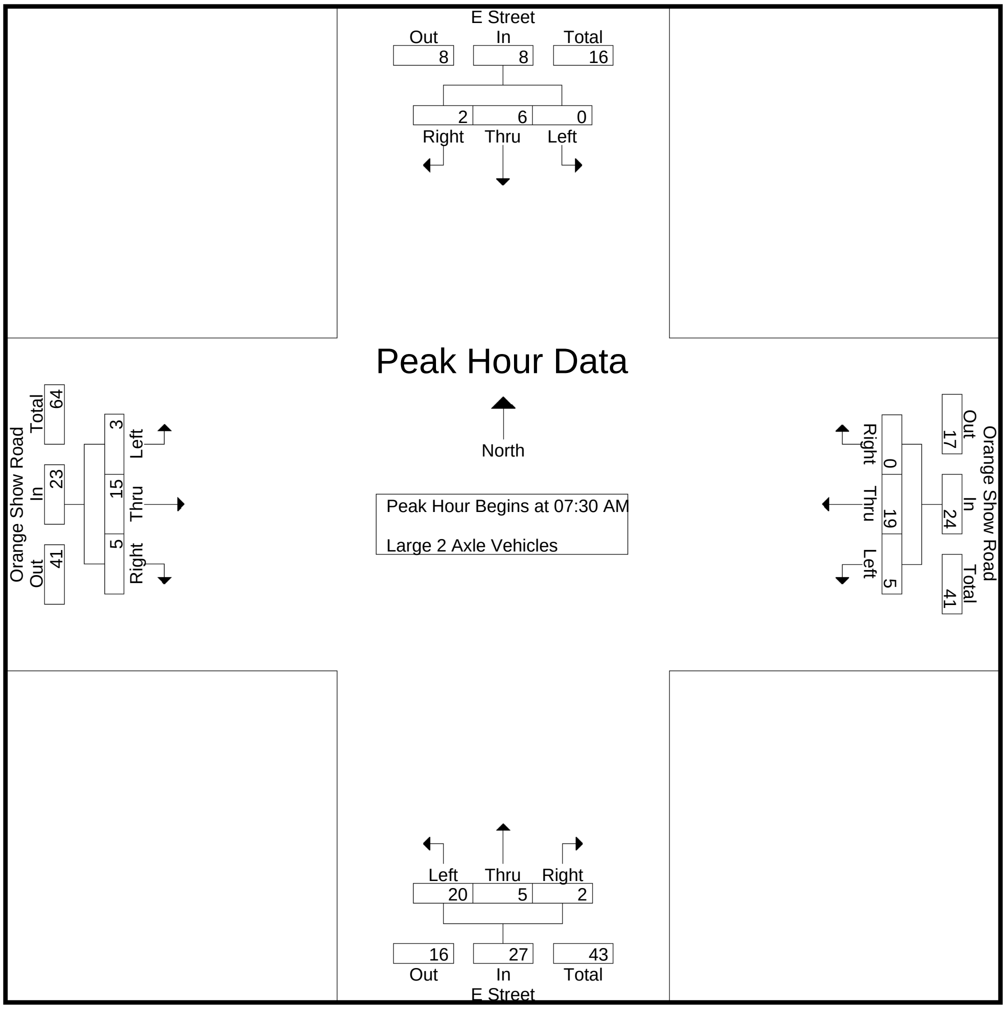

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	1	**1**	2	0	2	0	2	7	0	**1**	8	1	3	0	4
+15 mins.	0	**3**	0	**3**	0	4	0	4	**10**	**4**	1	**15**	**2**	**5**	1	**8**
+30 mins.	0	1	0	1	**3**	4	0	7	1	0	0	1	0	3	**2**	5
+45 mins.	0	1	1	2	2	**9**	0	**11**	2	1	0	3	0	4	2	6
Total Volume	0	6	2	8	5	19	0	24	20	5	2	27	3	15	5	23
% App. Total	0	75	25		20.8	79.2	0		74.1	18.5	7.4		13	65.2	21.7	
PHF	.000	.500	.500	.667	.417	.528	.000	.545	.500	.313	.500	.450	.375	.750	.625	.719

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Groups Printed- 3 Axle Vehicles

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	1	0	3	0	1	0	1	0	0	0	0	0	0	0	0	4
07:15 AM	0	2	0	2	0	2	0	2	0	1	1	2	0	1	0	1	7
07:30 AM	0	1	0	1	1	4	0	5	0	2	0	2	0	1	0	1	9
07:45 AM	0	2	0	2	0	0	0	0	0	2	0	2	0	1	0	1	5
Total	2	6	0	8	1	7	0	8	0	5	1	6	0	3	0	3	25
08:00 AM	0	1	0	1	0	1	0	1	0	1	0	1	0	1	2	3	6
08:15 AM	0	3	0	3	1	2	0	3	0	2	0	2	0	2	0	2	10
08:30 AM	0	1	0	1	0	1	0	1	0	3	0	3	1	5	0	6	11
08:45 AM	0	1	0	1	0	3	0	3	1	1	0	2	0	3	1	4	10
Total	0	6	0	6	1	7	0	8	1	7	0	8	1	11	3	15	37
Grand Total	2	12	0	14	2	14	0	16	1	12	1	14	1	14	3	18	62
Apprch %	14.3	85.7	0		12.5	87.5	0		7.1	85.7	7.1		5.6	77.8	16.7		
Total %	3.2	19.4	0	22.6	3.2	22.6	0	25.8	1.6	19.4	1.6	22.6	1.6	22.6	4.8	29	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	1	0	1	**1**	**4**	0	**5**	0	**2**	0	**2**	0	1	0	1	9
07:45 AM	0	2	0	2	0	0	0	0	0	2	0	2	0	1	0	1	5
08:00 AM	0	1	0	1	0	1	0	1	0	1	0	1	0	1	**2**	**3**	6
08:15 AM	0	**3**	0	**3**	1	2	0	3	0	2	0	2	0	**2**	0	2	**10**
Total Volume	0	7	0	7	2	7	0	9	0	7	0	7	0	5	2	7	30
% App. Total	0	100	0		22.2	77.8	0		0	100	0		0	71.4	28.6		
PHF	.000	.583	.000	.583	.500	.438	.000	.450	.000	.875	.000	.875	.000	.625	.250	.583	.750

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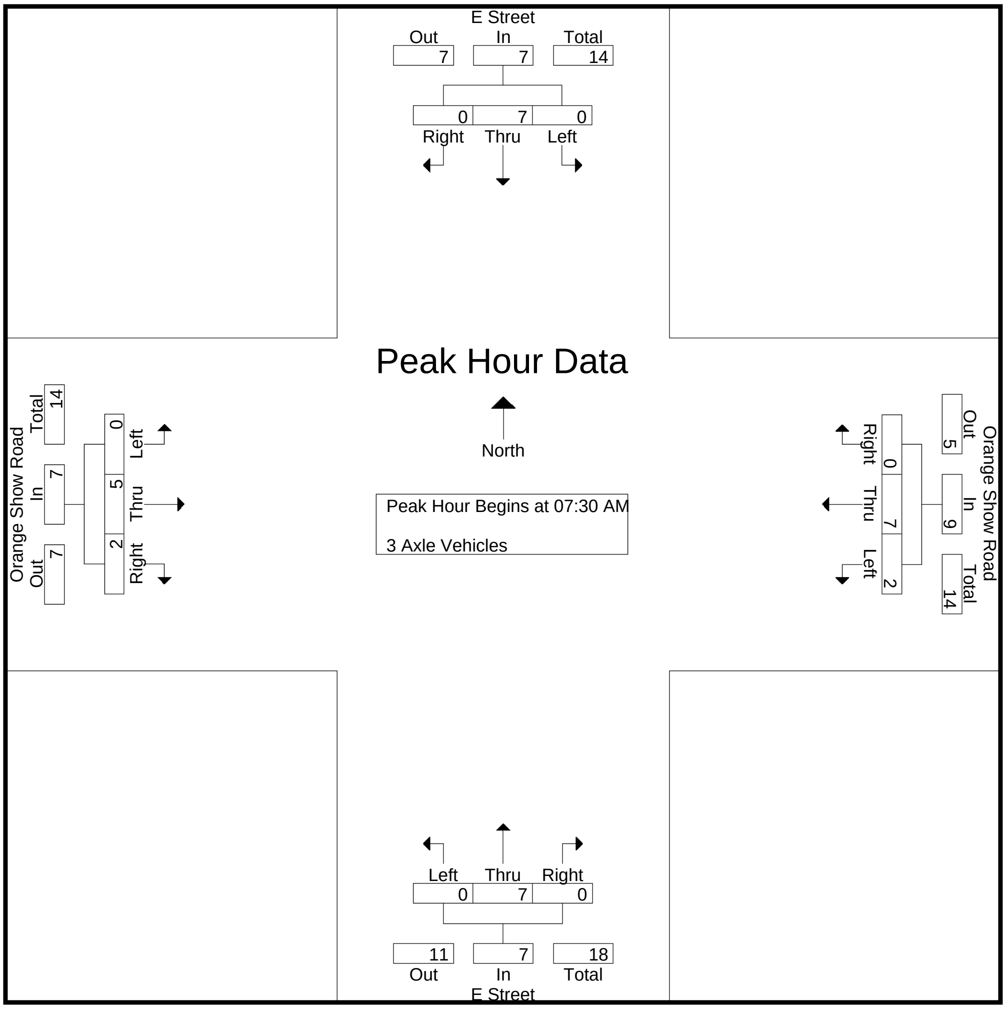

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	1	0	1	**1**	**4**	0	**5**	0	**2**	0	**2**	0	1	0	1
+15 mins.	0	2	0	2	0	0	0	0	0	2	0	2	0	1	0	1
+30 mins.	0	1	0	1	0	1	0	1	0	1	0	1	0	1	**2**	**3**
+45 mins.	0	**3**	0	**3**	1	2	0	3	0	2	0	2	0	**2**	0	2
Total Volume	0	7	0	7	2	7	0	9	0	7	0	7	0	5	2	7
% App. Total	0	100	0		22.2	77.8	0		0	100	0		0	71.4	28.6	
PHF	.000	.583	.000	.583	.500	.438	.000	.450	.000	.875	.000	.875	.000	.625	.250	.583

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Groups Printed- 4+ Axle Trucks

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	3	0	3	1	0	0	1	0	9	0	9	13
07:15 AM	0	0	0	0	0	6	0	6	2	0	0	2	0	4	0	4	12
07:30 AM	0	0	1	1	0	8	0	8	0	0	0	0	0	7	0	7	16
07:45 AM	0	0	0	0	0	4	0	4	1	0	0	1	0	5	0	5	10
Total	0	0	1	1	0	21	0	21	4	0	0	4	0	25	0	25	51
08:00 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	5	0	5	9
08:15 AM	0	0	0	0	0	5	0	5	1	0	0	1	1	5	0	6	12
08:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	8	0	8	9
08:45 AM	0	0	0	0	0	3	0	3	1	0	0	1	1	5	0	6	10
Total	0	0	0	0	0	13	0	13	2	0	0	2	2	23	0	25	40
Grand Total	0	0	1	1	0	34	0	34	6	0	0	6	2	48	0	50	91
Apprch %	0	0	100		0	100	0		100	0	0		4	96	0		
Total %	0	0	1.1	1.1	0	37.4	0	37.4	6.6	0	0	6.6	2.2	52.7	0	54.9	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	**1**	**1**	0	**8**	0	**8**	0	0	0	0	0	**7**	0	**7**	**16**
07:45 AM	0	0	0	0	0	4	0	4	**1**	0	0	**1**	0	5	0	5	10
08:00 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	5	0	5	9
08:15 AM	0	0	0	0	0	5	0	5	1	0	0	1	**1**	5	0	6	12
Total Volume	0	0	1	1	0	21	0	21	2	0	0	2	1	22	0	23	47
% App. Total	0	0	100		0	100	0		100	0	0		4.3	95.7	0		
PHF	.000	.000	.250	.250	.000	.656	.000	.656	.500	.000	.000	.500	.250	.786	.000	.821	.734

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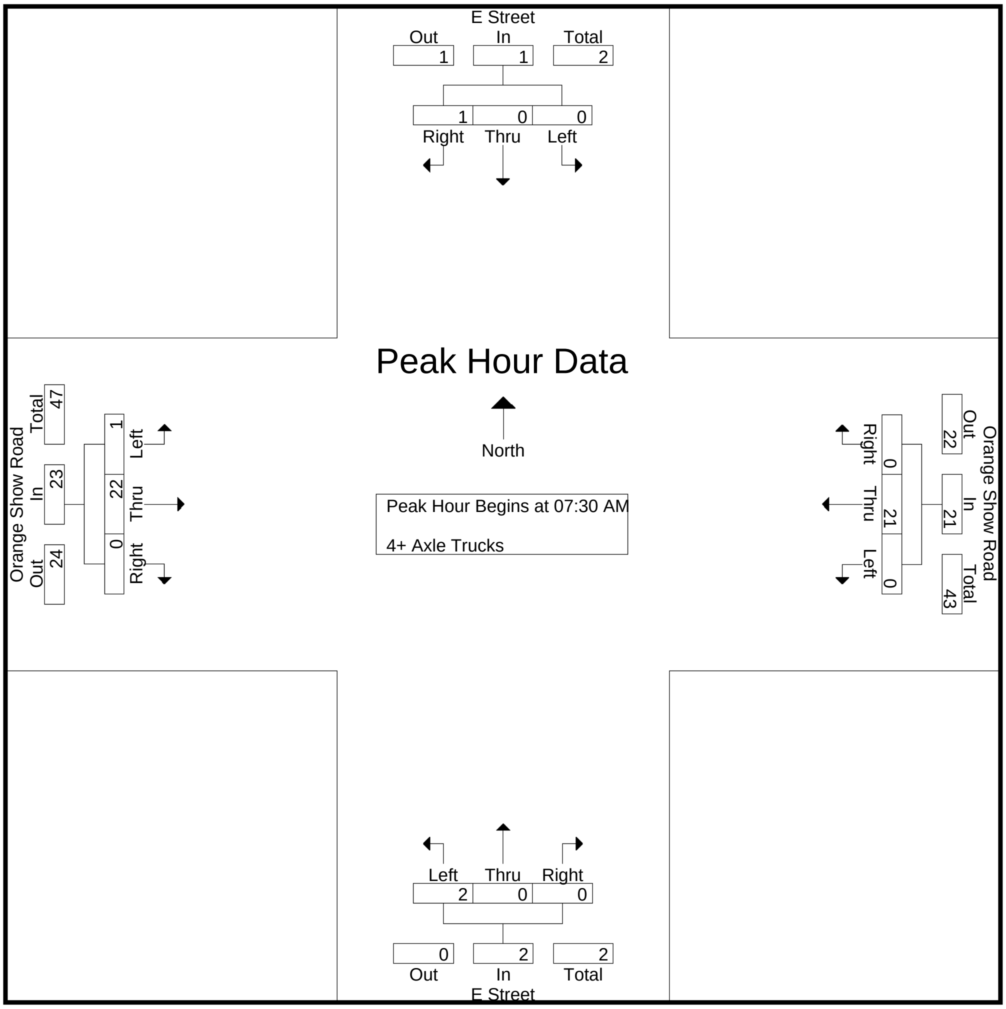

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	**1**	**1**	0	**8**	0	**8**	0	0	0	0	0	**7**	0	**7**
+15 mins.	0	0	0	0	0	4	0	4	**1**	0	0	**1**	0	5	0	5
+30 mins.	0	0	0	0	0	4	0	4	0	0	0	0	0	5	0	5
+45 mins.	0	0	0	0	0	5	0	5	1	0	0	1	**1**	5	0	6
Total Volume	0	0	1	1	0	21	0	21	2	0	0	2	1	22	0	23
% App. Total	0	0	100		0	100	0		100	0	0		4.3	95.7	0	
PHF	.000	.000	.250	.250	.000	.656	.000	.656	.500	.000	.000	.500	.250	.786	.000	.821

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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	E Street				Orange Show Road				E Street				Orange Show Road				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	38	50	66	154	40	132	8	180	91	39	12	142	34	98	79	211	687
04:15 PM	27	38	64	129	36	129	9	174	86	47	22	155	41	109	63	213	671
04:30 PM	40	38	46	124	25	169	18	212	95	34	16	145	53	154	63	270	751
04:45 PM	37	48	60	145	23	141	17	181	91	46	23	160	41	119	64	224	710
Total	142	174	236	552	124	571	52	747	363	166	73	602	169	480	269	918	2819
05:00 PM	31	37	80	148	31	171	8	210	105	68	26	199	39	205	76	320	877
05:15 PM	31	41	60	132	42	172	7	221	119	76	38	233	26	194	73	293	879
05:30 PM	46	38	66	150	42	195	18	255	124	74	30	228	25	217	83	325	958
05:45 PM	36	32	51	119	27	184	8	219	105	65	33	203	27	207	65	299	840
Total	144	148	257	549	142	722	41	905	453	283	127	863	117	823	297	1237	3554
Grand Total	286	322	493	1101	266	1293	93	1652	816	449	200	1465	286	1303	566	2155	6373
Apprch %	26	29.2	44.8		16.1	78.3	5.6		55.7	30.6	13.7		13.3	60.5	26.3		
Total %	4.5	5.1	7.7	17.3	4.2	20.3	1.5	25.9	12.8	7	3.1	23	4.5	20.4	8.9	33.8	
Passenger Vehicles	283	273	487	1043	230	1221	91	1542	802	433	195	1430	280	1210	496	1986	6001
% Passenger Vehicles	99	84.8	98.8	94.7	86.5	94.4	97.8	93.3	98.3	96.4	97.5	97.6	97.9	92.9	87.6	92.2	94.2
Large 2 Axle Vehicles	3	36	5	44	35	19	2	56	9	6	4	19	3	21	67	91	210
% Large 2 Axle Vehicles	1	11.2	1	4	13.2	1.5	2.2	3.4	1.1	1.3	2	1.3	1	1.6	11.8	4.2	3.3
3 Axle Vehicles	0	12	0	12	1	15	0	16	3	10	0	13	1	17	1	19	60
% 3 Axle Vehicles	0	3.7	0	1.1	0.4	1.2	0	1	0.4	2.2	0	0.9	0.3	1.3	0.2	0.9	0.9
4+ Axle Trucks	0	1	1	2	0	38	0	38	2	0	1	3	2	55	2	59	102
% 4+ Axle Trucks	0	0.3	0.2	0.2	0	2.9	0	2.3	0.2	0	0.5	0.2	0.7	4.2	0.4	2.7	1.6

	E Street				Orange Show Road				E Street				Orange Show Road				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	31	37	**80**	148	31	171	8	210	105	68	26	199	**39**	205	76	320	877
05:15 PM	31	**41**	60	132	**42**	172	7	221	119	**76**	**38**	**233**	26	194	73	293	879
05:30 PM	**46**	38	66	**150**	42	**195**	**18**	**255**	**124**	74	30	228	25	**217**	**83**	**325**	**958**
05:45 PM	36	32	51	119	27	184	8	219	105	65	33	203	27	207	65	299	840
Total Volume	144	148	257	549	142	722	41	905	453	283	127	863	117	823	297	1237	3554
% App. Total	26.2	27	46.8		15.7	79.8	4.5		52.5	32.8	14.7		9.5	66.5	24		
PHF	.783	.902	.803	.915	.845	.926	.569	.887	.913	.931	.836	.926	.750	.948	.895	.952	.927

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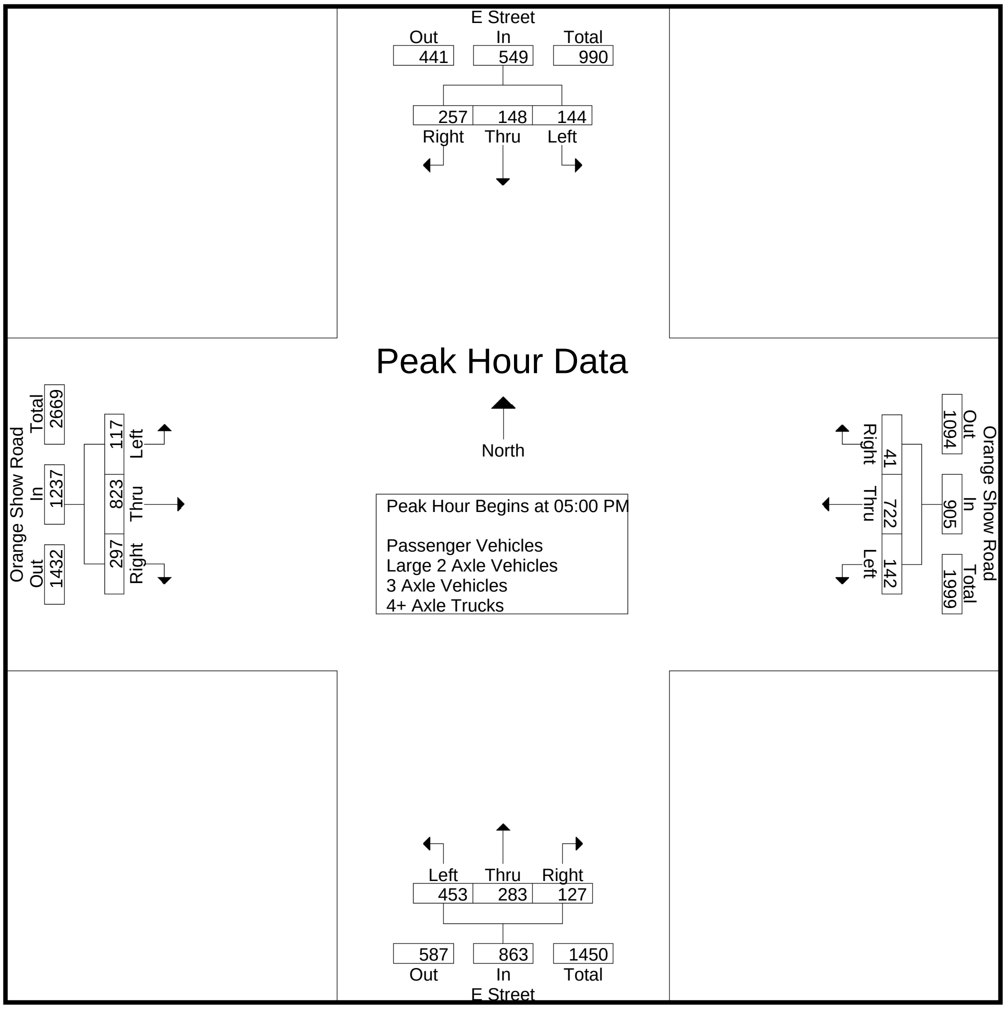

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	37	**48**	60	145	31	171	8	210	105	68	26	199	**39**	205	76	320
+15 mins.	31	37	**80**	148	**42**	172	7	221	119	**76**	**38**	**233**	26	194	73	293
+30 mins.	31	41	60	132	42	**195**	**18**	**255**	**124**	74	30	228	25	**217**	**83**	**325**
+45 mins.	**46**	38	66	**150**	27	184	8	219	105	65	33	203	27	207	65	299
Total Volume	145	164	266	575	142	722	41	905	453	283	127	863	117	823	297	1237
% App. Total	25.2	28.5	46.3		15.7	79.8	4.5		52.5	32.8	14.7		9.5	66.5	24	
PHF	.788	.854	.831	.958	.845	.926	.569	.887	.913	.931	.836	.926	.750	.948	.895	.952

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Groups Printed- Passenger Vehicles

	E Street				Orange Show Road				E Street				Orange Show Road				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	38	41	64	143	27	121	8	156	88	37	12	137	33	87	49	169	605
04:15 PM	27	23	63	113	19	120	9	148	84	45	19	148	40	97	38	175	584
04:30 PM	39	30	46	115	22	164	18	204	95	31	16	142	52	138	54	244	705
04:45 PM	37	43	59	139	21	132	17	170	86	43	23	152	40	109	60	209	670
Total	141	137	232	510	89	537	52	678	353	156	70	579	165	431	201	797	2564
05:00 PM	30	32	79	141	31	164	7	202	104	67	26	197	38	194	75	307	847
05:15 PM	31	37	59	127	41	165	7	213	119	73	38	230	26	184	72	282	852
05:30 PM	46	36	66	148	42	185	17	244	123	73	30	226	24	207	83	314	932
05:45 PM	35	31	51	117	27	170	8	205	103	64	31	198	27	194	65	286	806
Total	142	136	255	533	141	684	39	864	449	277	125	851	115	779	295	1189	3437
Grand Total	283	273	487	1043	230	1221	91	1542	802	433	195	1430	280	1210	496	1986	6001
Apprch %	27.1	26.2	46.7		14.9	79.2	5.9		56.1	30.3	13.6		14.1	60.9	25		
Total %	4.7	4.5	8.1	17.4	3.8	20.3	1.5	25.7	13.4	7.2	3.2	23.8	4.7	20.2	8.3	33.1	

	E Street				Orange Show Road				E Street				Orange Show Road				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	30	32	**79**	141	31	164	7	202	104	67	26	197	**38**	194	75	307	847
05:15 PM	31	**37**	59	127	41	165	7	213	119	**73**	**38**	**230**	26	184	72	282	852
05:30 PM	**46**	36	66	**148**	**42**	**185**	**17**	**244**	**123**	73	30	226	24	**207**	**83**	**314**	**932**
05:45 PM	35	31	51	117	27	170	8	205	103	64	31	198	27	194	65	286	806
Total Volume	142	136	255	533	141	684	39	864	449	277	125	851	115	779	295	1189	3437
% App. Total	26.6	25.5	47.8		16.3	79.2	4.5		52.8	32.5	14.7		9.7	65.5	24.8		
PHF	.772	.919	.807	.900	.839	.924	.574	.885	.913	.949	.822	.925	.757	.941	.889	.947	.922

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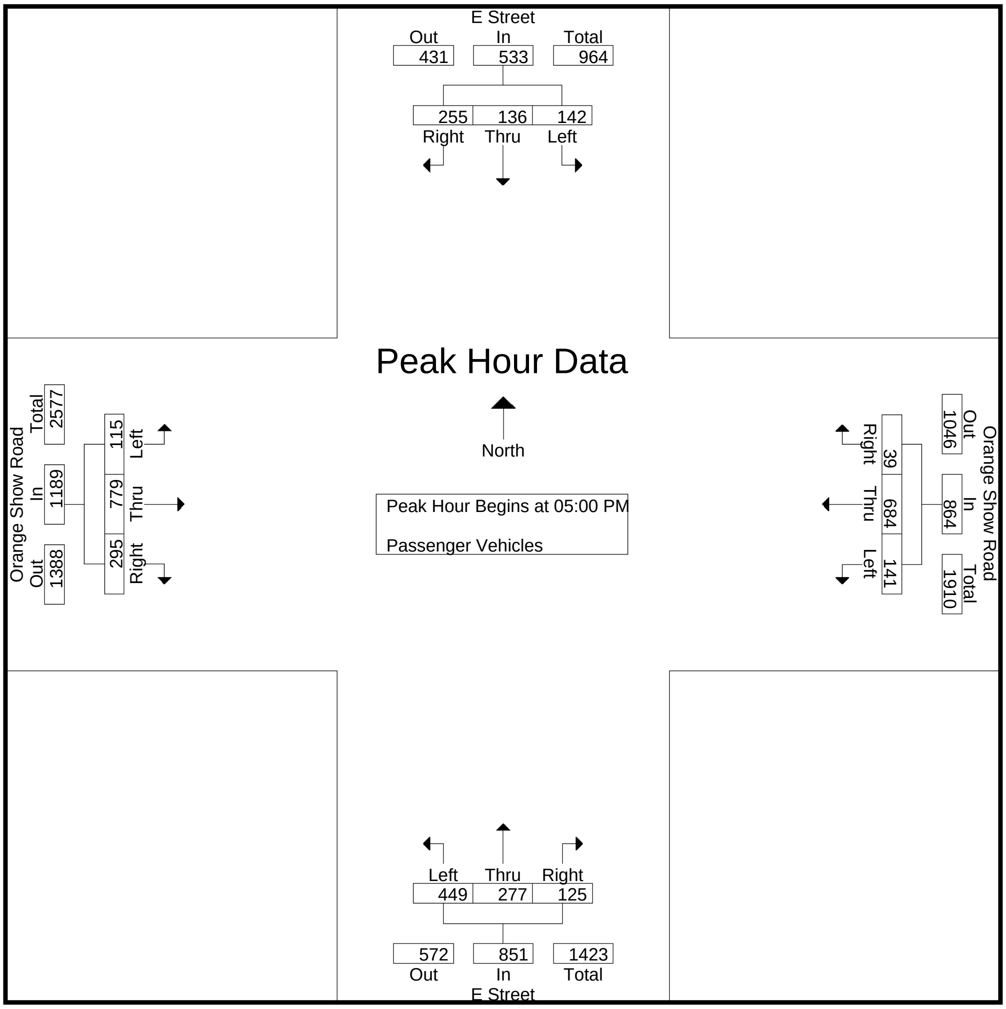

Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	30	32	**79**	141	31	164	7	202	104	67	26	197	**38**	194	75	307
+15 mins.	31	**37**	59	127	41	165	7	213	119	**73**	**38**	**230**	26	184	72	282
+30 mins.	**46**	36	66	**148**	**42**	**185**	**17**	**244**	**123**	73	30	226	24	**207**	**83**	**314**
+45 mins.	35	31	51	117	27	170	8	205	103	64	31	198	27	194	65	286
Total Volume	142	136	255	533	141	684	39	864	449	277	125	851	115	779	295	1189
% App. Total	26.6	25.5	47.8		16.3	79.2	4.5		52.8	32.5	14.7		9.7	65.5	24.8	
PHF	.772	.919	.807	.900	.839	.924	.574	.885	.913	.949	.822	.925	.757	.941	.889	.947

City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : SBCESORPM
Site Code : 07515438
Start Date : 8/18/2015
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	7	2	9	13	2	0	15	1	0	0	1	0	6	30	36	61
04:15 PM	0	12	0	12	17	1	0	18	2	2	2	6	1	2	25	28	64
04:30 PM	1	8	0	9	3	3	0	6	0	0	0	0	1	4	8	13	28
04:45 PM	0	3	1	4	2	3	0	5	4	2	0	6	0	2	3	5	20
Total	1	30	3	34	35	9	0	44	7	4	2	13	2	14	66	82	173
05:00 PM	1	3	1	5	0	3	1	4	1	0	0	1	1	3	1	5	15
05:15 PM	0	2	1	3	0	2	0	2	0	1	0	1	0	1	0	1	7
05:30 PM	0	1	0	1	0	2	1	3	1	0	0	1	0	2	0	2	7
05:45 PM	1	0	0	1	0	3	0	3	0	1	2	3	0	1	0	1	8
Total	2	6	2	10	0	10	2	12	2	2	2	6	1	7	1	9	37
Grand Total	3	36	5	44	35	19	2	56	9	6	4	19	3	21	67	91	210
Apprch %	6.8	81.8	11.4		62.5	33.9	3.6		47.4	31.6	21.1		3.3	23.1	73.6		
Total %	1.4	17.1	2.4	21	16.7	9	1	26.7	4.3	2.9	1.9	9	1.4	10	31.9	43.3	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**1**	**3**	**1**	**5**	0	**3**	**1**	**4**	**1**	0	0	1	**1**	**3**	**1**	**5**	**15**
05:15 PM	0	2	1	3	0	2	0	2	0	**1**	0	1	0	1	0	1	7
05:30 PM	0	1	0	1	0	2	1	3	1	0	0	1	0	2	0	2	7
05:45 PM	1	0	0	1	0	3	0	3	0	1	**2**	**3**	0	1	0	1	8
Total Volume	2	6	2	10	0	10	2	12	2	2	2	6	1	7	1	9	37
% App. Total	20	60	20		0	83.3	16.7		33.3	33.3	33.3		11.1	77.8	11.1		
PHF	.500	.500	.500	.500	.000	.833	.500	.750	.500	.500	.250	.500	.250	.583	.250	.450	.617

City of San Bernardino
N/S: E Street
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Weather: Clear

File Name : SBCESORPM
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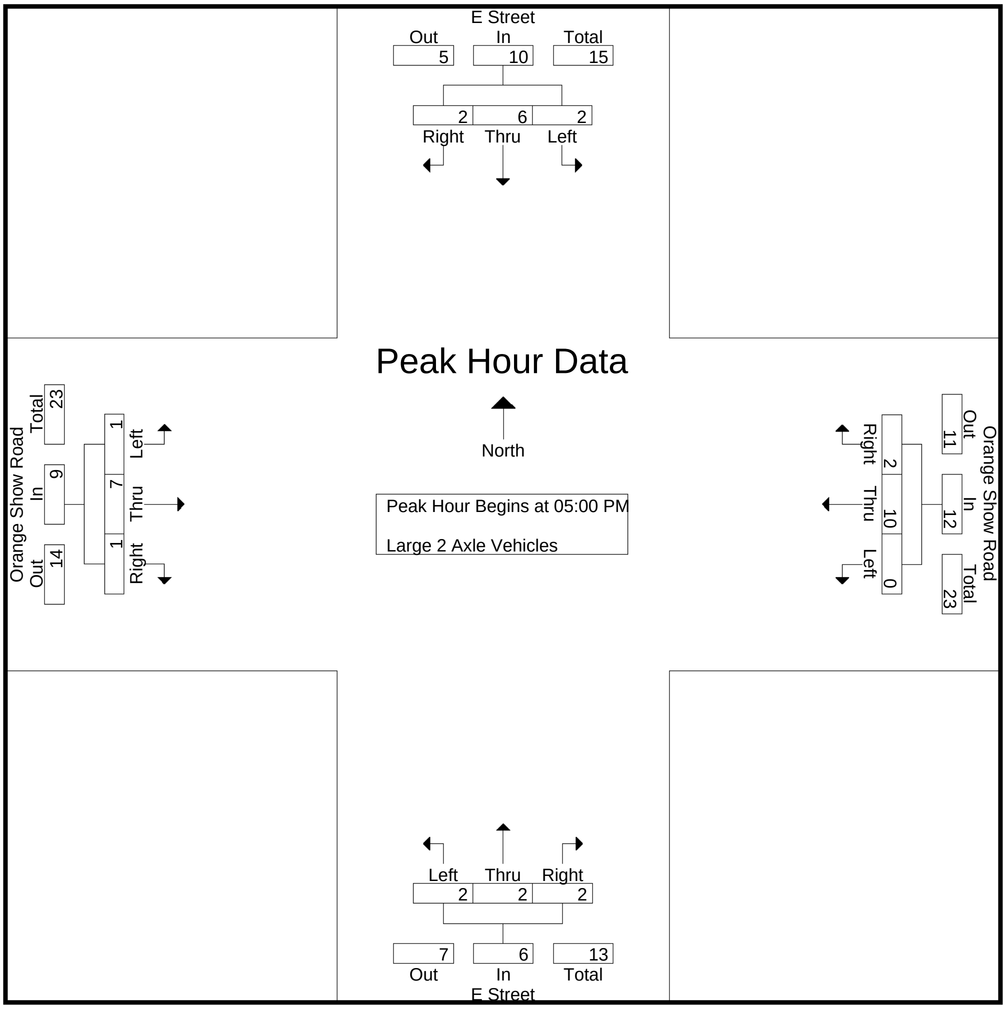

Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	**1**	**3**	**1**	**5**	0	**3**	**1**	**4**	**1**	0	0	1	**1**	**3**	**1**	**5**
+15 mins.	0	2	1	3	0	2	0	2	0	**1**	0	1	0	1	0	1
+30 mins.	0	1	0	1	0	2	1	3	1	0	0	1	0	2	0	2
+45 mins.	1	0	0	1	0	3	0	3	0	1	**2**	**3**	0	1	0	1
Total Volume	2	6	2	10	0	10	2	12	2	2	2	6	1	7	1	9
% App. Total	20	60	20		0	83.3	16.7		33.3	33.3	33.3		11.1	77.8	11.1	
PHF	.500	.500	.500	.500	.000	.833	.500	.750	.500	.500	.250	.500	.250	.583	.250	.450

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City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : SBCESORPM
Site Code : 07515438
Start Date : 8/18/2015
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Groups Printed- 3 Axle Vehicles

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	2	0	2	0	4	0	4	1	2	0	3	0	2	0	2	11
04:15 PM	0	2	0	2	0	2	0	2	0	0	0	0	0	2	0	2	6
04:30 PM	0	0	0	0	0	1	0	1	0	3	0	3	0	1	0	1	5
04:45 PM	0	2	0	2	0	1	0	1	1	1	0	2	1	4	0	5	10
Total	0	6	0	6	0	8	0	8	2	6	0	8	1	9	0	10	32
05:00 PM	0	2	0	2	0	1	0	1	0	1	0	1	0	2	0	2	6
05:15 PM	0	2	0	2	1	1	0	2	0	2	0	2	0	3	1	4	10
05:30 PM	0	1	0	1	0	4	0	4	0	1	0	1	0	1	0	1	7
05:45 PM	0	1	0	1	0	1	0	1	1	0	0	1	0	2	0	2	5
Total	0	6	0	6	1	7	0	8	1	4	0	5	0	8	1	9	28
Grand Total	0	12	0	12	1	15	0	16	3	10	0	13	1	17	1	19	60
Apprch %	0	100	0		6.2	93.8	0		23.1	76.9	0		5.3	89.5	5.3		
Total %	0	20	0	20	1.7	25	0	26.7	5	16.7	0	21.7	1.7	28.3	1.7	31.7	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**2**	0	**2**	0	1	0	1	0	1	0	1	0	2	0	2	6
05:15 PM	0	2	0	2	**1**	1	0	2	0	**2**	0	**2**	0	**3**	**1**	**4**	**10**
05:30 PM	0	1	0	1	0	**4**	0	**4**	0	1	0	1	0	1	0	1	7
05:45 PM	0	1	0	1	0	1	0	1	**1**	0	0	1	0	2	0	2	5
Total Volume	0	6	0	6	1	7	0	8	1	4	0	5	0	8	1	9	28
% App. Total	0	100	0		12.5	87.5	0		20	80	0		0	88.9	11.1		
PHF	.000	.750	.000	.750	.250	.438	.000	.500	.250	.500	.000	.625	.000	.667	.250	.563	.700

City of San Bernardino
N/S: E Street
E/W: Orange Show Road
Weather: Clear

File Name : SBCESORPM
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Start Date : 8/18/2015
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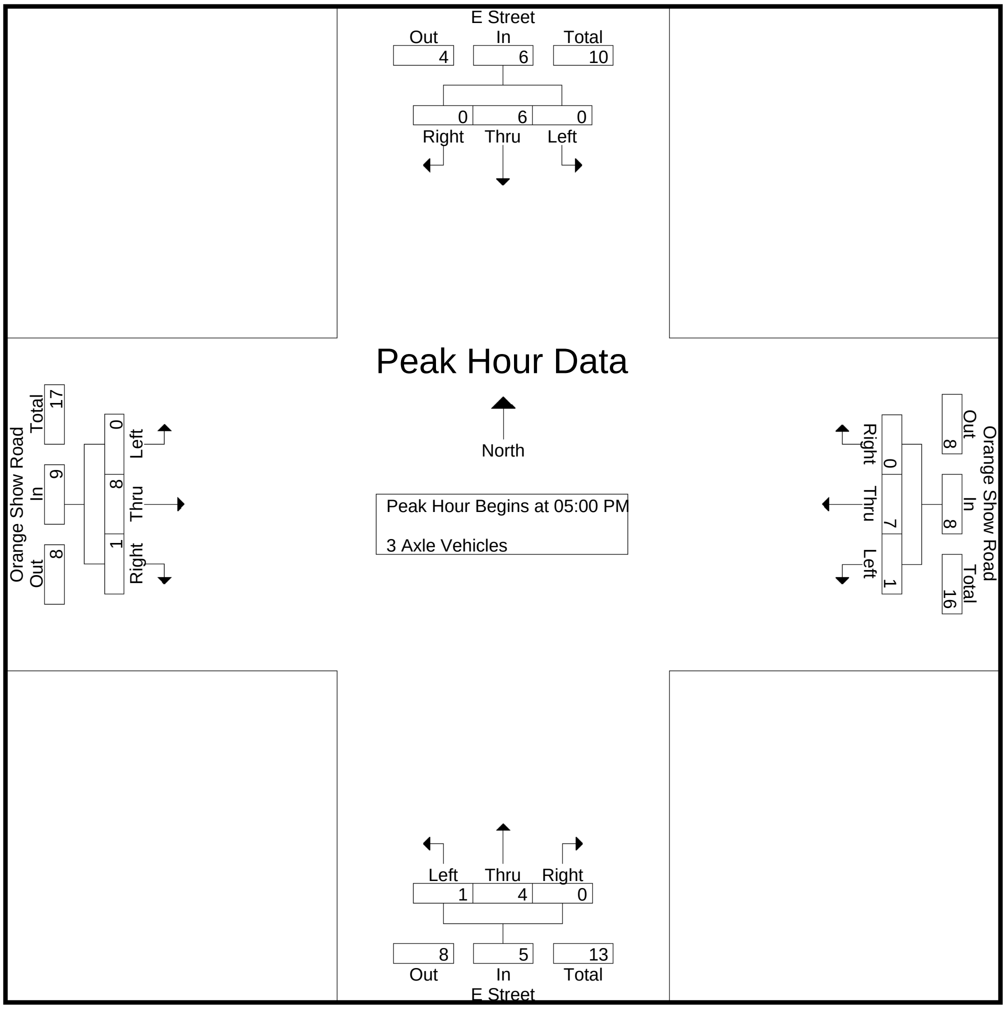

Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	0	**2**	0	**2**	0	1	0	1	0	1	0	1	0	2	0	2
+15 mins.	0	2	0	2	**1**	1	0	2	0	**2**	0	**2**	0	**3**	**1**	**4**
+30 mins.	0	1	0	1	0	**4**	0	**4**	0	1	0	1	0	1	0	1
+45 mins.	0	1	0	1	0	1	0	1	**1**	0	0	1	0	2	0	2
Total Volume	0	6	0	6	1	7	0	8	1	4	0	5	0	8	1	9
% App. Total	0	100	0		12.5	87.5	0		20	80	0		0	88.9	11.1	
PHF	.000	.750	.000	.750	.250	.438	.000	.500	.250	.500	.000	.625	.000	.667	.250	.563

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File Name : SBCESORPM
Site Code : 07515438
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Groups Printed- 4+ Axle Trucks

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	5	0	5	1	0	0	1	1	3	0	4	10
04:15 PM	0	1	1	2	0	6	0	6	0	0	1	1	0	8	0	8	17
04:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	11	1	12	13
04:45 PM	0	0	0	0	0	5	0	5	0	0	0	0	0	4	1	5	10
Total	0	1	1	2	0	17	0	17	1	0	1	2	1	26	2	29	50
05:00 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	6	0	6	9
05:15 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	6	0	6	10
05:30 PM	0	0	0	0	0	4	0	4	0	0	0	0	1	7	0	8	12
05:45 PM	0	0	0	0	0	10	0	10	1	0	0	1	0	10	0	10	21
Total	0	0	0	0	0	21	0	21	1	0	0	1	1	29	0	30	52
Grand Total	0	1	1	2	0	38	0	38	2	0	1	3	2	55	2	59	102
Apprch %	0	50	50		0	100	0		66.7	0	33.3		3.4	93.2	3.4		
Total %	0	1	1	2	0	37.3	0	37.3	2	0	1	2.9	2	53.9	2	57.8	

	E Street Southbound				Orange Show Road Westbound				E Street Northbound				Orange Show Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	6	0	6	9
05:15 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	6	0	6	10
05:30 PM	0	0	0	0	0	4	0	4	0	0	0	0	**1**	7	0	8	12
05:45 PM	0	0	0	0	0	**10**	0	**10**	**1**	0	0	**1**	0	**10**	0	**10**	**21**
Total Volume	0	0	0	0	0	21	0	21	1	0	0	1	1	29	0	30	52
% App. Total	0	0	0		0	100	0		100	0	0		3.3	96.7	0		
PHF	.000	.000	.000	.000	.000	.525	.000	.525	.250	.000	.000	.250	.250	.725	.000	.750	.619

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City of San Bernardino
N/S: E Street
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File Name : SBCESORPM
Site Code : 07515438
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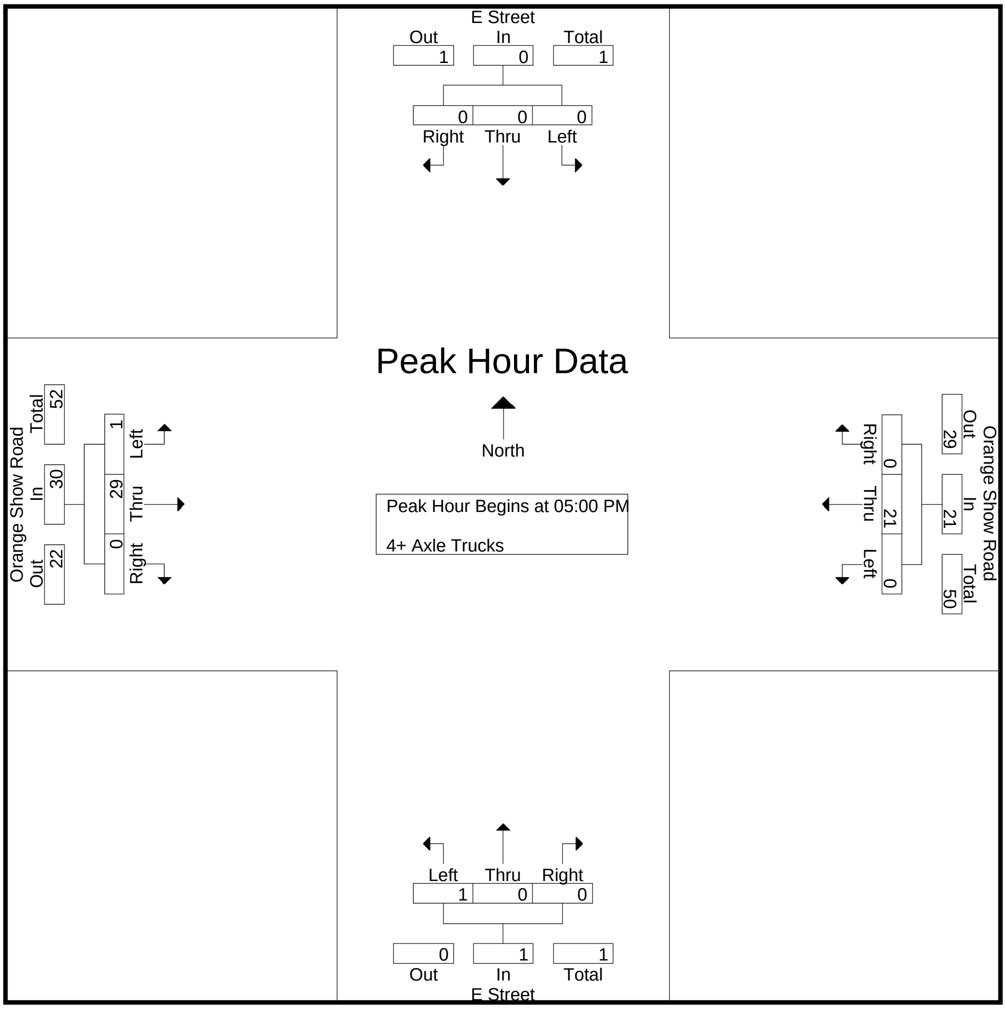

Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	0	0	0	0	0	3	0	3	0	0	0	0	0	6	0	6
+15 mins.	0	0	0	0	0	4	0	4	0	0	0	0	0	6	0	6
+30 mins.	0	0	0	0	0	4	0	4	0	0	0	0	**1**	7	0	8
+45 mins.	0	0	0	0	0	**10**	0	**10**	**1**	0	0	**1**	0	**10**	0	**10**
Total Volume	0	0	0	0	0	21	0	21	1	0	0	1	1	29	0	30
% App. Total	0	0	0		0	100	0		100	0	0		3.3	96.7	0	
PHF	.000	.000	.000	.000	.000	.525	.000	.525	.250	.000	.000	.250	.250	.725	.000	.750

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City of San Bernardino
N/S: E Street
E/W: Chandler Place
Weather: Clear

File Name : 02_SBC_E_CH AM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	11	87	98	0	2	0	2	34	0	0	34	0	134	134
07:15 AM	10	116	126	1	5	4	6	54	1	0	55	4	187	191
07:30 AM	8	93	101	0	2	2	2	45	1	0	46	2	149	151
07:45 AM	6	113	119	0	4	4	4	60	1	0	61	4	184	188
Total	35	409	444	1	13	10	14	193	3	0	196	10	654	664
08:00 AM	16	81	97	0	5	2	5	58	5	0	63	2	165	167
08:15 AM	8	95	103	2	4	4	6	48	1	0	49	4	158	162
08:30 AM	6	84	90	0	4	4	4	61	2	0	63	4	157	161
08:45 AM	10	73	83	0	4	3	4	66	0	0	66	3	153	156
Total	40	333	373	2	17	13	19	233	8	0	241	13	633	646
Grand Total	75	742	817	3	30	23	33	426	11	0	437	23	1287	1310
Apprch %	9.2	90.8		9.1	90.9			97.5	2.5					
Total %	5.8	57.7	63.5	0.2	2.3		2.6	33.1	0.9		34	1.8	98.2	
Passenger Vehicles	63	712	775	3	21		40	373	10		383	0	0	1198
% Passenger Vehicles	84	96	94.9	100	70	69.6	71.4	87.6	90.9	0	87.6	0	0	91.5
Large 2 Axle Vehicles	7	20	27	0	4		8	36	1		37	0	0	72
% Large 2 Axle Vehicles	9.3	2.7	3.3	0	13.3	17.4	14.3	8.5	9.1	0	8.5	0	0	5.5
3 Axle Vehicles	1	7	8	0	1		1	8	0		8	0	0	17
% 3 Axle Vehicles	1.3	0.9	1	0	3.3	0	1.8	1.9	0	0	1.8	0	0	1.3
4+ Axle Trucks	4	3	7	0	4		7	9	0		9	0	0	23
% 4+ Axle Trucks	5.3	0.4	0.9	0	13.3	13	12.5	2.1	0	0	2.1	0	0	1.8

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	10	**116**	**126**	**1**	**5**	**6**	54	1	55	**187**
07:30 AM	8	93	101	0	2	2	45	1	46	149
07:45 AM	6	113	119	0	4	4	**60**	1	61	184
08:00 AM	**16**	81	97	0	5	5	58	**5**	**63**	165
Total Volume	40	403	443	1	16	17	217	8	225	685
% App. Total	9	91		5.9	94.1		96.4	3.6		
PHF	.625	.869	.879	.250	.800	.708	.904	.400	.893	.916

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City of San Bernardino
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File Name : 02_SBC_E_CH AM
Site Code : 05121147
Start Date : 4/8/2021
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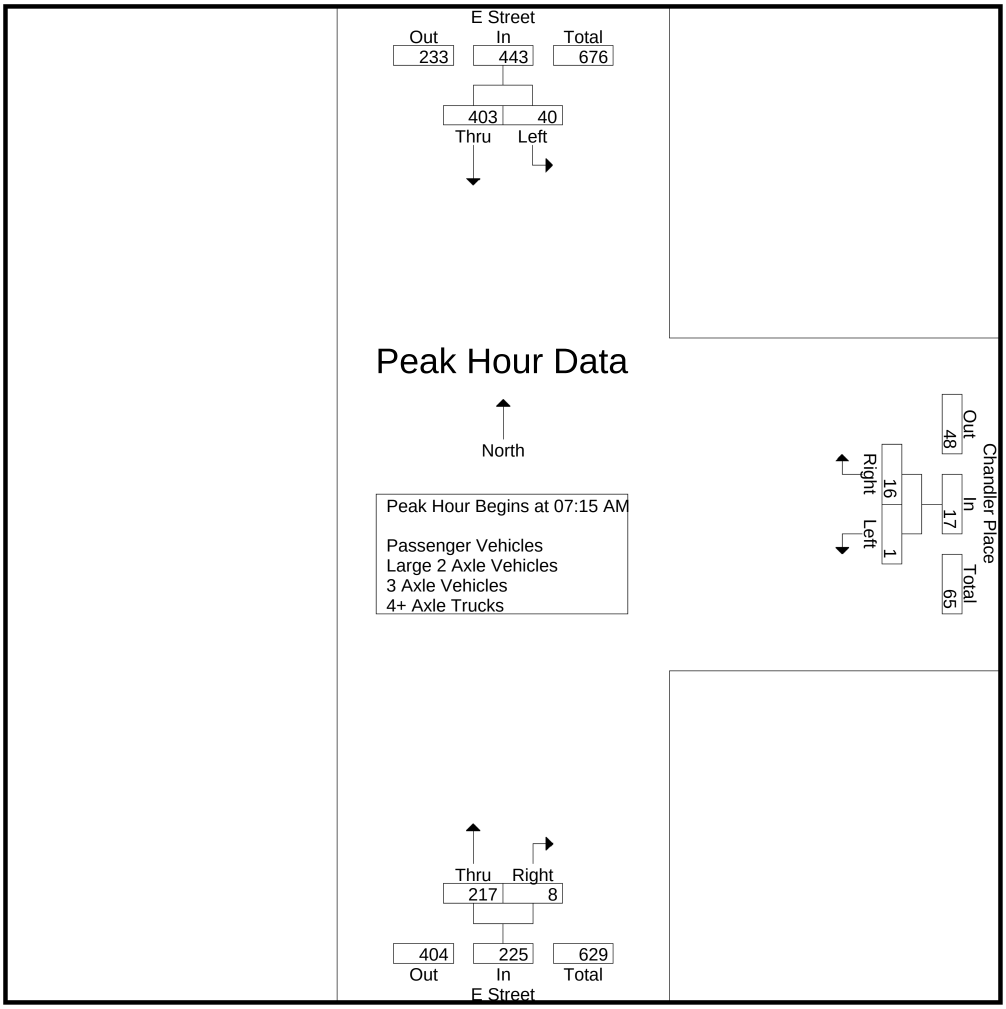

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:45 AM			08:00 AM		
+0 mins.	**11**	87	98	0	4	4	58	**5**	63
+15 mins.	10	**116**	**126**	0	**5**	5	48	1	49
+30 mins.	8	93	101	**2**	4	**6**	61	2	63
+45 mins.	6	113	119	0	4	4	**66**	0	**66**
Total Volume	35	409	444	2	17	19	233	8	241
% App. Total	7.9	92.1		10.5	89.5		96.7	3.3	
PHF	.795	.881	.881	.250	.850	.792	.883	.400	.913

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City of San Bernardino
N/S: E Street
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Weather: Clear

File Name : 02_SBC_E_CH AM
Site Code : 05121147
Start Date : 4/8/2021
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Groups Printed- Passenger Vehicles

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	9	85	94	0	1	0	1	31	0	0	31	0	126	126
07:15 AM	10	113	123	1	4	3	5	46	1	0	47	3	175	178
07:30 AM	7	91	98	0	1	1	1	37	1	0	38	1	137	138
07:45 AM	5	108	113	0	2	2	2	50	1	0	51	2	166	168
Total	31	397	428	1	8	6	9	164	3	0	167	6	604	610
08:00 AM	14	74	88	0	4	1	4	54	5	0	59	1	151	152
08:15 AM	7	92	99	2	3	3	5	40	0	0	40	3	144	147
08:30 AM	4	80	84	0	4	4	4	56	2	0	58	4	146	150
08:45 AM	7	69	76	0	2	2	2	59	0	0	59	2	137	139
Total	32	315	347	2	13	10	15	209	7	0	216	10	578	588
Grand Total	63	712	775	3	21	16	24	373	10	0	383	16	1182	1198
Apprch %	8.1	91.9		12.5	87.5			97.4	2.6					
Total %	5.3	60.2	65.6	0.3	1.8		2	31.6	0.8		32.4	1.3	98.7	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	10	**113**	**123**	**1**	**4**	**5**	46	1	47	**175**
07:30 AM	7	91	98	0	1	1	37	1	38	137
07:45 AM	5	108	113	0	2	2	50	1	51	166
08:00 AM	**14**	74	88	0	4	4	**54**	**5**	**59**	151
Total Volume	36	386	422	1	11	12	187	8	195	629
% App. Total	8.5	91.5		8.3	91.7		95.9	4.1		
PHF	.643	.854	.858	.250	.688	.600	.866	.400	.826	.899

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City of San Bernardino
N/S: E Street
E/W: Chandler Place
Weather: Clear

File Name : 02_SBC_E_CH AM
Site Code : 05121147
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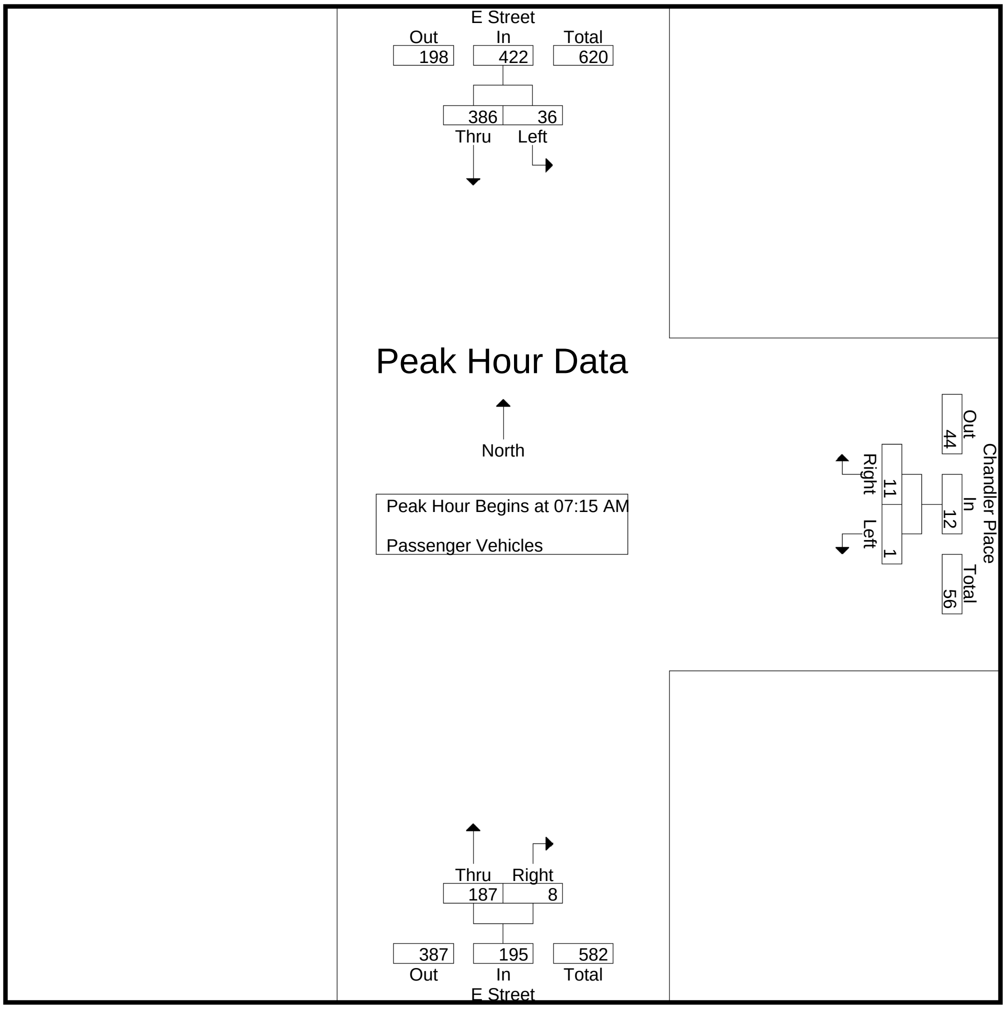

Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:15 AM			07:15 AM		
+0 mins.	10	**113**	**123**	**1**	**4**	**5**	46	1	47
+15 mins.	7	91	98	0	1	1	37	1	38
+30 mins.	5	108	113	0	2	2	50	1	51
+45 mins.	**14**	74	88	0	4	4	**54**	**5**	**59**
Total Volume	36	386	422	1	11	12	187	8	195
% App. Total	8.5	91.5		8.3	91.7		95.9	4.1	
PHF	.643	.854	.858	.250	.688	.600	.866	.400	.826

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Groups Printed- Large 2 Axle Vehicles

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	1	0	0	0	0	2	0	0	2	0	3	3
07:15 AM	0	1	1	0	1	1	1	6	0	0	6	1	8	9
07:30 AM	1	2	3	0	0	0	0	5	0	0	5	0	8	8
07:45 AM	1	2	3	0	1	1	1	9	0	0	9	1	13	14
Total	2	6	8	0	2	2	2	22	0	0	22	2	32	34
08:00 AM	1	6	7	0	1	1	1	1	0	0	1	1	9	10
08:15 AM	1	1	2	0	1	1	1	7	1	0	8	1	11	12
08:30 AM	2	3	5	0	0	0	0	1	0	0	1	0	6	6
08:45 AM	1	4	5	0	0	0	0	5	0	0	5	0	10	10
Total	5	14	19	0	2	2	2	14	1	0	15	2	36	38
Grand Total	7	20	27	0	4	4	4	36	1	0	37	4	68	72
Apprch %	25.9	74.1		0	100			97.3	2.7					
Total %	10.3	29.4	39.7	0	5.9		5.9	52.9	1.5		54.4	5.6	94.4	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	0	1	1	0	**1**	**1**	6	0	6	8
07:30 AM	**1**	2	3	0	0	0	5	0	5	8
07:45 AM	1	2	3	0	1	1	**9**	0	**9**	**13**
08:00 AM	1	**6**	**7**	0	1	1	1	0	1	9
Total Volume	3	11	14	0	3	3	21	0	21	38
% App. Total	21.4	78.6		0	100		100	0		
PHF	.750	.458	.500	.000	.750	.750	.583	.000	.583	.731

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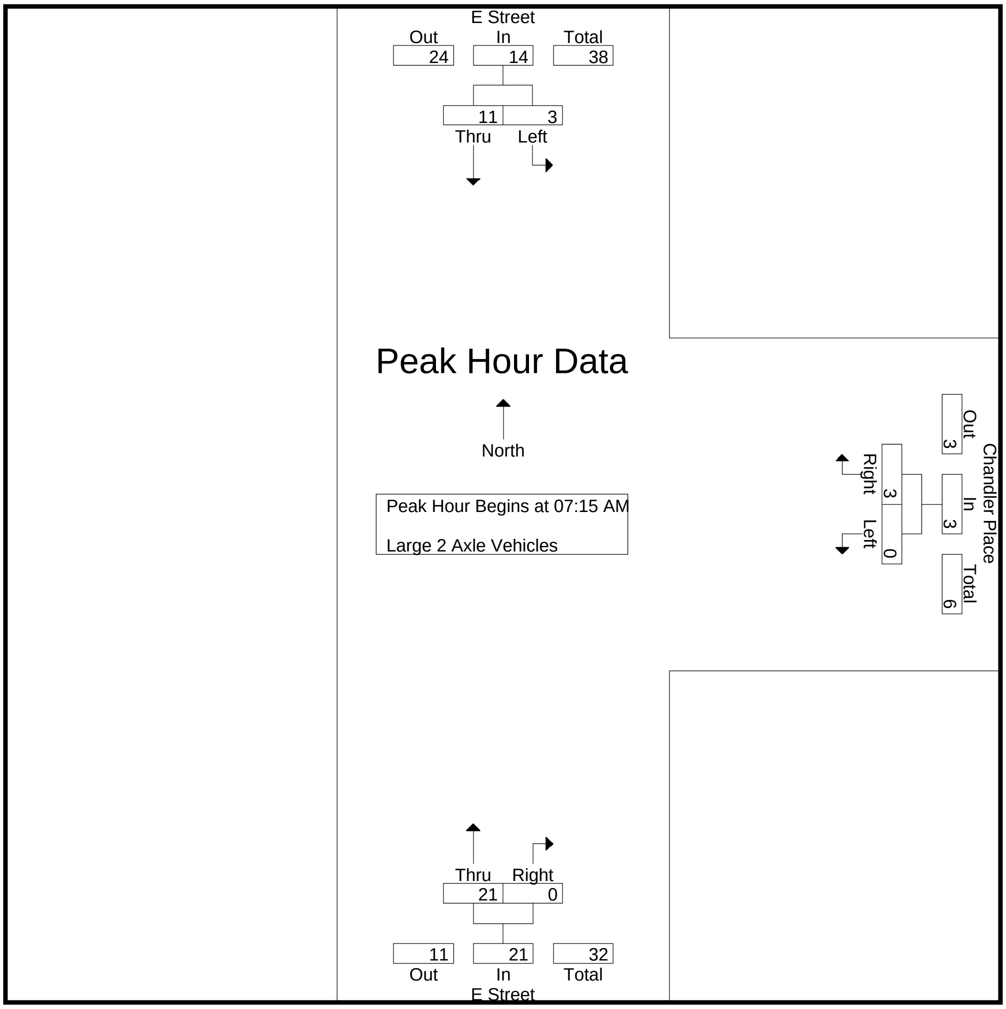

Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:15 AM			07:15 AM		
+0 mins.	0	1	1	0	**1**	**1**	6	0	6
+15 mins.	**1**	2	3	0	0	0	5	0	5
+30 mins.	1	2	3	0	1	1	**9**	0	**9**
+45 mins.	1	**6**	**7**	0	1	1	1	0	1
Total Volume	3	11	14	0	3	3	21	0	21
% App. Total	21.4	78.6		0	100		100	0	
PHF	.750	.458	.500	.000	.750	.750	.583	.000	.583

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Groups Printed- 3 Axle Vehicles

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	1	0	1	0	1	1	0	0	1	0	3	3
07:15 AM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
07:30 AM	0	0	0	0	0	0	0	2	0	0	2	0	2	2
07:45 AM	0	2	2	0	0	0	0	0	0	0	0	0	2	2
Total	0	4	4	0	1	0	1	4	0	0	4	0	9	9
08:00 AM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
08:15 AM	0	1	1	0	0	0	0	0	0	0	0	0	1	1
08:30 AM	0	1	1	0	0	0	0	2	0	0	2	0	3	3
08:45 AM	1	0	1	0	0	0	0	1	0	0	1	0	2	2
Total	1	3	4	0	0	0	0	4	0	0	4	0	8	8
Grand Total	1	7	8	0	1	0	1	8	0	0	8	0	17	17
Apprch %	12.5	87.5		0	100			100	0					
Total %	5.9	41.2	47.1	0	5.9		5.9	47.1	0		47.1	0	100	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	0	1	1	0	0	0	1	0	1	**2**
07:30 AM	0	0	0	0	0	0	**2**	0	**2**	2
07:45 AM	0	**2**	**2**	0	0	0	0	0	0	2
08:00 AM	0	1	1	0	0	0	1	0	1	2
Total Volume	0	4	4	0	0	0	4	0	4	8
% App. Total	0	100		0	0		100	0		
PHF	.000	.500	.500	.000	.000	.000	.500	.000	.500	1.00

City of San Bernardino
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Weather: Clear

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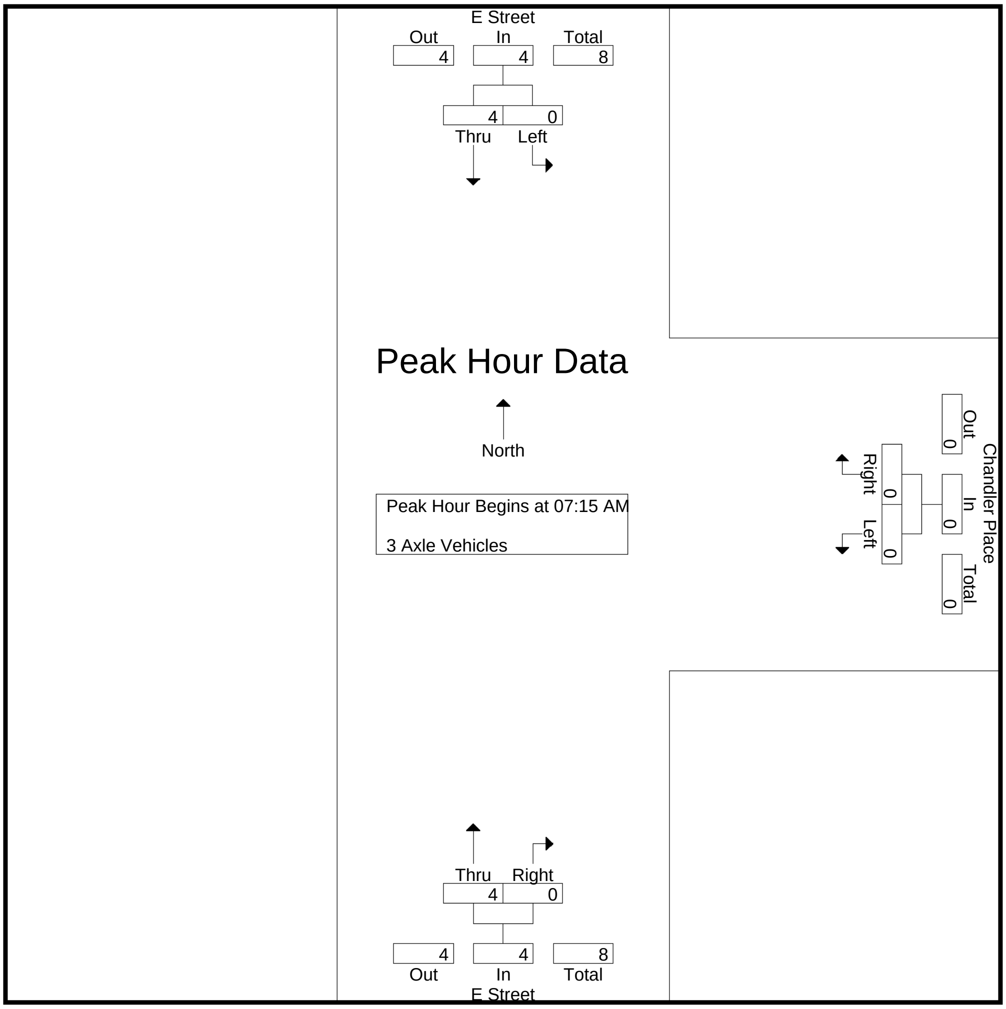

Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:15 AM			07:15 AM		
+0 mins.	0	1	1	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	0	**2**	0	**2**
+30 mins.	0	**2**	**2**	0	0	0	0	0	0
+45 mins.	0	1	1	0	0	0	1	0	1
Total Volume	0	4	4	0	0	0	4	0	4
% App. Total	0	100		0	0		100	0	
PHF	.000	.500	.500	.000	.000	.000	.500	.000	.500

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Groups Printed- 4+ Axle Trucks

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	2	0	2	0	0	0	0	0	0	0	0	0	2	2
07:15 AM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
07:30 AM	0	0	0	0	1	1	1	1	0	0	1	1	2	3
07:45 AM	0	1	1	0	1	1	1	1	0	0	1	1	3	4
Total	2	2	4	0	2	2	2	3	0	0	3	2	9	11
08:00 AM	1	0	1	0	0	0	0	2	0	0	2	0	3	3
08:15 AM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
08:30 AM	0	0	0	0	0	0	0	2	0	0	2	0	2	2
08:45 AM	1	0	1	0	2	1	2	1	0	0	1	1	4	5
Total	2	1	3	0	2	1	2	6	0	0	6	1	11	12
Grand Total	4	3	7	0	4	3	4	9	0	0	9	3	20	23
Apprch %	57.1	42.9		0	100			100	0					
Total %	20	15	35	0	20		20	45	0		45	13	87	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	0	**1**	**1**	0	0	0	1	0	1	2
07:30 AM	0	0	0	0	**1**	**1**	1	0	1	2
07:45 AM	0	1	1	0	1	1	1	0	1	**3**
08:00 AM	**1**	0	1	0	0	0	**2**	0	**2**	3
Total Volume	1	2	3	0	2	2	5	0	5	10
% App. Total	33.3	66.7		0	100		100	0		
PHF	.250	.500	.750	.000	.500	.500	.625	.000	.625	.833

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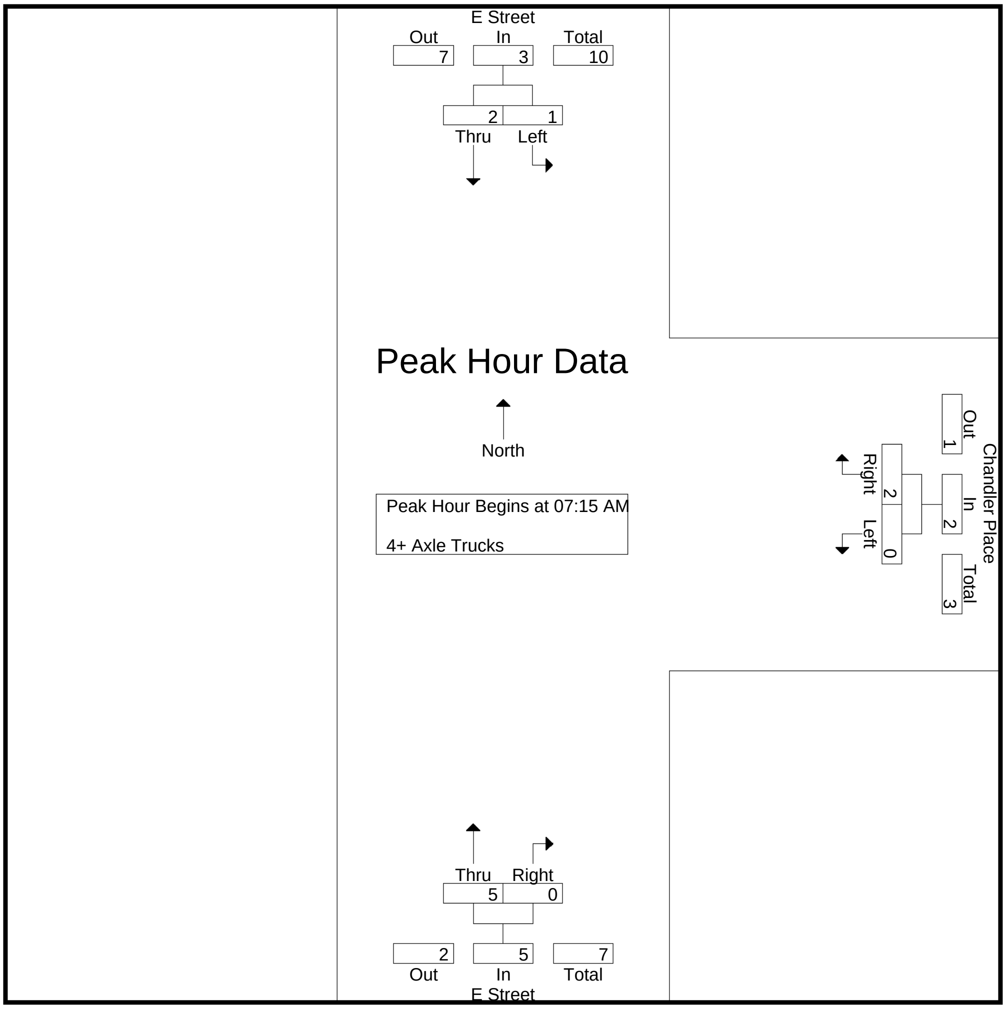

Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:15 AM			07:15 AM		
+0 mins.	0	**1**	**1**	0	0	0	1	0	1
+15 mins.	0	0	0	0	**1**	**1**	1	0	1
+30 mins.	0	1	1	0	1	1	1	0	1
+45 mins.	**1**	0	1	0	0	0	**2**	0	**2**
Total Volume	1	2	3	0	2	2	5	0	5
% App. Total	33.3	66.7		0	100		100	0	
PHF	.250	.500	.750	.000	.500	.500	.625	.000	.625

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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	8	189	197	5	13	4	18	169	1	0	170	4	385	389
04:15 PM	6	162	168	2	8	6	10	186	1	0	187	6	365	371
04:30 PM	12	163	175	7	9	4	16	177	1	0	178	4	369	373
04:45 PM	10	182	192	2	2	2	4	156	1	0	157	2	353	355
Total	36	696	732	16	32	16	48	688	4	0	692	16	1472	1488
05:00 PM	9	152	161	4	14	5	18	254	2	0	256	5	435	440
05:15 PM	11	173	184	1	4	4	5	202	2	0	204	4	393	397
05:30 PM	8	147	155	1	8	6	9	167	0	0	167	6	331	337
05:45 PM	6	125	131	2	4	3	6	144	0	0	144	3	281	284
Total	34	597	631	8	30	18	38	767	4	0	771	18	1440	1458
Grand Total	70	1293	1363	24	62	34	86	1455	8	0	1463	34	2912	2946
Apprch %	5.1	94.9		27.9	72.1			99.5	0.5					
Total %	2.4	44.4	46.8	0.8	2.1		3	50	0.3		50.2	1.2	98.8	
Passenger Vehicles	66	1254	1320	22	59		113	1428	7		1435	0	0	2868
% Passenger Vehicles	94.3	97	96.8	91.7	95.2	94.1	94.2	98.1	87.5	0	98.1	0	0	97.4
Large 2 Axle Vehicles	2	23	25	1	2		5	17	1		18	0	0	48
% Large 2 Axle Vehicles	2.9	1.8	1.8	4.2	3.2	5.9	4.2	1.2	12.5	0	1.2	0	0	1.6
3 Axle Vehicles	1	10	11	1	0		1	6	0		6	0	0	18
% 3 Axle Vehicles	1.4	0.8	0.8	4.2	0	0	0.8	0.4	0	0	0.4	0	0	0.6
4+ Axle Trucks	1	6	7	0	1		1	4	0		4	0	0	12
% 4+ Axle Trucks	1.4	0.5	0.5	0	1.6	0	0.8	0.3	0	0	0.3	0	0	0.4

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	**12**	163	175	**7**	9	16	177	1	178	369
04:45 PM	10	**182**	**192**	2	2	4	156	1	157	353
05:00 PM	9	152	161	4	**14**	**18**	**254**	**2**	**256**	**435**
05:15 PM	11	173	184	1	4	5	202	2	204	393
Total Volume	42	670	712	14	29	43	789	6	795	1550
% App. Total	5.9	94.1		32.6	67.4		99.2	0.8		
PHF	.875	.920	.927	.500	.518	.597	.777	.750	.776	.891

City of San Bernardino
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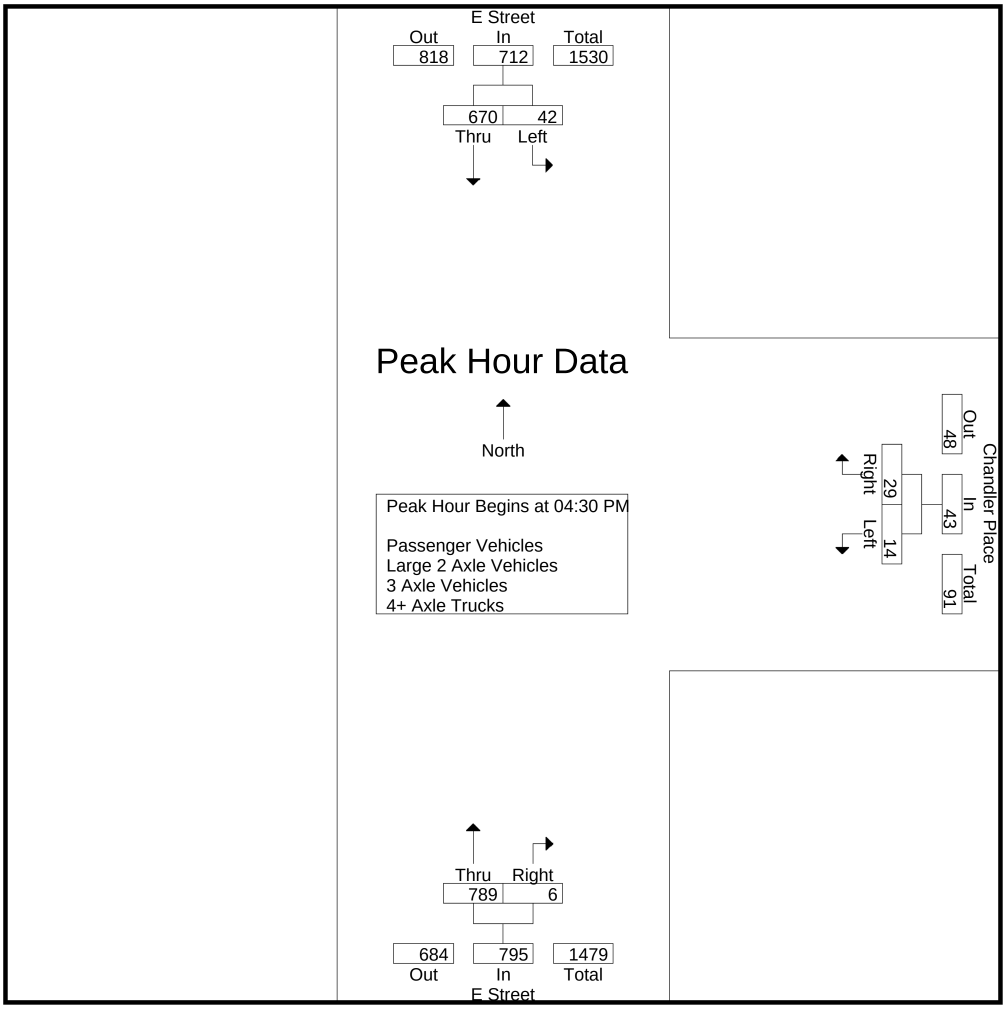

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:30 PM		
+0 mins.	8	**189**	**197**	5	**13**	**18**	177	1	178
+15 mins.	6	162	168	2	8	10	156	1	157
+30 mins.	**12**	163	175	**7**	9	16	**254**	**2**	**256**
+45 mins.	10	182	192	2	2	4	202	2	204
Total Volume	36	696	732	16	32	48	789	6	795
% App. Total	4.9	95.1		33.3	66.7		99.2	0.8	
PHF	.750	.921	.929	.571	.615	.667	.777	.750	.776

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Groups Printed- Passenger Vehicles

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	8	184	192	5	13	4	18	166	1	0	167	4	377	381
04:15 PM	6	157	163	2	8	6	10	182	1	0	183	6	356	362
04:30 PM	12	155	167	6	9	4	15	175	1	0	176	4	358	362
04:45 PM	9	172	181	2	2	2	4	152	1	0	153	2	338	340
Total	35	668	703	15	32	16	47	675	4	0	679	16	1429	1445
05:00 PM	7	148	155	4	12	4	16	252	1	0	253	4	424	428
05:15 PM	10	172	182	1	4	4	5	197	2	0	199	4	386	390
05:30 PM	8	145	153	1	8	6	9	164	0	0	164	6	326	332
05:45 PM	6	121	127	1	3	2	4	140	0	0	140	2	271	273
Total	31	586	617	7	27	16	34	753	3	0	756	16	1407	1423
Grand Total	66	1254	1320	22	59	32	81	1428	7	0	1435	32	2836	2868
Apprch %	5	95		27.2	72.8			99.5	0.5					
Total %	2.3	44.2	46.5	0.8	2.1		2.9	50.4	0.2		50.6	1.1	98.9	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	**12**	155	167	**6**	9	15	175	1	176	358
04:45 PM	9	**172**	181	2	2	4	152	1	153	338
05:00 PM	7	148	155	4	**12**	**16**	**252**	1	**253**	**424**
05:15 PM	10	172	**182**	1	4	5	197	**2**	199	386
Total Volume	38	647	685	13	27	40	776	5	781	1506
% App. Total	5.5	94.5		32.5	67.5		99.4	0.6		
PHF	.792	.940	.941	.542	.563	.625	.770	.625	.772	.888

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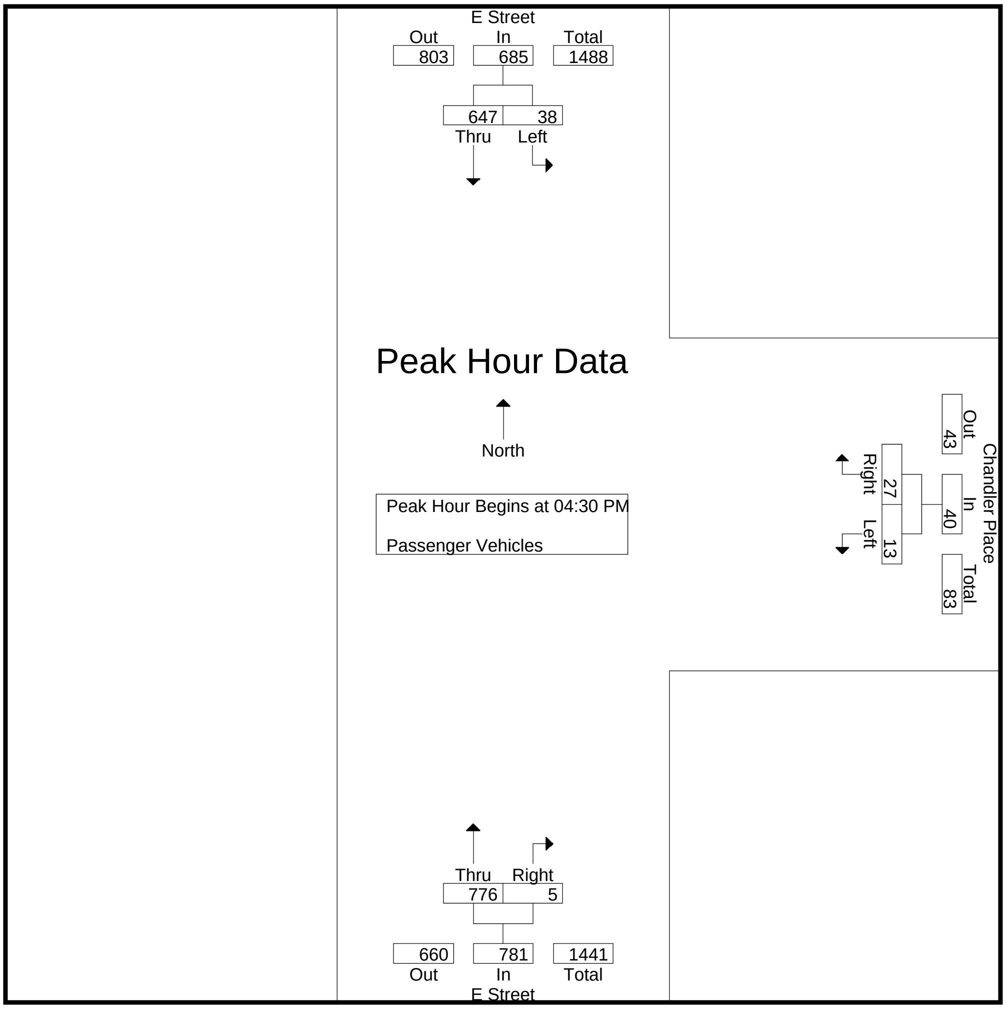

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	**12**	155	167	**6**	9	15	175	1	176
+15 mins.	9	**172**	181	2	2	4	152	1	153
+30 mins.	7	148	155	4	**12**	**16**	**252**	1	**253**
+45 mins.	10	172	**182**	1	4	5	197	**2**	199
Total Volume	38	647	685	13	27	40	776	5	781
% App. Total	5.5	94.5		32.5	67.5		99.4	0.6	
PHF	.792	.940	.941	.542	.563	.625	.770	.625	.772

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Groups Printed- Large 2 Axle Vehicles

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	3	3	0	0	0	0	3	0	0	3	0	6	6
04:15 PM	0	1	1	0	0	0	0	3	0	0	3	0	4	4
04:30 PM	0	7	7	1	0	0	1	1	0	0	1	0	9	9
04:45 PM	1	7	8	0	0	0	0	2	0	0	2	0	10	10
Total	1	18	19	1	0	0	1	9	0	0	9	0	29	29
05:00 PM	1	2	3	0	1	1	1	1	1	0	2	1	6	7
05:15 PM	0	0	0	0	0	0	0	3	0	0	3	0	3	3
05:30 PM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
05:45 PM	0	2	2	0	1	1	1	3	0	0	3	1	6	7
Total	1	5	6	0	2	2	2	8	1	0	9	2	17	19
Grand Total	2	23	25	1	2	2	3	17	1	0	18	2	46	48
Apprch %	8	92		33.3	66.7			94.4	5.6					
Total %	4.3	50	54.3	2.2	4.3		6.5	37	2.2		39.1	4.2	95.8	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	**7**	7	**1**	0	**1**	1	0	1	9
04:45 PM	**1**	7	**8**	0	0	0	2	0	2	**10**
05:00 PM	1	2	3	0	**1**	1	1	**1**	2	6
05:15 PM	0	0	0	0	0	0	**3**	0	**3**	3
Total Volume	2	16	18	1	1	2	7	1	8	28
% App. Total	11.1	88.9		50	50		87.5	12.5		
PHF	.500	.571	.563	.250	.250	.500	.583	.250	.667	.700

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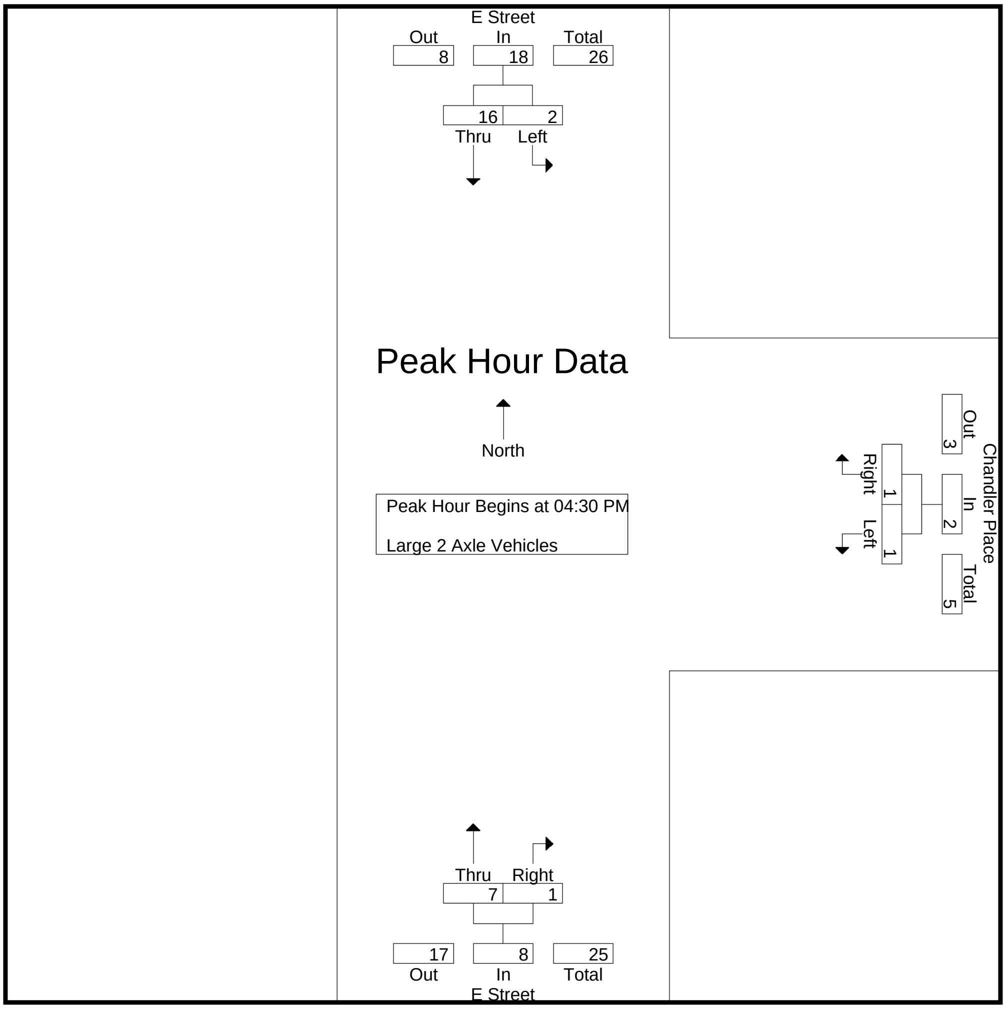
City of San Bernardino
N/S: E Street
E/W: Chandler Place
Weather: Clear

File Name : 02_SBC_E_CH PM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	**7**	7	**1**	0	**1**	1	0	1
+15 mins.	**1**	7	**8**	0	0	0	2	0	2
+30 mins.	1	2	3	0	**1**	1	1	**1**	2
+45 mins.	0	0	0	0	0	0	**3**	0	**3**
Total Volume	2	16	18	1	1	2	7	1	8
% App. Total	11.1	88.9		50	50		87.5	12.5	
PHF	.500	.571	.563	.250	.250	.500	.583	.250	.667

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City of San Bernardino
N/S: E Street
E/W: Chandler Place
Weather: Clear

File Name : 02_SBC_E_CH PM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- 3 Axle Vehicles

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	0	3	3	0	0	0	0	1	0	0	1	0	4	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	2	2	0	0	0	0	1	0	0	1	0	3	3
Total	0	6	6	0	0	0	0	2	0	0	2	0	8	8
05:00 PM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
05:15 PM	1	1	2	0	0	0	0	1	0	0	1	0	3	3
05:30 PM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
05:45 PM	0	1	1	1	0	0	1	1	0	0	1	0	3	3
Total	1	4	5	1	0	0	1	4	0	0	4	0	10	10
Grand Total	1	10	11	1	0	0	1	6	0	0	6	0	18	18
Apprch %	9.1	90.9		100	0			100	0					
Total %	5.6	55.6	61.1	5.6	0		5.6	33.3	0		33.3	0	100	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	**2**	**2**	0	0	0	**1**	0	**1**	**3**
05:00 PM	0	1	1	0	0	0	1	0	1	2
05:15 PM	**1**	1	2	0	0	0	1	0	1	3
Total Volume	1	4	5	0	0	0	3	0	3	8
% App. Total	20	80		0	0		100	0		
PHF	.250	.500	.625	.000	.000	.000	.750	.000	.750	.667

City of San Bernardino
N/S: E Street
E/W: Chandler Place
Weather: Clear

File Name : 02_SBC_E_CH PM
Site Code : 05121147
Start Date : 4/8/2021
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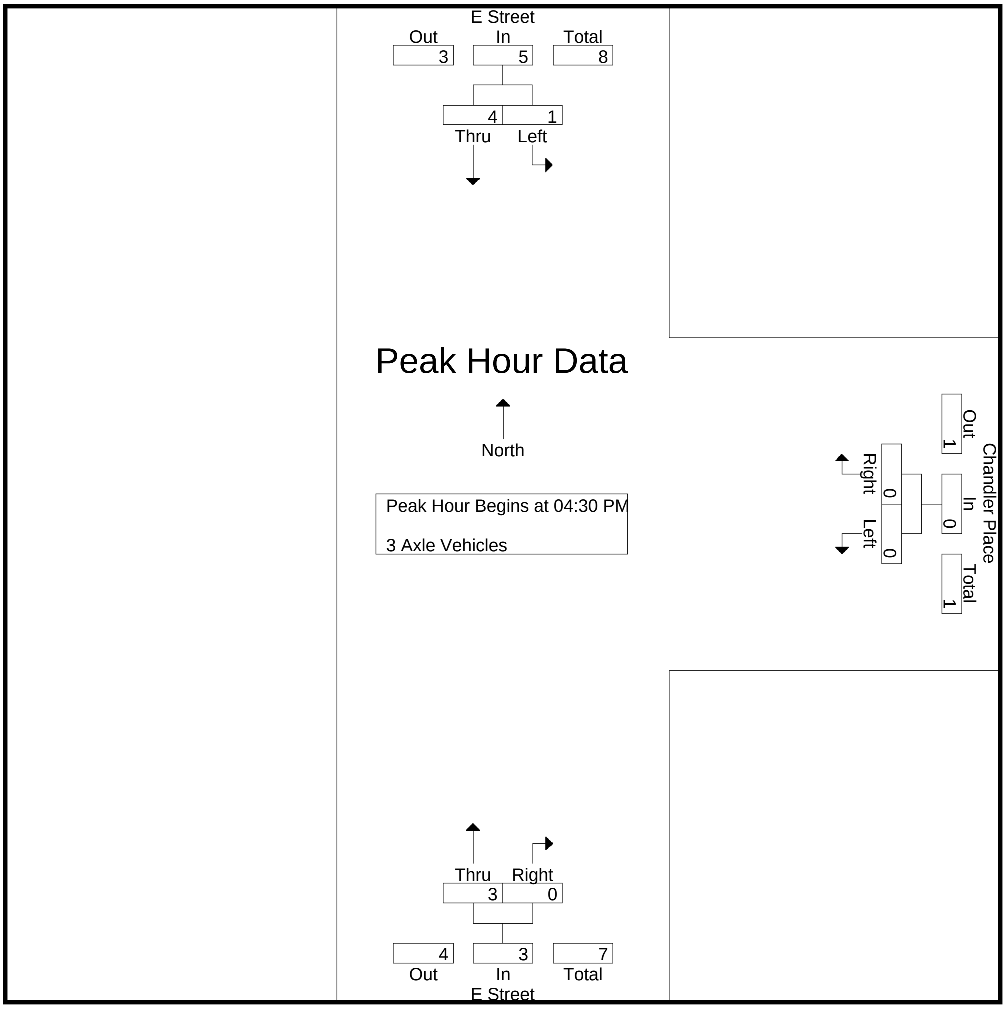

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	**2**	**2**	0	0	0	**1**	0	**1**
+30 mins.	0	1	1	0	0	0	1	0	1
+45 mins.	**1**	1	2	0	0	0	1	0	1
Total Volume	1	4	5	0	0	0	3	0	3
% App. Total	20	80		0	0		100	0	
PHF	.250	.500	.625	.000	.000	.000	.750	.000	.750

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City of San Bernardino
N/S: E Street
E/W: Chandler Place
Weather: Clear

File Name : 02_SBC_E_CH PM
Site Code : 05121147
Start Date : 4/8/2021
Page No : 1

Groups Printed- 4+ Axle Trucks

	E Street Southbound			Chandler Place Westbound				E Street Northbound						
Start Time	Left	Thru	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	0	1	1	0	0	0	0	0	0	0	0	0	1	1
04:30 PM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
04:45 PM	0	1	1	0	0	0	0	1	0	0	1	0	2	2
Total	0	4	4	0	0	0	0	2	0	0	2	0	6	6
05:00 PM	1	1	2	0	1	0	1	0	0	0	0	0	3	3
05:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	1	1
05:30 PM	0	0	0	0	0	0	0	1	0	0	1	0	1	1
05:45 PM	0	1	1	0	0	0	0	0	0	0	0	0	1	1
Total	1	2	3	0	1	0	1	2	0	0	2	0	6	6
Grand Total	1	6	7	0	1	0	1	4	0	0	4	0	12	12
Apprch %	14.3	85.7		0	100			100	0					
Total %	8.3	50	58.3	0	8.3		8.3	33.3	0		33.3	0	100	

	E Street Southbound			Chandler Place Westbound			E Street Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	**1**	1	0	0	0	**1**	0	**1**	2
04:45 PM	0	1	1	0	0	0	1	0	1	2
05:00 PM	**1**	1	**2**	0	**1**	**1**	0	0	0	**3**
05:15 PM	0	0	0	0	0	0	1	0	1	1
Total Volume	1	3	4	0	1	1	3	0	3	8
% App. Total	25	75		0	100		100	0		
PHF	.250	.750	.500	.000	.250	.250	.750	.000	.750	.667

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City of San Bernardino
N/S: E Street
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File Name : 02_SBC_E_CH PM
Site Code : 05121147
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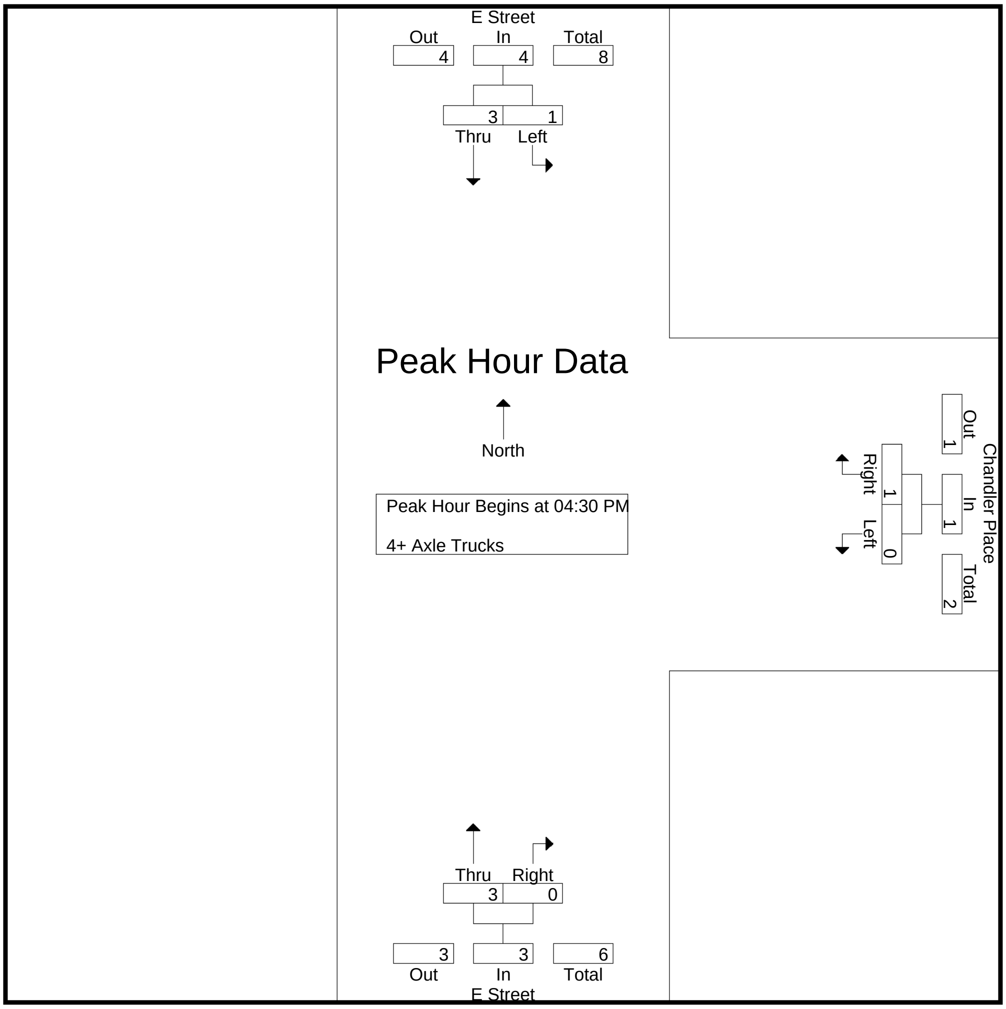

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	**1**	1	0	0	0	**1**	0	**1**
+15 mins.	0	1	1	0	0	0	1	0	1
+30 mins.	**1**	1	**2**	0	**1**	**1**	0	0	0
+45 mins.	0	0	0	0	0	0	1	0	1
Total Volume	1	3	4	0	1	1	3	0	3
% App. Total	25	75		0	100		100	0	
PHF	.250	.750	.500	.000	.250	.250	.750	.000	.750

Location: San Bernardino
N/S: E Street
E/W: Chandler Place

Date: 4/8/2021
Day: Thursday

PEDESTRIANS

	North Leg	East Leg	South Leg	West Leg	
	E Street	Chandler Place	E Street	Dead End	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg	East Leg	South Leg	West Leg	
	E Street	Chandler Place	E Street	Dead End	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	1	0	0	0	1
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	3	3
5:00 PM	0	0	0	0	0
5:15 PM	0	1	0	0	1
5:30 PM	0	2	1	3	6
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	1	3	1	6	11

Location: San Bernardino
N/S: E Street
E/W: Chandler Place

Date: 4/8/2021
Day: Thursday

BICYCLES

	Southbound E Street			Westbound Chandler Place			Northbound E Street			Eastbound Dead End			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0	0	0	4	0	0	0	0	4

	Southbound E Street			Westbound Chandler Place			Northbound E Street			Eastbound Dead End			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	1	1	0	0	0	1	3
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
5:30 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	2	0	0	0	1	1	3	0	0	0	1	8

APPENDIX 3.2:

EXISTING (2021) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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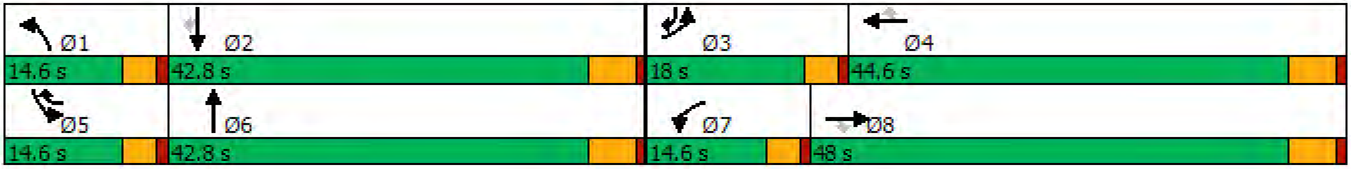
1: E St. & Orange Show Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	263	956	402	90	459	32	116	104	61	148	68
Future Volume (vph)	263	956	402	90	459	32	116	104	61	148	68
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.6	46.4	46.4	14.6	44.4	14.6	14.6	38.3	14.6	42.3	14.6
Total Split (s)	18.0	48.0	48.0	14.6	44.6	14.6	14.6	42.8	14.6	42.8	18.0
Total Split (%)	15.0%	40.0%	40.0%	12.2%	37.2%	12.2%	12.2%	35.7%	12.2%	35.7%	15.0%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	12.4	45.6	45.6	10.2	40.3	55.9	9.5	17.5	10.1	15.0	28.8
Actuated g/C Ratio	0.13	0.47	0.47	0.11	0.42	0.58	0.10	0.18	0.10	0.16	0.30
v/c Ratio	0.63	0.61	0.45	0.26	0.33	0.04	0.37	0.25	0.18	0.29	0.14
Control Delay	47.9	23.2	4.7	44.2	21.4	2.0	46.0	24.3	43.9	36.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	23.2	4.7	44.2	21.4	2.0	46.0	24.3	43.9	36.3	5.2
LOS	D	C	A	D	C	A	D	C	D	D	A
Approach Delay		22.6			23.9			33.6		30.3	
Approach LOS		C			C			C		C	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 96.2
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 24.7 Intersection LOS: C
Intersection Capacity Utilization 77.1% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: E St. & Orange Show Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	263	956	402	90	459	32	116	104	49	61	148	68
Future Volume (veh/h)	263	956	402	90	459	32	116	104	49	61	148	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	286	1039	251	98	499	18	126	113	30	66	161	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	385	1688	736	353	1655	882	332	390	100	313	476	388
Arrive On Green	0.11	0.47	0.47	0.10	0.46	0.46	0.09	0.14	0.14	0.09	0.13	0.13
Sat Flow, veh/h	3510	3610	1573	3510	3610	1610	3510	2838	728	3510	3610	1603
Grp Volume(v), veh/h	286	1039	251	98	499	18	126	70	73	66	161	39
Grp Sat Flow(s),veh/h/ln	1755	1805	1573	1755	1805	1610	1755	1805	1761	1755	1805	1603
Q Serve(g_s), s	7.2	19.6	9.2	2.4	7.9	0.5	3.1	3.2	3.4	1.6	3.7	1.7
Cycle Q Clear(g_c), s	7.2	19.6	9.2	2.4	7.9	0.5	3.1	3.2	3.4	1.6	3.7	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	385	1688	736	353	1655	882	332	248	242	313	476	388
V/C Ratio(X)	0.74	0.62	0.34	0.28	0.30	0.02	0.38	0.28	0.30	0.21	0.34	0.10
Avail Cap(c_a), veh/h	539	1688	736	408	1655	882	408	743	725	408	1486	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.3	18.1	15.4	37.9	15.5	9.4	38.7	35.3	35.3	38.5	35.9	26.9
Incr Delay (d2), s/veh	3.5	1.7	1.3	0.4	0.5	0.0	0.7	0.6	0.7	0.3	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	7.8	3.3	1.0	3.1	0.2	1.3	1.4	1.4	0.7	1.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.8	19.8	16.6	38.3	16.0	9.5	39.4	35.9	36.0	38.9	36.4	27.0
LnGrp LOS	D	B	B	D	B	A	D	D	D	D	D	C
Approach Vol, veh/h		1576			615			269			266	
Approach Delay, s/veh		23.5			19.3			37.6			35.6	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	17.3	14.0	47.2	12.1	17.8	13.2	48.0
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	10.6	37.5	14.0	39.2	10.6	37.5	10.6	42.6
Max Q Clear Time (g_c+I1), s	5.1	5.7	9.2	9.9	3.6	5.4	4.4	21.6
Green Ext Time (p_c), s	0.1	1.1	0.4	3.3	0.1	0.7	0.1	8.2

Intersection Summary	
HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

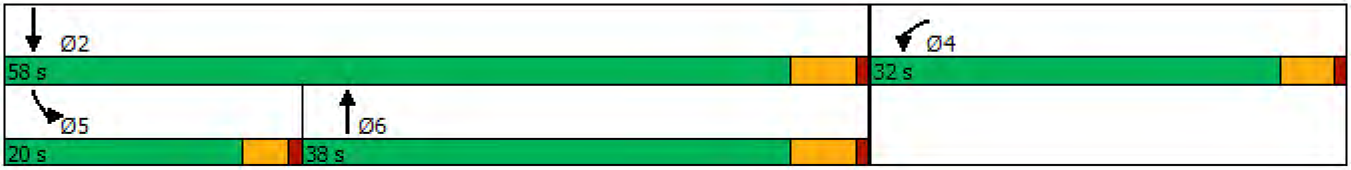
2: E St. & Chandler Pl.

Lane Group	WBL	NBT	SBL	SBT
	↙	↑	↘	↓
Lane Configurations	↰↱	↑↱	↰	↑
Traffic Volume (vph)	1	295	53	508
Future Volume (vph)	1	295	53	508
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.2
Total Split (s)	32.0	38.0	20.0	58.0
Total Split (%)	35.6%	42.2%	22.2%	64.4%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	20.8	24.3	19.5	28.2
Actuated g/C Ratio	0.60	0.70	0.56	0.81
v/c Ratio	0.03	0.13	0.06	0.36
Control Delay	6.9	11.7	16.2	7.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.9	11.7	16.2	7.0
LOS	A	B	B	A
Approach Delay	6.9	11.7		7.9
Approach LOS	A	B		A

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 34.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.36
Intersection Signal Delay: 9.2 Intersection LOS: A
Intersection Capacity Utilization 45.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: E St. & Chandler Pl.



	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↱		↰	↑
Traffic Volume (veh/h)	1	26	295	10	53	508
Future Volume (veh/h)	1	26	295	10	53	508
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	1	12	321	11	58	552
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	6	67	1192	41	298	1195
Arrive On Green	0.05	0.05	0.33	0.33	0.16	0.63
Sat Flow, veh/h	117	1407	3653	122	1810	1900
Grp Volume(v), veh/h	14	0	162	170	58	552
Grp Sat Flow(s),veh/h/ln	1641	0	1805	1875	1810	1900
Q Serve(g_s), s	0.3	0.0	2.0	2.0	0.9	4.7
Cycle Q Clear(g_c), s	0.3	0.0	2.0	2.0	0.9	4.7
Prop In Lane	0.07	0.86		0.06	1.00	
Lane Grp Cap(c), veh/h	78	0	605	628	298	1195
V/C Ratio(X)	0.18	0.00	0.27	0.27	0.19	0.46
Avail Cap(c_a), veh/h	1453	0	1902	1975	936	3230
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	0.0	7.5	7.5	11.1	3.0
Incr Delay (d2), s/veh	1.5	0.0	0.3	0.3	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.5	0.5	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.7	0.0	7.9	7.8	11.5	3.4
LnGrp LOS	B	A	A	A	B	A
Approach Vol, veh/h	14		332			610
Approach Delay, s/veh	15.7		7.9			4.2
Approach LOS	B		A			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		24.9		6.1	9.1	15.8
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		52.6		27.4	16.0	32.6
Max Q Clear Time (g_c+I1), s		6.7		2.3	2.9	4.0
Green Ext Time (p_c), s		5.7		0.0	0.1	2.6

Intersection Summary			
HCM 6th Ctrl Delay			5.6
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	286	849	259	175	832	110	310	434	174	284	177
Future Volume (vph)	286	849	259	175	832	110	310	434	174	284	177
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	46.4	46.4	14.0	44.4	14.0	13.0	38.3	14.0	42.3	14.0
Total Split (s)	16.0	46.4	46.4	14.0	44.4	16.0	17.0	43.6	16.0	42.6	16.0
Total Split (%)	13.3%	38.7%	38.7%	11.7%	37.0%	13.3%	14.2%	36.3%	13.3%	35.5%	13.3%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	12.1	41.2	41.2	10.1	39.2	51.7	13.1	24.7	11.0	22.7	36.1
Actuated g/C Ratio	0.11	0.39	0.39	0.10	0.37	0.49	0.12	0.23	0.10	0.21	0.34
v/c Ratio	0.81	0.69	0.37	0.60	0.71	0.15	0.81	0.74	0.54	0.42	0.35
Control Delay	64.0	31.2	4.7	55.7	33.2	7.7	62.3	41.2	52.3	36.8	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	31.2	4.7	55.7	33.2	7.7	62.3	41.2	52.3	36.8	17.3
LOS	E	C	A	E	C	A	E	D	D	D	B
Approach Delay		33.0			34.2			48.9		35.6	
Approach LOS		C			C			D		D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 105.9

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

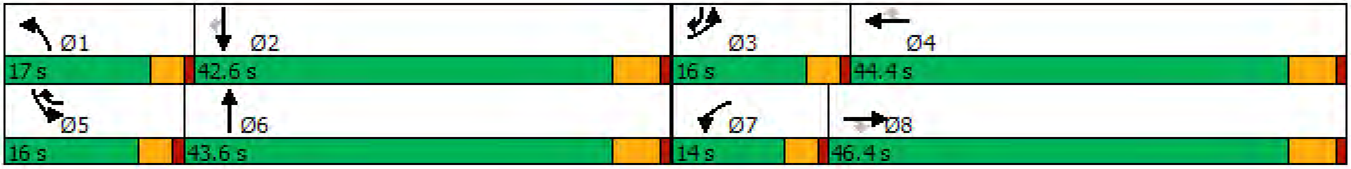
Maximum v/c Ratio: 0.81

Intersection Signal Delay: 37.1 — Intersection LOS: D

Intersection Capacity Utilization 84.8% — ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: E St. & Orange Show Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	286	849	259	175	832	110	310	434	107	174	284	177
Future Volume (veh/h)	286	849	259	175	832	110	310	434	107	174	284	177
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	325	965	137	199	945	69	352	493	97	198	323	114
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	390	1440	641	340	1389	774	417	675	132	340	734	504
Arrive On Green	0.11	0.40	0.40	0.10	0.38	0.38	0.12	0.23	0.23	0.10	0.20	0.20
Sat Flow, veh/h	3510	3610	1606	3510	3610	1605	3510	2997	586	3510	3610	1598
Grp Volume(v), veh/h	325	965	137	199	945	69	352	296	294	198	323	114
Grp Sat Flow(s),veh/h/ln	1755	1805	1606	1755	1805	1605	1755	1805	1778	1755	1805	1598
Q Serve(g_s), s	9.3	22.5	5.8	5.6	22.4	2.4	10.1	15.6	15.8	5.5	8.0	5.4
Cycle Q Clear(g_c), s	9.3	22.5	5.8	5.6	22.4	2.4	10.1	15.6	15.8	5.5	8.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	390	1440	641	340	1389	774	417	406	400	340	734	504
V/C Ratio(X)	0.83	0.67	0.21	0.58	0.68	0.09	0.84	0.73	0.73	0.58	0.44	0.23
Avail Cap(c_a), veh/h	410	1440	641	342	1389	774	444	673	663	410	1310	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.8	25.3	20.3	44.4	26.3	14.4	44.3	36.9	37.0	44.4	35.8	26.0
Incr Delay (d2), s/veh	13.3	2.5	0.8	2.5	2.7	0.2	13.2	2.5	2.6	1.6	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	9.6	2.2	2.5	9.6	0.9	5.0	6.9	6.9	2.4	3.5	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	27.8	21.1	47.0	29.0	14.6	57.5	39.4	39.6	46.0	36.2	26.2
LnGrp LOS	E	C	C	D	C	B	E	D	D	D	D	C
Approach Vol, veh/h		1427			1213			942			635	
Approach Delay, s/veh		34.1			31.2			46.2			37.5	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.2	26.2	15.4	45.0	14.0	28.4	14.0	46.4
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	13.0	37.3	12.0	39.0	12.0	38.3	10.0	41.0
Max Q Clear Time (g_c+I1), s	12.1	10.0	11.3	24.4	7.5	17.8	7.6	24.5
Green Ext Time (p_c), s	0.1	2.4	0.1	5.6	0.2	3.3	0.1	6.4

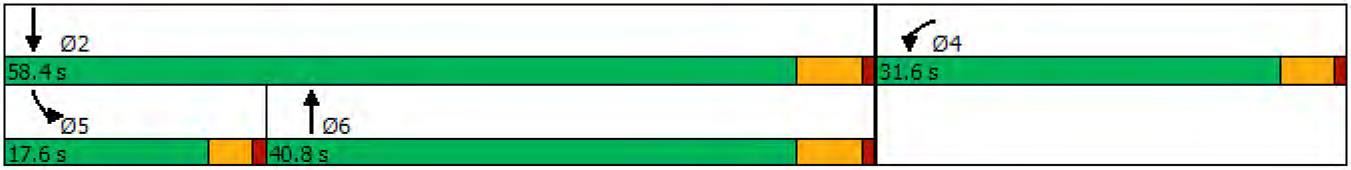
Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	↰↰	↑↱	↰	↑
Traffic Volume (vph)	15	802	46	688
Future Volume (vph)	15	802	46	688
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.2
Total Split (s)	31.6	40.8	17.6	58.4
Total Split (%)	35.1%	45.3%	19.6%	64.9%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	22.5	33.2	20.9	40.4
Actuated g/C Ratio	0.43	0.64	0.40	0.78
v/c Ratio	0.07	0.39	0.07	0.52
Control Delay	12.2	13.9	26.8	8.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.2	13.9	26.8	8.7
LOS	B	B	C	A
Approach Delay	12.2	13.9		9.9
Approach LOS	B	B		A

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 51.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 12.0 Intersection LOS: B
Intersection Capacity Utilization 55.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: E St. & Chandler Pl.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱		↰	↑
Traffic Volume (veh/h)	15	32	802	7	46	688
Future Volume (veh/h)	15	32	802	7	46	688
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	17	19	901	8	52	773
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	84	94	1567	14	253	1254
Arrive On Green	0.11	0.11	0.43	0.43	0.14	0.66
Sat Flow, veh/h	783	875	3761	33	1810	1900
Grp Volume(v), veh/h	37	0	444	465	52	773
Grp Sat Flow(s),veh/h/ln	1703	0	1805	1893	1810	1900
Q Serve(g_s), s	0.9	0.0	8.0	8.0	1.1	10.0
Cycle Q Clear(g_c), s	0.9	0.0	8.0	8.0	1.1	10.0
Prop In Lane	0.46	0.51		0.02	1.00	
Lane Grp Cap(c), veh/h	184	0	772	809	253	1254
V/C Ratio(X)	0.20	0.00	0.58	0.58	0.21	0.62
Avail Cap(c_a), veh/h	1067	0	1483	1555	571	2336
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.5	0.0	9.4	9.4	16.4	4.2
Incr Delay (d2), s/veh	0.8	0.0	1.0	0.9	0.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	2.3	2.4	0.4	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.3	0.0	10.3	10.3	16.8	4.9
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h	37		909			825
Approach Delay, s/veh	18.3		10.3			5.7
Approach LOS	B		B			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		33.8		9.3	10.0	23.8
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		53.0		27.0	13.6	35.4
Max Q Clear Time (g_c+I1), s		12.0		2.9	3.1	10.0
Green Ext Time (p_c), s		9.4		0.1	0.1	8.4

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

APPENDIX 5.1:

E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	263	956	424	102	459	32	136	114	61	155	68
Future Volume (vph)	263	956	424	102	459	32	136	114	61	155	68
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.6	46.4	46.4	14.6	44.4	14.6	13.6	38.3	14.6	42.3	14.6
Total Split (s)	18.0	48.0	48.0	14.6	44.6	14.6	13.6	42.8	14.6	43.8	18.0
Total Split (%)	15.0%	40.0%	40.0%	12.2%	37.2%	12.2%	11.3%	35.7%	12.2%	36.5%	15.0%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	12.6	43.2	43.2	10.2	40.8	52.3	9.4	17.3	10.1	15.0	28.9
Actuated g/C Ratio	0.13	0.45	0.45	0.11	0.42	0.54	0.10	0.18	0.10	0.16	0.30
v/c Ratio	0.66	0.67	0.51	0.31	0.34	0.04	0.46	0.30	0.19	0.31	0.14
Control Delay	48.5	25.4	5.6	44.6	21.5	2.1	47.7	23.3	43.8	36.7	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	25.4	5.6	44.6	21.5	2.1	47.7	23.3	43.8	36.7	5.0
LOS	D	C	A	D	C	A	D	C	D	D	A
Approach Delay		24.0			24.4			33.9		30.6	
Approach LOS		C			C			C		C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 96.7

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

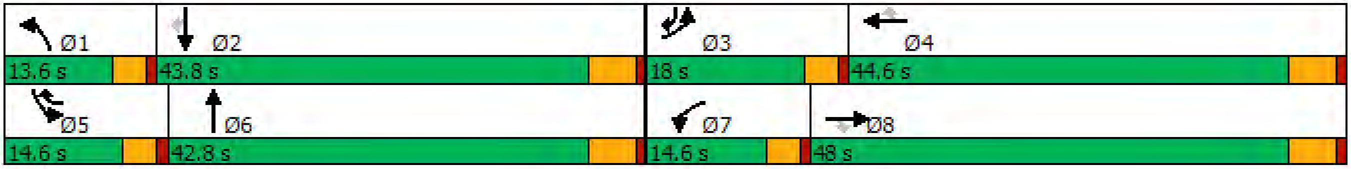
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 25.8 Intersection LOS: C

Intersection Capacity Utilization 79.2% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: E St. & Orange Show Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	263	956	424	102	459	32	136	114	64	61	155	68
Future Volume (veh/h)	263	956	424	102	459	32	136	114	64	61	155	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	299	1086	325	116	522	-20	155	130	48	69	176	-10
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	381	1637	729	356	1611	862	330	409	144	312	549	420
Arrive On Green	0.11	0.45	0.45	0.10	0.45	0.00	0.09	0.16	0.16	0.09	0.15	0.00
Sat Flow, veh/h	3510	3610	1607	3510	3610	1610	3510	2596	913	3510	3610	1610
Grp Volume(v), veh/h	299	1086	325	116	522	-20	155	88	90	69	176	-10
Grp Sat Flow(s),veh/h/ln	1755	1805	1607	1755	1805	1610	1755	1805	1704	1755	1805	1610
Q Serve(g_s), s	7.8	22.1	13.0	2.9	8.8	0.0	3.9	4.1	4.4	1.7	4.1	0.0
Cycle Q Clear(g_c), s	7.8	22.1	13.0	2.9	8.8	0.0	3.9	4.1	4.4	1.7	4.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	381	1637	729	356	1611	862	330	284	268	312	549	420
V/C Ratio(X)	0.79	0.66	0.45	0.33	0.32	-0.02	0.47	0.31	0.33	0.22	0.32	-0.02
Avail Cap(c_a), veh/h	523	1637	729	396	1611	862	359	720	680	396	1479	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.8	20.1	17.6	39.2	16.8	0.0	40.3	35.1	35.2	39.8	35.5	0.0
Incr Delay (d2), s/veh	5.4	2.1	2.0	0.5	0.5	0.0	1.0	0.6	0.7	0.4	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	9.0	4.8	1.2	3.5	0.0	1.7	1.8	1.8	0.7	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.2	22.2	19.6	39.8	17.4	0.0	41.4	35.7	35.9	40.1	35.8	0.0
LnGrp LOS	D	C	B	D	B	A	D	D	D	D	D	A
Approach Vol, veh/h		1710			618			333			235	
Approach Delay, s/veh		25.9			22.1			38.4			38.6	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	19.6	14.2	47.3	12.3	20.1	13.5	48.0
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	9.6	38.5	14.0	39.2	10.6	37.5	10.6	42.6
Max Q Clear Time (g_c+I1), s	5.9	6.1	9.8	10.8	3.7	6.4	4.9	24.1
Green Ext Time (p_c), s	0.1	1.0	0.4	3.4	0.1	0.9	0.1	8.4

Intersection Summary	
HCM 6th Ctrl Delay	27.6
HCM 6th LOS	C

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	↰↱	↑↱	↰	↑
Traffic Volume (vph)	6	295	95	508
Future Volume (vph)	6	295	95	508
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.2
Total Split (s)	33.0	36.0	21.0	57.0
Total Split (%)	36.7%	40.0%	23.3%	63.3%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	18.6	18.3	16.8	32.4
Actuated g/C Ratio	0.41	0.41	0.37	0.72
v/c Ratio	0.12	0.23	0.15	0.40
Control Delay	5.6	16.7	19.7	8.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.6	16.7	19.7	8.8
LOS	A	B	B	A
Approach Delay	5.6	16.7		10.5
Approach LOS	A	B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 45.1

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 12.0 Intersection LOS: B

Intersection Capacity Utilization 45.9% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: E St. & Chandler Pl.

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↱		↰	↑
Traffic Volume (veh/h)	6	72	295	10	95	508
Future Volume (veh/h)	6	72	295	10	95	508
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	7	62	321	11	103	552
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	28	252	937	32	397	1103
Arrive On Green	0.17	0.17	0.26	0.26	0.22	0.58
Sat Flow, veh/h	163	1445	3653	122	1810	1900
Grp Volume(v), veh/h	70	0	162	170	103	552
Grp Sat Flow(s),veh/h/ln	1632	0	1805	1875	1810	1900
Q Serve(g_s), s	1.5	0.0	3.0	3.0	1.9	7.0
Cycle Q Clear(g_c), s	1.5	0.0	3.0	3.0	1.9	7.0
Prop In Lane	0.10	0.89		0.06	1.00	
Lane Grp Cap(c), veh/h	285	0	475	493	397	1103
V/C Ratio(X)	0.25	0.00	0.34	0.34	0.26	0.50
Avail Cap(c_a), veh/h	1135	0	1353	1405	754	2401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	0.0	12.2	12.2	13.2	5.1
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.6	0.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	1.0	1.0	0.6	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.2	0.0	12.8	12.8	13.5	5.6
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h	70		332			655
Approach Delay, s/veh	15.2		12.8			6.8
Approach LOS	B		B			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.1		11.7	13.0	16.1
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		51.6		28.4	17.0	30.6
Max Q Clear Time (g_c+I1), s		9.0		3.5	3.9	5.0
Green Ext Time (p_c), s		5.7		0.3	0.2	2.6

Intersection Summary						
HCM 6th Ctrl Delay			9.2			
HCM 6th LOS			A			

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	0	304	5	0	514
Future Vol, veh/h	0	0	304	5	0	514
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	330	5	0	559

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	168	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	853	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	853	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

4: E St. & Driveway 2

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	0	309	2	0	514
Future Vol, veh/h	0	0	309	2	0	514
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	336	2	0	559

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	169	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	852	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	852	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	63	42	0	78	0	0
Future Vol, veh/h	63	42	0	78	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	68	46	0	85	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	114	0	176	91
Stage 1	-	-	-	-	91	-
Stage 2	-	-	-	-	85	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1488	-	818	972
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	943	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1488	-	818	972
Mov Cap-2 Maneuver	-	-	-	-	818	-
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	943	-

Approach	EB		WB		NB
HCM Control Delay, s	0		0		0
HCM LOS					A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1488	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	63	0	0	40	38	0
Future Vol, veh/h	63	0	0	40	38	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	68	0	0	43	41	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	111	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1546	-	891	1001
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	891	1001
Mov Cap-2 Maneuver	-	-	-	-	891	-
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	891	-	-	1546	-
HCM Lane V/C Ratio	0.046	-	-	-	-
HCM Control Delay (s)	9.2	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

7: Driveway 5 & Chandler Pl.

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	63	0	0	32	8	0
Future Vol, veh/h	63	0	0	32	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	68	0	0	35	9	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	103	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	35	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1546	-	900	1001
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	993	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	900	1001
Mov Cap-2 Maneuver	-	-	-	-	900	-
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	993	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	900	-	-	1546	-
HCM Lane V/C Ratio	0.01	-	-	-	-
HCM Control Delay (s)	9	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

8: Driveway 6 & Chandler Pl.

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	63	0	0	27	5	0
Future Vol, veh/h	63	0	0	27	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	68	0	0	29	5	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	97	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	29	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1546	-	907	1001
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	907	1001
Mov Cap-2 Maneuver	-	-	-	-	907	-
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	907	-	-	1546	-
HCM Lane V/C Ratio	0.006	-	-	-	-
HCM Control Delay (s)	9	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	286	849	279	190	832	110	354	449	174	294	177
Future Volume (vph)	286	849	279	190	832	110	354	449	174	294	177
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.6	46.4	46.4	14.6	44.4	14.6	13.6	38.3	14.6	42.3	14.6
Total Split (s)	16.1	46.4	46.4	14.6	44.9	16.1	16.0	42.9	16.1	43.0	16.1
Total Split (%)	13.4%	38.7%	38.7%	12.2%	37.4%	13.4%	13.3%	35.8%	13.4%	35.8%	13.4%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	12.2	41.4	41.4	10.5	39.7	52.2	12.1	26.1	11.1	25.1	38.6
Actuated g/C Ratio	0.11	0.38	0.38	0.10	0.37	0.48	0.11	0.24	0.10	0.23	0.36
v/c Ratio	0.82	0.70	0.40	0.64	0.71	0.15	1.03	0.76	0.55	0.40	0.33
Control Delay	65.8	32.4	4.7	57.2	33.9	7.8	100.8	42.1	53.4	35.7	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.8	32.4	4.7	57.2	33.9	7.8	100.8	42.1	53.4	35.7	16.7
LOS	E	C	A	E	C	A	F	D	D	D	B
Approach Delay		33.7			35.2			64.4		35.3	
Approach LOS		C			D			E		D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 107.8

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

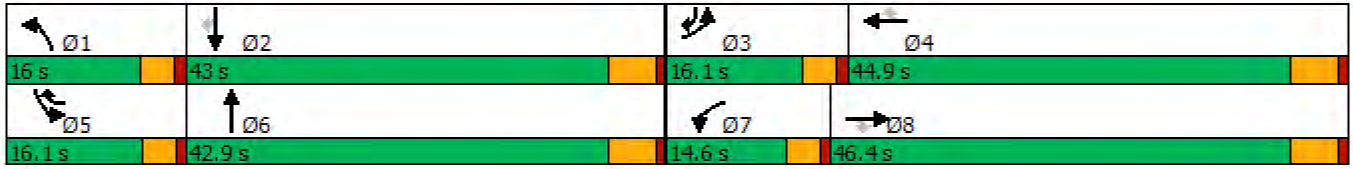
Maximum v/c Ratio: 1.03

Intersection Signal Delay: 41.3 Intersection LOS: D

Intersection Capacity Utilization 85.7% ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: E St. & Orange Show Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	286	849	279	190	832	110	354	449	132	174	294	177
Future Volume (veh/h)	286	849	279	190	832	110	354	449	132	174	294	177
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	325	965	160	216	945	69	402	510	125	198	334	114
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	389	1421	632	336	1366	761	404	676	165	335	782	525
Arrive On Green	0.11	0.39	0.39	0.10	0.38	0.38	0.11	0.24	0.24	0.10	0.22	0.22
Sat Flow, veh/h	3510	3610	1606	3510	3610	1605	3510	2863	698	3510	3610	1599
Grp Volume(v), veh/h	325	965	160	216	945	69	402	320	315	198	334	114
Grp Sat Flow(s),veh/h/ln	1755	1805	1606	1755	1805	1605	1755	1805	1755	1755	1805	1599
Q Serve(g_s), s	9.5	23.1	7.0	6.2	23.0	2.5	11.9	17.2	17.4	5.6	8.3	5.4
Cycle Q Clear(g_c), s	9.5	23.1	7.0	6.2	23.0	2.5	11.9	17.2	17.4	5.6	8.3	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	389	1421	632	336	1366	761	404	426	415	335	782	525
V/C Ratio(X)	0.84	0.68	0.25	0.64	0.69	0.09	1.00	0.75	0.76	0.59	0.43	0.22
Avail Cap(c_a), veh/h	407	1421	632	357	1366	761	404	650	632	407	1304	756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.5	26.2	21.3	45.5	27.3	15.1	46.2	37.0	37.1	45.2	35.3	25.4
Incr Delay (d2), s/veh	13.7	2.6	1.0	3.6	2.9	0.2	43.7	2.7	2.9	1.7	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	9.9	2.7	2.8	9.9	0.9	7.5	7.7	7.5	2.5	3.6	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.2	28.8	22.3	49.1	30.2	15.3	89.8	39.7	40.0	46.9	35.7	25.6
LnGrp LOS	E	C	C	D	C	B	F	D	D	D	D	C
Approach Vol, veh/h		1450			1230			1037			646	
Approach Delay, s/veh		34.9			32.7			59.2			37.3	
Approach LOS		C			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	27.9	15.6	44.9	14.0	29.9	14.0	46.5
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	12.0	37.7	12.1	39.5	12.1	37.6	10.6	41.0
Max Q Clear Time (g_c+I1), s	13.9	10.3	11.5	25.0	7.6	19.4	8.2	25.1
Green Ext Time (p_c), s	0.0	2.4	0.1	5.6	0.2	3.5	0.2	6.3

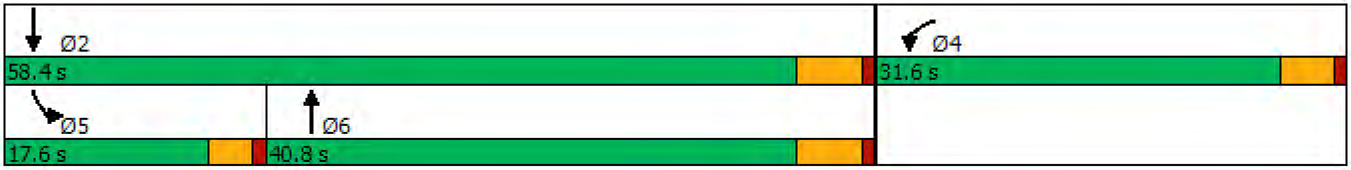
Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

	↙	↑	↘	↓
Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	↖↗	↑↱	↰	↑
Traffic Volume (vph)	30	871	92	688
Future Volume (vph)	30	871	92	688
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.2
Total Split (s)	31.6	40.8	17.6	58.4
Total Split (%)	35.1%	45.3%	19.6%	64.9%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	20.3	32.6	18.5	44.4
Actuated g/C Ratio	0.33	0.52	0.30	0.71
v/c Ratio	0.15	0.52	0.19	0.57
Control Delay	12.6	17.5	29.5	10.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.6	17.5	29.5	10.1
LOS	B	B	C	B
Approach Delay	12.6	17.5		12.4
Approach LOS	B	B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 62.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 15.0 Intersection LOS: B
Intersection Capacity Utilization 57.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: E St. & Chandler Pl.



HCM 6th Signalized Intersection Summary
2: E St. & Chandler Pl.

SBMWD (JN 13867)
09/08/2021

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱		↰	↑
Traffic Volume (veh/h)	30	47	871	12	92	688
Future Volume (veh/h)	30	47	871	12	92	688
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	34	36	979	13	103	773
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	127	134	1487	20	336	1264
Arrive On Green	0.16	0.16	0.41	0.41	0.19	0.67
Sat Flow, veh/h	816	864	3742	48	1810	1900
Grp Volume(v), veh/h	71	0	485	507	103	773
Grp Sat Flow(s),veh/h/ln	1704	0	1805	1890	1810	1900
Q Serve(g_s), s	2.0	0.0	12.1	12.1	2.7	12.8
Cycle Q Clear(g_c), s	2.0	0.0	12.1	12.1	2.7	12.8
Prop In Lane	0.48	0.51		0.03	1.00	
Lane Grp Cap(c), veh/h	265	0	736	771	336	1264
V/C Ratio(X)	0.27	0.00	0.66	0.66	0.31	0.61
Avail Cap(c_a), veh/h	824	0	1145	1199	441	1805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	0.0	13.4	13.4	19.6	5.3
Incr Delay (d2), s/veh	0.8	0.0	1.4	1.4	0.5	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	4.2	4.3	1.1	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.5	0.0	14.8	14.7	20.1	6.0
LnGrp LOS	C	A	B	B	C	A
Approach Vol, veh/h	71		992			876
Approach Delay, s/veh	21.5		14.8			7.6
Approach LOS	C		B			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		42.5		13.3	14.4	28.2
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		53.0		27.0	13.6	35.4
Max Q Clear Time (g_c+I1), s		14.8		4.0	4.7	14.1
Green Ext Time (p_c), s		9.2		0.3	0.1	8.6

Intersection Summary			
HCM 6th Ctrl Delay			11.8
HCM 6th LOS			B

Notes

User approved volume balancing among the lanes for turning movement.

3: E St. & Driveway 1

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	25	857	0	0	718
Future Vol, veh/h	0	25	857	0	0	718
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	27	932	0	0	780

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	466	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	549	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	549	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	549	-
HCM Lane V/C Ratio	-	-	0.049	-
HCM Control Delay (s)	-	-	11.9	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	44	813	0	0	718
Future Vol, veh/h	0	44	813	0	0	718
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	48	884	0	0	780

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	442	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	569	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	569	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	569	-
HCM Lane V/C Ratio	-	-	0.084	-
HCM Control Delay (s)	-	-	11.9	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	104	0	0	46	29	0
Future Vol, veh/h	104	0	0	46	29	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	113	0	0	50	32	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	113	0	163	113
Stage 1	-	-	-	-	113	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1489	-	832	945
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	978	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1489	-	832	945
Mov Cap-2 Maneuver	-	-	-	-	832	-
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	978	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	832	-	-	1489	-
HCM Lane V/C Ratio	0.038	-	-	-	-
HCM Control Delay (s)	9.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	66	38	0	46	0	0
Future Vol, veh/h	66	38	0	46	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	72	41	0	50	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	113	0	143	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1489	-	854	970
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	978	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1489	-	854	970
Mov Cap-2 Maneuver	-	-	-	-	854	-
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	978	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1489	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	58	8	0	46	0	0
Future Vol, veh/h	58	8	0	46	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	63	9	0	50	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	118	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1541	-	883	1001
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	978	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1541	-	883	1001
Mov Cap-2 Maneuver	-	-	-	-	883	-
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	978	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0		0	
HCM LOS					A	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1541	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	53	5	0	46	0	0
Future Vol, veh/h	53	5	0	46	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	58	5	0	50	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	63	0	111	61
Stage 1	-	-	-	-	61	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1553	-	891	1010
Stage 1	-	-	-	-	967	-
Stage 2	-	-	-	-	978	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1553	-	891	1010
Mov Cap-2 Maneuver	-	-	-	-	891	-
Stage 1	-	-	-	-	967	-
Stage 2	-	-	-	-	978	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1553	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

APPENDIX 5.2:

E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **E+P**

___ DIST ___ CO ___ RTE ___ PM

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

Major Street: **E Street**

Minor Street: **Driveway 1**

Critical Approach Speed (Major) 40 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **15,789** vpd

Minor Street Future ADT = **18** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐

or **RURAL (R)**

In built up area of isolated community of < 10,000 population ……………….…. ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **15,789**	1 **18**	8,000 *	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **15,789**	1 **18**	12,000 *	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
1%	1%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **E+P**

DIST ___ CO ___ RTE ___ PM ___

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: City of San Bernardino

Major Street: **E Street**

Minor Street: **Driveway 2**

Critical Approach Speed (Major) 40 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **15,761** vpd

Minor Street Future ADT = **25** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …………………… ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **15,761**	1 **25**	8,000 *	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **15,761**	1 **25**	12,000 *	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
1%	**2%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___ DIST ___ CO ___ RTE ___ PM

TRAFFIC CONDITIONS **E+P**

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

Major Street: **Chandler Pl.**

Minor Street: **Driveway 3**

Critical Approach Speed (Major) 25 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,351** vpd

Minor Street Future ADT = **56** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐

or **URBAN (U)**

In built up area of isolated community of < 10,000 population ……………….….. ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,351**	1 **56**	8,000	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,351**	1 **56**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
2%	**5%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **E+P**

DIST ___ CO ___ RTE ___ PM ___
CALC CS DATE 06/17/21
CHK CS DATE 06/17/21
Jurisdiction: **City of San Bernardino**
Major Street: **Chandler Pl.**
Minor Street: **Driveway 4**
Critical Approach Speed (Major) 25 mph
Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane
Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,109** vpd
Minor Street Future ADT = **86** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐
or
In built up area of isolated community of < 10,000 population …………………… ☐

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,109**	1 **86**	8,000	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,109**	1 **86**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
4%	**7%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **E+P**

DIST ___ CO ___ RTE ___ PM ___

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

Major Street: **Chandler Pl.**

Minor Street: **Driveway 5**

Critical Approach Speed (Major) 25 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,006** vpd

Minor Street Future ADT = **17** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …………………… ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,006**	1 **17**	8,000	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,006**	1 **17**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
1%	1%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **E+P**

DIST ___ CO ___ RTE ___ PM ___

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

Major Street: **Chandler Pl.**

Minor Street: **Driveway 6**

Critical Approach Speed (Major) 25 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **977** vpd

Minor Street Future ADT = **12** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); .... ☐

or **URBAN (U)**

In built up area of isolated community of < 10,000 population .... ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **977**	1 **12**	8,000	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **977**	1 **12**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more					
A	B				
1%	1%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 6.1:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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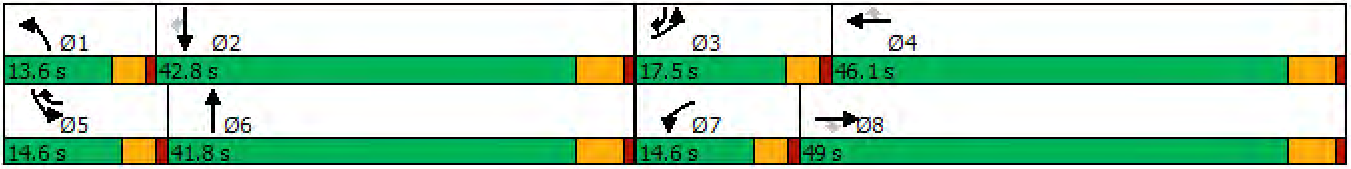
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	271	1235	414	109	707	38	119	108	72	153	70
Future Volume (vph)	271	1235	414	109	707	38	119	108	72	153	70
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.6	46.4	46.4	14.6	44.4	14.6	13.6	38.3	14.6	42.3	14.6
Total Split (s)	17.5	49.0	49.0	14.6	46.1	14.6	13.6	41.8	14.6	42.8	17.5
Total Split (%)	14.6%	40.8%	40.8%	12.2%	38.4%	12.2%	11.3%	34.8%	12.2%	35.7%	14.6%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	12.7	44.3	44.3	10.2	41.8	53.4	9.3	17.3	10.2	15.1	29.2
Actuated g/C Ratio	0.13	0.45	0.45	0.10	0.43	0.55	0.09	0.18	0.10	0.15	0.30
v/c Ratio	0.68	0.86	0.53	0.34	0.52	0.05	0.41	0.30	0.23	0.31	0.15
Control Delay	50.0	31.8	8.8	45.6	23.8	2.9	47.5	22.9	44.5	37.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	31.8	8.8	45.6	23.8	2.9	47.5	22.9	44.5	37.2	8.7
LOS	D	C	A	D	C	A	D	C	D	D	A
Approach Delay		29.4			25.7			32.9		32.2	
Approach LOS		C			C			C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 97.9	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 29.0	Intersection LOS: C
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: E St. & Orange Show Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	271	1235	414	109	707	38	119	108	67	72	153	70
Future Volume (veh/h)	271	1235	414	109	707	38	119	108	67	72	153	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	308	1403	313	124	803	-13	135	123	51	82	174	-7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	387	1657	737	356	1624	875	323	376	147	327	545	420
Arrive On Green	0.11	0.46	0.46	0.10	0.45	0.00	0.09	0.15	0.15	0.09	0.15	0.00
Sat Flow, veh/h	3510	3610	1607	3510	3610	1610	3510	2509	984	3510	3610	1610
Grp Volume(v), veh/h	308	1403	313	124	803	-13	135	87	87	82	174	-7
Grp Sat Flow(s),veh/h/ln	1755	1805	1607	1755	1805	1610	1755	1805	1688	1755	1805	1610
Q Serve(g_s), s	8.1	32.7	12.4	3.1	14.9	0.0	3.4	4.1	4.4	2.1	4.1	0.0
Cycle Q Clear(g_c), s	8.1	32.7	12.4	3.1	14.9	0.0	3.4	4.1	4.4	2.1	4.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	1.00		1.00
Lane Grp Cap(c), veh/h	387	1657	737	356	1624	875	323	270	253	327	545	420
V/C Ratio(X)	0.80	0.85	0.42	0.35	0.49	-0.01	0.42	0.32	0.35	0.25	0.32	-0.02
Avail Cap(c_a), veh/h	499	1657	737	392	1624	875	355	694	649	392	1425	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.2	22.7	17.3	39.8	18.5	0.0	40.7	36.1	36.2	40.0	36.0	0.0
Incr Delay (d2), s/veh	6.8	5.6	1.8	0.6	1.1	0.0	0.9	0.7	0.8	0.4	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	13.8	4.6	1.3	6.0	0.0	1.5	1.8	1.8	0.9	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	28.3	19.1	40.4	19.6	0.0	41.6	36.7	37.0	40.4	36.3	0.0
LnGrp LOS	D	C	B	D	B	A	D	D	D	D	D	A
Approach Vol, veh/h		2024			914			309			249	
Approach Delay, s/veh		29.9			22.7			38.9			38.7	
Approach LOS		C			C			D			D	

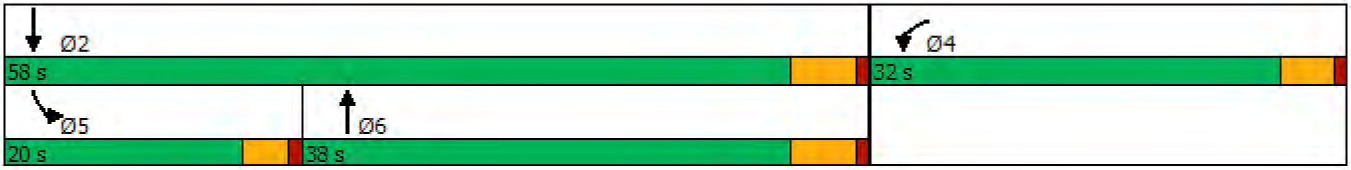
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	19.6	14.5	48.1	12.9	19.5	13.6	49.0
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	9.6	37.5	13.5	40.7	10.6	36.5	10.6	43.6
Max Q Clear Time (g_c+I1), s	5.4	6.1	10.1	16.9	4.1	6.4	5.1	34.7
Green Ext Time (p_c), s	0.1	1.0	0.3	5.5	0.1	0.9	0.1	6.3

Intersection Summary			
HCM 6th Ctrl Delay			29.4
HCM 6th LOS			C

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	Y	↑↱	↰	↑
Traffic Volume (vph)	1	321	55	540
Future Volume (vph)	1	321	55	540
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.2
Total Split (s)	32.0	38.0	20.0	58.0
Total Split (%)	35.6%	42.2%	22.2%	64.4%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	20.7	24.8	19.4	28.7
Actuated g/C Ratio	0.58	0.70	0.55	0.81
v/c Ratio	0.03	0.14	0.06	0.38
Control Delay	7.0	11.6	16.6	7.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.0	11.6	16.6	7.2
LOS	A	B	B	A
Approach Delay	7.0	11.6		8.0
Approach LOS	A	B		A

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 35.4
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.38
Intersection Signal Delay: 9.2 Intersection LOS: A
Intersection Capacity Utilization 47.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: E St. & Chandler Pl.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⅄		↑↱		↰	↑
Traffic Volume (veh/h)	1	27	321	10	55	540
Future Volume (veh/h)	1	27	321	10	55	540
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	1	13	349	11	60	587
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	6	72	1196	38	305	1199
Arrive On Green	0.05	0.05	0.33	0.33	0.17	0.63
Sat Flow, veh/h	109	1420	3665	112	1810	1900
Grp Volume(v), veh/h	15	0	176	184	60	587
Grp Sat Flow(s),veh/h/ln	1639	0	1805	1877	1810	1900
Q Serve(g_s), s	0.3	0.0	2.3	2.3	0.9	5.2
Cycle Q Clear(g_c), s	0.3	0.0	2.3	2.3	0.9	5.2
Prop In Lane	0.07	0.87		0.06	1.00	
Lane Grp Cap(c), veh/h	83	0	605	629	305	1199
V/C Ratio(X)	0.18	0.00	0.29	0.29	0.20	0.49
Avail Cap(c_a), veh/h	1429	0	1873	1947	921	3181
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	7.7	7.7	11.2	3.1
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.4	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.5	0.6	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.7	0.0	8.1	8.1	11.5	3.5
LnGrp LOS	B	A	A	A	B	A
Approach Vol, veh/h	15		360			647
Approach Delay, s/veh	15.7		8.1			4.3
Approach LOS	B		A			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		25.2		6.2	9.3	15.9
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		52.6		27.4	16.0	32.6
Max Q Clear Time (g_c+I1), s		7.2		2.3	2.9	4.3
Green Ext Time (p_c), s		6.2		0.0	0.1	2.9

Intersection Summary	
HCM 6th Ctrl Delay	5.8
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	295	1149	267	201	1140	123	319	447	185	292	182
Future Volume (vph)	295	1149	267	201	1140	123	319	447	185	292	182
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.6	46.4	46.4	14.6	44.4	14.6	13.6	38.3	14.6	42.3	14.6
Total Split (s)	15.3	46.4	46.4	14.6	45.7	16.5	16.2	42.5	16.5	42.8	15.3
Total Split (%)	12.8%	38.7%	38.7%	12.2%	38.1%	13.8%	13.5%	35.4%	13.8%	35.7%	12.8%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	11.4	41.3	41.3	10.5	40.5	53.3	12.3	26.0	11.4	25.1	37.8
Actuated g/C Ratio	0.11	0.38	0.38	0.10	0.38	0.49	0.11	0.24	0.11	0.23	0.35
v/c Ratio	0.91	0.95	0.41	0.67	0.96	0.17	0.91	0.76	0.57	0.40	0.35
Control Delay	78.4	48.0	9.6	58.8	50.4	9.3	77.0	42.3	53.6	35.8	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.4	48.0	9.6	58.8	50.4	9.3	77.0	42.3	53.6	35.8	17.5
LOS	E	D	A	E	D	A	E	D	D	D	B
Approach Delay		47.2			48.1			54.7		35.7	
Approach LOS		D			D			D		D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 108

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

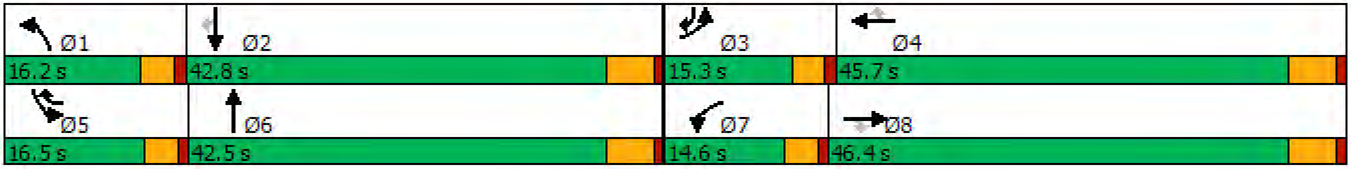
Maximum v/c Ratio: 0.96

Intersection Signal Delay: 47.3 Intersection LOS: D

Intersection Capacity Utilization 85.7% ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: E St. & Orange Show Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	295	1149	267	201	1140	123	319	447	131	185	292	182
Future Volume (veh/h)	295	1149	267	201	1140	123	319	447	131	185	292	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	335	1306	146	228	1295	84	362	508	124	210	332	120
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	378	1432	637	334	1387	770	408	673	163	334	771	515
Arrive On Green	0.11	0.40	0.40	0.10	0.38	0.38	0.12	0.23	0.23	0.10	0.21	0.21
Sat Flow, veh/h	3510	3610	1606	3510	3610	1605	3510	2865	695	3510	3610	1599
Grp Volume(v), veh/h	335	1306	146	228	1295	84	362	319	313	210	332	120
Grp Sat Flow(s),veh/h/ln	1755	1805	1606	1755	1805	1605	1755	1805	1756	1755	1805	1599
Q Serve(g_s), s	9.9	35.9	6.3	6.6	36.1	3.0	10.7	17.2	17.4	6.0	8.4	5.8
Cycle Q Clear(g_c), s	9.9	35.9	6.3	6.6	36.1	3.0	10.7	17.2	17.4	6.0	8.4	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	378	1432	637	334	1387	770	408	424	412	334	771	515
V/C Ratio(X)	0.89	0.91	0.23	0.68	0.93	0.11	0.89	0.75	0.76	0.63	0.43	0.23
Avail Cap(c_a), veh/h	378	1432	637	355	1387	770	408	640	622	418	1290	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	29.9	21.0	45.9	31.0	15.0	45.7	37.3	37.4	45.7	35.7	26.1
Incr Delay (d2), s/veh	21.4	10.3	0.8	4.9	12.8	0.3	20.3	2.7	3.0	2.0	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	16.6	2.4	3.0	17.2	1.1	5.7	7.7	7.6	2.7	3.6	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.6	40.3	21.8	50.8	43.8	15.3	66.0	40.0	40.3	47.7	36.1	26.3
LnGrp LOS	E	D	C	D	D	B	E	D	D	D	D	C
Approach Vol, veh/h		1787			1607			994			662	
Approach Delay, s/veh		43.9			43.3			49.6			38.0	
Approach LOS		D			D			D			D	

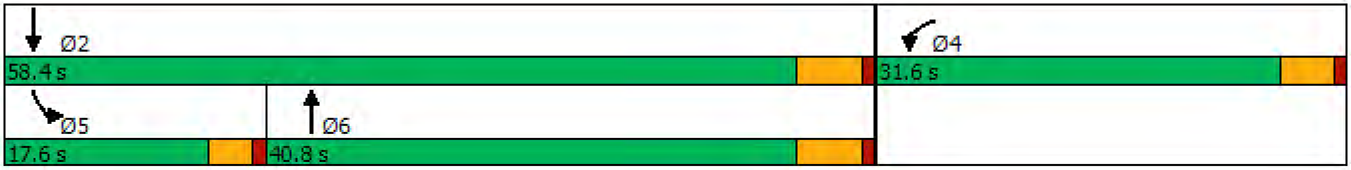
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.2	27.7	15.3	45.7	14.0	29.9	14.0	47.0
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	12.2	37.5	11.3	40.3	12.5	37.2	10.6	41.0
Max Q Clear Time (g_c+I1), s	12.7	10.4	11.9	38.1	8.0	19.4	8.6	37.9
Green Ext Time (p_c), s	0.0	2.4	0.0	1.6	0.3	3.4	0.1	2.3

Intersection Summary	
HCM 6th Ctrl Delay	44.1
HCM 6th LOS	D

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	↰↱	↑↱	↰	↑
Traffic Volume (vph)	15	847	47	730
Future Volume (vph)	15	847	47	730
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.2
Total Split (s)	31.6	40.8	17.6	58.4
Total Split (%)	35.1%	45.3%	19.6%	64.9%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	21.7	34.3	20.1	41.5
Actuated g/C Ratio	0.41	0.65	0.38	0.78
v/c Ratio	0.07	0.41	0.08	0.55
Control Delay	12.3	14.0	27.3	9.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.3	14.0	27.3	9.2
LOS	B	B	C	A
Approach Delay	12.3	14.0		10.3
Approach LOS	B	B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 53	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 57.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: E St. & Chandler Pl.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↑↱		↰	↑
Traffic Volume (veh/h)	15	32	847	7	47	730
Future Volume (veh/h)	15	32	847	7	47	730
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	17	19	952	8	53	820
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	84	94	1612	14	254	1271
Arrive On Green	0.11	0.11	0.44	0.44	0.14	0.67
Sat Flow, veh/h	783	875	3763	31	1810	1900
Grp Volume(v), veh/h	37	0	469	491	53	820
Grp Sat Flow(s),veh/h/ln	1703	0	1805	1894	1810	1900
Q Serve(g_s), s	0.9	0.0	8.8	8.8	1.2	11.2
Cycle Q Clear(g_c), s	0.9	0.0	8.8	8.8	1.2	11.2
Prop In Lane	0.46	0.51		0.02	1.00	
Lane Grp Cap(c), veh/h	182	0	793	832	254	1271
V/C Ratio(X)	0.20	0.00	0.59	0.59	0.21	0.64
Avail Cap(c_a), veh/h	1029	0	1429	1499	550	2253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.2	0.0	9.5	9.5	17.0	4.3
Incr Delay (d2), s/veh	0.8	0.0	1.0	1.0	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.5	2.6	0.4	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.0	0.0	10.5	10.4	17.4	5.1
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h	37		960			873
Approach Delay, s/veh	19.0		10.5			5.8
Approach LOS	B		B			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		35.3		9.4	10.3	25.0
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		53.0		27.0	13.6	35.4
Max Q Clear Time (g_c+I1), s		13.2		2.9	3.2	10.8
Green Ext Time (p_c), s		10.3		0.1	0.1	8.9

Intersection Summary	
HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

APPENDIX 6.2:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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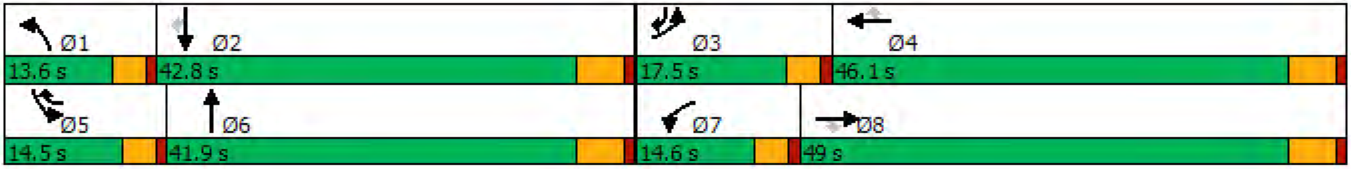
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	271	1235	436	121	707	38	139	118	72	160	70
Future Volume (vph)	271	1235	436	121	707	38	139	118	72	160	70
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.6	46.4	46.4	14.6	44.4	14.5	13.6	38.3	14.5	42.3	14.6
Total Split (s)	17.5	49.0	49.0	14.6	46.1	14.5	13.6	41.9	14.5	42.8	17.5
Total Split (%)	14.6%	40.8%	40.8%	12.2%	38.4%	12.1%	11.3%	34.9%	12.1%	35.7%	14.6%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	12.7	44.3	44.3	10.2	41.8	53.4	9.4	17.3	10.2	15.1	29.1
Actuated g/C Ratio	0.13	0.45	0.45	0.10	0.43	0.55	0.10	0.18	0.10	0.15	0.30
v/c Ratio	0.68	0.86	0.55	0.38	0.52	0.05	0.47	0.34	0.23	0.33	0.16
Control Delay	50.0	31.9	9.0	46.2	23.8	2.9	48.6	22.2	44.5	37.5	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	31.9	9.0	46.2	23.8	2.9	48.6	22.2	44.5	37.5	8.7
LOS	D	C	A	D	C	A	D	C	D	D	A
Approach Delay		29.3			26.1			33.0		32.5	
Approach LOS		C			C			C		C	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 97.9
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 29.1 Intersection LOS: C
Intersection Capacity Utilization 79.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: E St. & Orange Show Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	271	1235	436	121	707	38	139	118	82	72	160	70
Future Volume (veh/h)	271	1235	436	121	707	38	139	118	82	72	160	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	308	1403	338	138	803	-13	158	134	68	82	182	-7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	387	1653	735	359	1624	874	327	353	168	326	544	420
Arrive On Green	0.11	0.46	0.46	0.10	0.45	0.00	0.09	0.15	0.15	0.09	0.15	0.00
Sat Flow, veh/h	3510	3610	1607	3510	3610	1610	3510	2346	1118	3510	3610	1610
Grp Volume(v), veh/h	308	1403	338	138	803	-13	158	101	101	82	182	-7
Grp Sat Flow(s),veh/h/ln	1755	1805	1607	1755	1805	1610	1755	1805	1659	1755	1805	1610
Q Serve(g_s), s	8.2	32.8	13.8	3.5	15.0	0.0	4.1	4.8	5.2	2.1	4.3	0.0
Cycle Q Clear(g_c), s	8.2	32.8	13.8	3.5	15.0	0.0	4.1	4.8	5.2	2.1	4.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.67	1.00		1.00
Lane Grp Cap(c), veh/h	387	1653	735	359	1624	874	327	272	250	326	544	420
V/C Ratio(X)	0.80	0.85	0.46	0.38	0.49	-0.01	0.48	0.37	0.40	0.25	0.33	-0.02
Avail Cap(c_a), veh/h	498	1653	735	391	1624	874	354	694	638	387	1421	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.3	22.9	17.7	40.0	18.5	0.0	41.0	36.4	36.6	40.1	36.2	0.0
Incr Delay (d2), s/veh	6.8	5.7	2.1	0.7	1.1	0.0	1.1	0.8	1.0	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	13.9	5.1	1.5	6.0	0.0	1.8	2.1	2.1	0.9	1.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.2	28.6	19.8	40.6	19.6	0.0	42.1	37.2	37.6	40.5	36.5	0.0
LnGrp LOS	D	C	B	D	B	A	D	D	D	D	D	A
Approach Vol, veh/h		2049			928			360			257	
Approach Delay, s/veh		30.1			23.0			39.5			38.8	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	19.6	14.5	48.2	12.9	19.6	13.7	49.0
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	9.6	37.5	13.5	40.7	10.5	36.6	10.6	43.6
Max Q Clear Time (g_c+I1), s	6.1	6.3	10.2	17.0	4.1	7.2	5.5	34.8
Green Ext Time (p_c), s	0.1	1.1	0.3	5.5	0.1	1.1	0.2	6.3

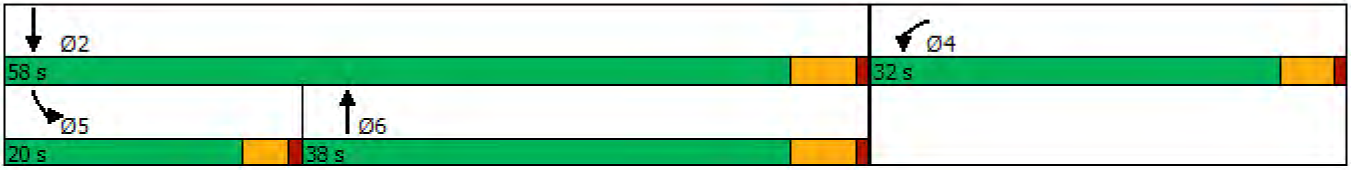
Intersection Summary	
HCM 6th Ctrl Delay	29.8
HCM 6th LOS	C

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	6	321	97	540
Future Volume (vph)	6	321	97	540
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.2
Total Split (s)	32.0	38.0	20.0	58.0
Total Split (%)	35.6%	42.2%	22.2%	64.4%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	18.6	18.6	16.9	32.8
Actuated g/C Ratio	0.41	0.41	0.37	0.72
v/c Ratio	0.12	0.24	0.16	0.43
Control Delay	5.6	16.6	20.0	9.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.6	16.6	20.0	9.0
LOS	A	B	C	A
Approach Delay	5.6	16.6		10.7
Approach LOS	A	B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 45.4
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.43
Intersection Signal Delay: 12.2 Intersection LOS: B
Intersection Capacity Utilization 47.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: E St. & Chandler Pl.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⑂		↑↱		↰	↑
Traffic Volume (veh/h)	6	73	321	10	97	540
Future Volume (veh/h)	6	73	321	10	97	540
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	7	63	349	11	105	587
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	28	254	939	30	400	1104
Arrive On Green	0.18	0.18	0.26	0.26	0.22	0.58
Sat Flow, veh/h	161	1448	3665	112	1810	1900
Grp Volume(v), veh/h	71	0	176	184	105	587
Grp Sat Flow(s),veh/h/ln	1631	0	1805	1877	1810	1900
Q Serve(g_s), s	1.5	0.0	3.3	3.3	2.0	7.7
Cycle Q Clear(g_c), s	1.5	0.0	3.3	3.3	2.0	7.7
Prop In Lane	0.10	0.89		0.06	1.00	
Lane Grp Cap(c), veh/h	287	0	475	494	400	1104
V/C Ratio(X)	0.25	0.00	0.37	0.37	0.26	0.53
Avail Cap(c_a), veh/h	1087	0	1431	1488	704	2430
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	0.0	12.4	12.4	13.3	5.2
Incr Delay (d2), s/veh	0.6	0.0	0.7	0.7	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	1.1	1.1	0.7	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.2	0.0	13.1	13.0	13.6	5.8
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h	71		360			692
Approach Delay, s/veh	15.2		13.1			7.0
Approach LOS	B		B			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.3		11.8	13.1	16.2
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		52.6		27.4	16.0	32.6
Max Q Clear Time (g_c+I1), s		9.7		3.5	4.0	5.3
Green Ext Time (p_c), s		6.2		0.3	0.2	2.9

Intersection Summary						
HCM 6th Ctrl Delay			9.4			
HCM 6th LOS			A			

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	0	331	5	0	546
Future Vol, veh/h	0	0	331	5	0	546
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	360	5	0	593

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	183	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	834	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	834	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	0	336	2	0	546
Future Vol, veh/h	0	0	336	2	0	546
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	365	2	0	593

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	184	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	833	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	833	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	65	42	0	79	0	0
Future Vol, veh/h	65	42	0	79	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	71	46	0	86	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	117	0	180	94
Stage 1	-	-	-	-	94	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1484	-	814	968
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	942	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1484	-	814	968
Mov Cap-2 Maneuver	-	-	-	-	814	-
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	942	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1484	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	65	0	0	41	38	0
Future Vol, veh/h	65	0	0	41	38	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	71	0	0	45	41	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	71	0	116	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	45	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1542	-	885	997
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	983	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1542	-	885	997
Mov Cap-2 Maneuver	-	-	-	-	885	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	983	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	885	-	-	1542	-
HCM Lane V/C Ratio	0.047	-	-	-	-
HCM Control Delay (s)	9.3	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	65	0	0	33	8	0
Future Vol, veh/h	65	0	0	33	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	71	0	0	36	9	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	71	0	107	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1542	-	895	997
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	992	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1542	-	895	997
Mov Cap-2 Maneuver	-	-	-	-	895	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	992	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	895	-	-	1542	-
HCM Lane V/C Ratio	0.01	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	65	0	0	28	5	0
Future Vol, veh/h	65	0	0	28	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	71	0	0	30	5	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	71	0	101	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	30	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1542	-	902	997
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	998	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1542	-	902	997
Mov Cap-2 Maneuver	-	-	-	-	902	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	998	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	902	-	-	1542	-
HCM Lane V/C Ratio	0.006	-	-	-	-
HCM Control Delay (s)	9	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

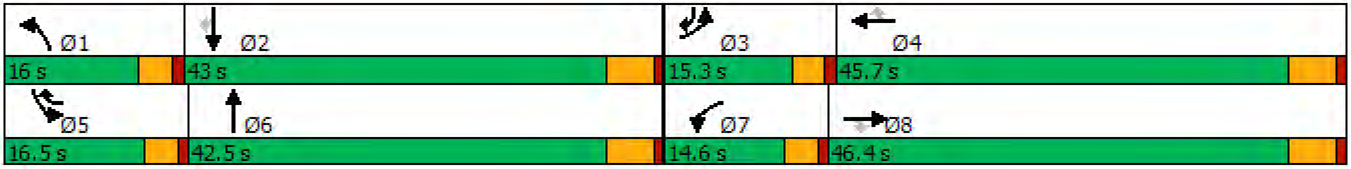
1: E St. & Orange Show Rd.

	↗	→	↘	↙	←	↖	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱	↰↰	↑↑	↱
Traffic Volume (vph)	295	1149	287	216	1140	123	363	462	185	302	182
Future Volume (vph)	295	1149	287	216	1140	123	363	462	185	302	182
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov
Protected Phases	3	8		7	4	5	1	6	5	2	3
Permitted Phases			8			4					2
Detector Phase	3	8	8	7	4	5	1	6	5	2	3
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.6	46.4	46.4	14.6	44.4	14.6	13.6	38.3	14.6	42.3	14.6
Total Split (s)	15.3	46.4	46.4	14.6	45.7	16.5	16.0	42.5	16.5	43.0	15.3
Total Split (%)	12.8%	38.7%	38.7%	12.2%	38.1%	13.8%	13.3%	35.4%	13.8%	35.8%	12.8%
Yellow Time (s)	3.0	4.4	4.4	3.0	4.4	3.0	3.0	4.3	3.0	4.3	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.4	5.4	4.0	5.4	4.0	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
Act Effct Green (s)	11.3	41.3	41.3	10.5	40.5	53.3	12.1	27.2	11.4	26.5	39.2
Actuated g/C Ratio	0.10	0.38	0.38	0.10	0.37	0.49	0.11	0.25	0.10	0.24	0.36
v/c Ratio	0.92	0.96	0.44	0.73	0.97	0.17	1.07	0.79	0.58	0.39	0.34
Control Delay	81.0	50.4	9.8	62.4	53.1	9.5	112.7	42.9	54.4	35.3	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.0	50.4	9.8	62.4	53.1	9.5	112.7	42.9	54.4	35.3	17.2
LOS	F	D	A	E	D	A	F	D	D	D	B
Approach Delay		48.9			50.8			68.7		35.6	
Approach LOS		D			D			E		D	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 109.2
Natural Cycle: 130
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 51.7 Intersection LOS: D
Intersection Capacity Utilization 86.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: E St. & Orange Show Rd.



1: E St. & Orange Show Rd.

09/08/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑↑	↱
Traffic Volume (veh/h)	295	1149	287	216	1140	123	363	462	156	185	302	182
Future Volume (veh/h)	295	1149	287	216	1140	123	363	462	156	185	302	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	335	1306	169	245	1295	84	412	525	152	210	343	120
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	373	1411	628	330	1367	759	396	676	195	329	818	534
Arrive On Green	0.11	0.39	0.39	0.09	0.38	0.38	0.11	0.25	0.25	0.09	0.23	0.23
Sat Flow, veh/h	3510	3610	1606	3510	3610	1605	3510	2749	792	3510	3610	1600
Grp Volume(v), veh/h	335	1306	169	245	1295	84	412	344	333	210	343	120
Grp Sat Flow(s),veh/h/ln	1755	1805	1606	1755	1805	1605	1755	1805	1736	1755	1805	1600
Q Serve(g_s), s	10.0	36.7	7.6	7.2	37.0	3.1	12.0	18.9	19.1	6.1	8.6	5.8
Cycle Q Clear(g_c), s	10.0	36.7	7.6	7.2	37.0	3.1	12.0	18.9	19.1	6.1	8.6	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	373	1411	628	330	1367	759	396	444	427	329	818	534
V/C Ratio(X)	0.90	0.93	0.27	0.74	0.95	0.11	1.04	0.78	0.78	0.64	0.42	0.22
Avail Cap(c_a), veh/h	373	1411	628	350	1367	759	396	631	607	412	1279	738
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.0	30.9	22.1	47.0	32.0	15.6	47.2	37.4	37.5	46.5	35.2	25.6
Incr Delay (d2), s/veh	23.7	11.7	1.1	7.9	14.6	0.3	56.3	3.9	4.2	2.2	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	17.3	3.0	3.4	18.0	1.1	8.2	8.5	8.3	2.7	3.7	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.7	42.7	23.1	54.8	46.7	15.9	103.5	41.3	41.7	48.7	35.5	25.8
LnGrp LOS	E	D	C	D	D	B	F	D	D	D	D	C
Approach Vol, veh/h		1810			1624			1089			673	
Approach Delay, s/veh		46.0			46.3			64.9			37.9	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	29.4	15.3	45.7	14.0	31.5	14.0	47.0
Change Period (Y+Rc), s	4.0	5.3	4.0	5.4	4.0	5.3	4.0	5.4
Max Green Setting (Gmax), s	12.0	37.7	11.3	40.3	12.5	37.2	10.6	41.0
Max Q Clear Time (g_c+I1), s	14.0	10.6	12.0	39.0	8.1	21.1	9.2	38.7
Green Ext Time (p_c), s	0.0	2.5	0.0	1.0	0.3	3.6	0.1	1.7

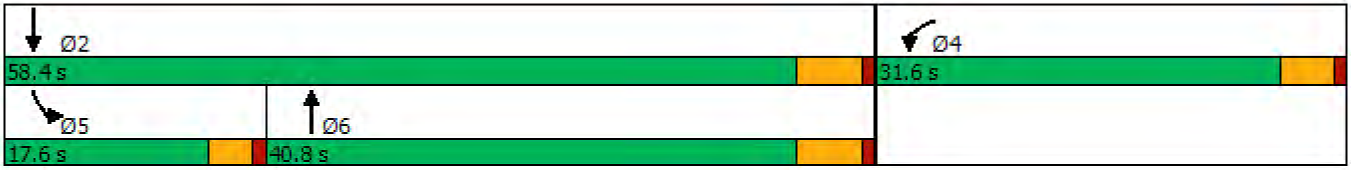
Intersection Summary	
HCM 6th Ctrl Delay	49.0
HCM 6th LOS	D

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	↰↰	↑↱	↰	↑
Traffic Volume (vph)	30	916	93	730
Future Volume (vph)	30	916	93	730
Turn Type	Prot	NA	Prot	NA
Protected Phases	4	6	5	2
Permitted Phases				
Detector Phase	4	6	5	2
Switch Phase				
Minimum Initial (s)	13.0	11.0	13.0	11.0
Minimum Split (s)	31.6	24.4	17.6	23.4
Total Split (s)	31.6	40.8	17.6	58.4
Total Split (%)	35.1%	45.3%	19.6%	64.9%
Yellow Time (s)	3.6	4.4	3.0	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.0	5.4
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)	20.2	33.9	18.3	45.6
Actuated g/C Ratio	0.32	0.53	0.29	0.72
v/c Ratio	0.15	0.54	0.20	0.60
Control Delay	12.8	17.6	30.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.8	17.6	30.1	10.6
LOS	B	B	C	B
Approach Delay	12.8	17.6		12.8
Approach LOS	B	B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 63.4
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 15.3 Intersection LOS: B
Intersection Capacity Utilization 59.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: E St. & Chandler Pl.



HCM 6th Signalized Intersection Summary
2: E St. & Chandler Pl.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↱		↰	↑
Traffic Volume (veh/h)	30	47	916	12	93	730
Future Volume (veh/h)	30	47	916	12	93	730
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	34	36	1029	13	104	820
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	125	133	1529	19	332	1277
Arrive On Green	0.15	0.15	0.42	0.42	0.18	0.67
Sat Flow, veh/h	816	864	3744	46	1810	1900
Grp Volume(v), veh/h	71	0	509	533	104	820
Grp Sat Flow(s),veh/h/ln	1704	0	1805	1890	1810	1900
Q Serve(g_s), s	2.1	0.0	13.1	13.1	2.9	14.3
Cycle Q Clear(g_c), s	2.1	0.0	13.1	13.1	2.9	14.3
Prop In Lane	0.48	0.51		0.02	1.00	
Lane Grp Cap(c), veh/h	262	0	756	792	332	1277
V/C Ratio(X)	0.27	0.00	0.67	0.67	0.31	0.64
Avail Cap(c_a), veh/h	802	0	1114	1167	429	1756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	13.5	13.5	20.3	5.4
Incr Delay (d2), s/veh	0.8	0.0	1.5	1.4	0.5	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	4.5	4.7	1.1	3.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.2	0.0	15.0	14.9	20.8	6.2
LnGrp LOS	C	A	B	B	C	A
Approach Vol, veh/h	71		1042			924
Approach Delay, s/veh	22.2		14.9			7.8
Approach LOS	C		B			A
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		43.9		13.4	14.5	29.4
Change Period (Y+Rc), s		5.4		4.6	4.0	5.4
Max Green Setting (Gmax), s		53.0		27.0	13.6	35.4
Max Q Clear Time (g_c+I1), s		16.3		4.1	4.9	15.1
Green Ext Time (p_c), s		10.1		0.3	0.1	8.9

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	25	902	0	0	760
Future Vol, veh/h	0	25	902	0	0	760
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	27	980	0	0	826

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	490	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	529	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	529	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	529	-
HCM Lane V/C Ratio	-	-	0.051	-
HCM Control Delay (s)	-	-	12.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

4: E St. & Driveway 2

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	44	858	0	0	760
Future Vol, veh/h	0	44	858	0	0	760
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	48	933	0	0	826

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	467	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	548	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	548	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	548	-
HCM Lane V/C Ratio	-	-	0.087	-
HCM Control Delay (s)	-	-	12.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	⇆	
Traffic Vol, veh/h	105	0	0	47	29	0
Future Vol, veh/h	105	0	0	47	29	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	114	0	0	51	32	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	114	0	165	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	51	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1488	-	830	944
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	977	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1488	-	830	944
Mov Cap-2 Maneuver	-	-	-	-	830	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	977	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	830	-	-	1488	-
HCM Lane V/C Ratio	0.038	-	-	-	-
HCM Control Delay (s)	9.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	67	38	0	47	0	0
Future Vol, veh/h	67	38	0	47	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	73	41	0	51	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	114	0	145	94
Stage 1	-	-	-	-	94	-
Stage 2	-	-	-	-	51	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1488	-	852	968
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	977	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1488	-	852	968
Mov Cap-2 Maneuver	-	-	-	-	852	-
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	977	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1488	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

7: Driveway 5 & Chandler Pl.

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↰↑	↰↱	
Traffic Vol, veh/h	59	8	0	47	0	0
Future Vol, veh/h	59	8	0	47	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	64	9	0	51	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	73	0	120	69
Stage 1	-	-	-	-	69	-
Stage 2	-	-	-	-	51	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1540	-	880	1000
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	977	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1540	-	880	1000
Mov Cap-2 Maneuver	-	-	-	-	880	-
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	977	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1540	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

8: Driveway 6 & Chandler Pl.

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	54	5	0	47	0	0
Future Vol, veh/h	54	5	0	47	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	59	5	0	51	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	64	0	113	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	51	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1551	-	888	1009
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	977	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1551	-	888	1009
Mov Cap-2 Maneuver	-	-	-	-	888	-
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	977	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1551	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

APPENDIX 6.3:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **2022 WP**
DIST ___ CO ___ RTE ___ PM ___ CALC CS DATE 06/17/21
Jurisdiction: **City of San Bernardino** CHK CS DATE 06/17/21
Major Street: **E Street** Critical Approach Speed (Major) 40 mph
Minor Street: **Driveway 1** Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **16,812** vpd Minor Street Future ADT = **18** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐
or **RURAL (R)**
In built up area of isolated community of < 10,000 population ……………….…… ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **16,812**	1 **18**	8,000 *	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **16,812**	1 **18**	12,000 *	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
1%	1%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

TRAFFIC CONDITIONS **2022 WP**
DIST ___ CO ___ RTE ___ PM ___
CALC CS DATE 06/17/21
CHK CS DATE 06/17/21
Jurisdiction: City of San Bernardino
Major Street: **E Street**
Minor Street: **Driveway 2**
Critical Approach Speed (Major) 40 mph
Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane
Minor Street Approach Lanes **1** lane

Major Street Future ADT = **16,784** vpd
Minor Street Future ADT = **25** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐
or
In built up area of isolated community of < 10,000 population ……………….…… ☐

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **16,784**	1 **25**	8,000 *	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **16,784**	1 **25**	12,000 *	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
1%	2%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST ___ CO ___ RTE ___ PM ___

TRAFFIC CONDITIONS **2022 WP**

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

Major Street: **Chandler Pl.**

Minor Street: **Driveway 3**

Critical Approach Speed (Major) 25 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,280** vpd

Minor Street Future ADT = **56** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …………………… ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,280**	*1* **56**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2 +*	9,600	6,720	3,200	2,240
1	*2 +*	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,280**	*1* **56**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2 +*	14,400	10,080	1,600	1,120
1	*2 +*	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
2%	**5%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

TRAFFIC CONDITIONS **2022 WP**

DIST ___ CO ___ RTE ___ PM ___

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

Major Street: **Chandler Pl.**

Minor Street: **Driveway 4**

Critical Approach Speed (Major) 25 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,138** vpd

Minor Street Future ADT = **86** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …………………… ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,138**	1 **86**	8,000	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,138**	1 **86**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
4%	**7%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **2022 WP**

DIST __ CO __ RTE __ PM __

CALC CS DATE 06/17/21

CHK CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

Major Street: **Chandler Pl.**

Minor Street: **Driveway 5**

Critical Approach Speed (Major) 25 mph

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **1,035** vpd

Minor Street Future ADT = **17** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); .... ☐

or **URBAN (U)**

In built up area of isolated community of < 10,000 population .... ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN XX | RURAL

Minimum Requirements EADT

CONDITION A - Minimum Vehicular Volume

Satisfied | Not Satisfied XX

Number of lanes for moving traffic on each approach		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,035**	1 **17**	8,000	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied | Not Satisfied XX

Number of lanes for moving traffic on each approach		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,035**	1 **17**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied | Not Satisfied XX

No one condition satisfied, but following conditions fulfilled 80% of more .....

A	B
1%	1%

2 CONDITIONS 80%

2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

TRAFFIC CONDITIONS **2022 WP**

DIST ___ CO ___ RTE ___ PM ___

CALC CS DATE 06/17/21

Jurisdiction: **City of San Bernardino**

CHK CS DATE 06/17/21

Major Street: **Chandler Pl.**

Critical Approach Speed (Major) 25 mph

Minor Street: **Driveway 6**

Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,006** vpd

Minor Street Future ADT = **12** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ………. ☐

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …………………… ☐

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,006**	1 **12**	8,000	5,600	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,006**	1 **12**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..					
A	B				
1%	1%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 7b

URBAN
CROSSROADS
urbanxroads.com

February 24, 2021

Ms. Kaitlyn Dodson-Hamilton
Tom Dodson & Associates
PO Box 2307
San Bernardino, CA 92406-2307

SUBJECT: SAN BERNARDINO MUNICIPAL WATER DEPARTMENT WATER FACILITIES RELOCATION VEHICLE MILES TRAVELED (VMT) SCREENING ANALYSIS

Dear Ms. Kaitlyn Dodson-Hamilton:

The following VMT Screening Analysis has been prepared for the proposed San Bernardino Municipal Water Department (SBMWD) Water Facilities Relocation (**Project**), which is located at 397 Chandler Place in the City of San Bernardino.

PROJECT OVERVIEW

The proposed Project consists of the development of a 27,812 square foot one-story structural steel administrative office building (New Building A) and a 13,500 square foot one-story tilt-up concrete warehouse with loading docks (New Warehouse B). Just east of the New Building A, administration building, the Project proposes to install a 17,921 SF demonstration garden. The proposed Project would also include renovations of the existing 26,055.6 SF concrete block operations building (Building C) that is located toward the eastern boundary of the site. This building will house vehicle maintenance in the existing service bays and administrative offices in the two-story office section of the building. Additionally, the Project includes the development of a 13,500 SF one-story tilt-up concrete warehouse with loading docks (New Warehouse B) along the easternmost boundary of the site, to the east of the existing building.

The new SBMWD Administrative Headquarters will employ about fewer than 100 persons, with no new positions created as a result of this project. The Administrative Headquarters will operate between the hours of 6:30 AM and 4:30 PM, except in the event of an emergency.

Trip generation rates used for this assessment are based upon user specific information supplied by SBMWD. As shown in Attachment A, the resulting net trip generation for the proposed Project is 344 vehicle trip-ends per day (also referred to as daily trips).

BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which require all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020.

It is our understanding that the City of San Bernardino utilizes the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool (**Screening Tool**). The Screening Tool allows users to input an assessor's parcel number (APN) to determine if a project's location meets one or more of the screening thresholds for land use projects as identified in San Bernardino County Transportation Authority (SBCTA) Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (**SBCTA Guidelines**) that addresses both traditional automobile delay-based level of service (LOS) and new VMT analysis requirements. (2) The City of San Bernardino then used the SBCTA Guidelines to develop its City of San Bernardino Traffic Impact Analysis Guidelines (August 2020) (**City Guidelines**). (3) These guidelines have been used to conduct this screening analysis.

PROJECT SCREENING

The City Guidelines provides details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed project level analysis. Screening thresholds are broken into the following three steps:

- Transit Priority Area (TPA) Screening
- Low VMT Area Screening
- Project Type Screening

A land use project need only to meet one of the above screening thresholds to result in a less-than-significant impact.

TPA SCREENING

As described in the City Guidelines, projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may

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[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").

[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

be presumed to have a less than significant impact absent substantial evidence to the contrary. However, the presumption may not be appropriate if a project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the Screening Tool results presented in Attachment B, the Project site is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

The TPA screening threshold is not met.

LOW VMT AREA SCREENING

The City Guidelines states that "residential and office projects located within a low VMT-generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related and mixed-use land use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per resident, per worker or per service population that is similar to the existing land uses in the low VMT area." The Screening Tool uses the sub-regional San Bernardino Transportation Analysis Model (SBTAM) to measure VMT performance within individual traffic analysis zones (TAZ's) within the SBCTA region. The Project's physical location based on the APN is input into the Screening Tool to determine VMT generated by the existing TAZ as compared to the City's impact threshold of "better than General Plan Buildout VMT per service population". The parcel containing the proposed Project was selected and the Screening Tool was run for the Origin/Destination VMT per service population measure of VMT. Based on the Screening Tool results (see Attachment B), the Project is not located within a low VMT generating zone.

The Low VMT Area screening threshold is not met.

PROJECT TYPE SCREENING

The City Guidelines identifies that local serving retail projects less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition to local serving retail, other types of local serving uses such as community institutions (public libraries, fire stations, local government, etc.) may also be presumed to have a less than significant impact as their uses are local serving in nature and would tend to shorten vehicle trips.

The proposed SBMWD Project will relocate local serving municipal services within the same geographic region and would not result in an increase in employees due to the new location.

The Project Type screening threshold is met.

CONCLUSION

Based on our review of applicable VMT screening thresholds, the proposed Project meets the Project Type screening and would therefore be assumed to result in a less than significant VMT impact; no additional VMT analysis is required.

If you have any questions, please contact me directly at aso@urbanxroads.com.

Respectfully submitted,

URBAN CROSSROADS, INC.

Aric Evatt
President

Alexander So
Senior Analyst

REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.

2. **San Bernardino County Transportation Authority (SBCTA).** *Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment.* February 2020.

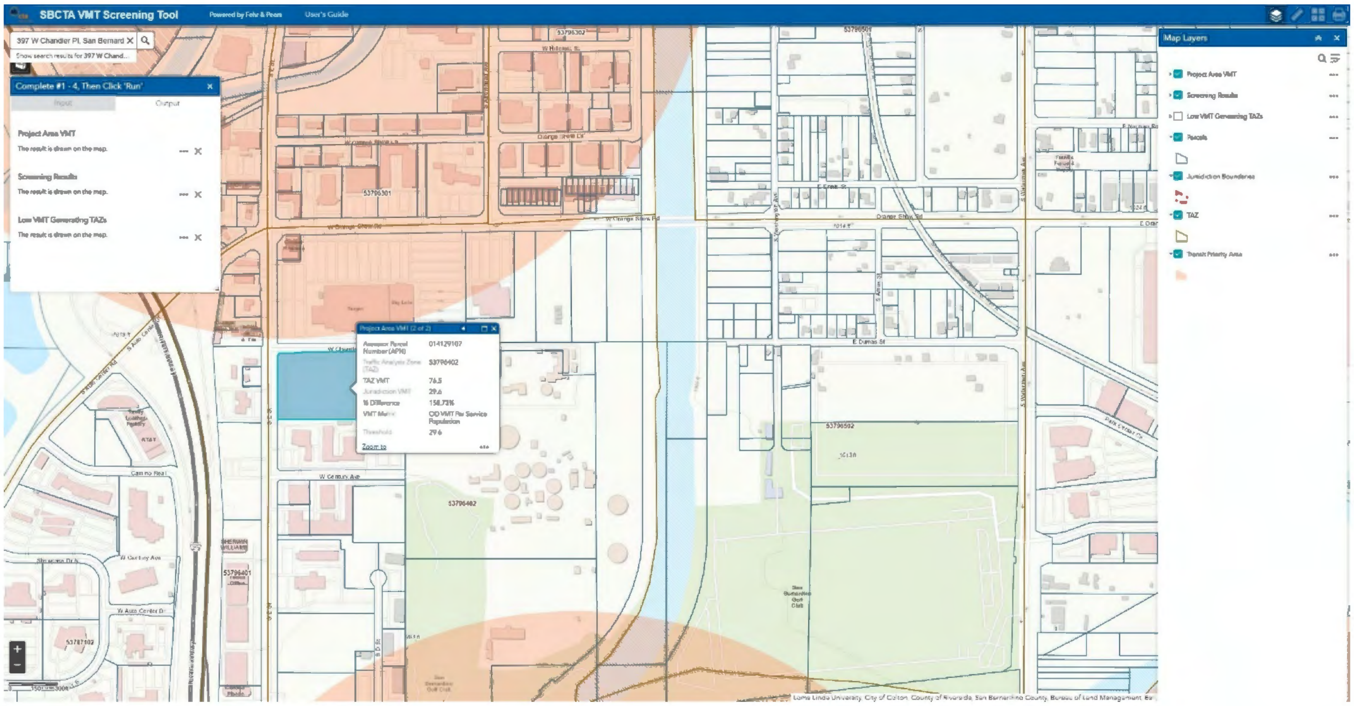
3. **City of San Bernardino.** *Traffic Impact Analysis Guidelines .* City of San Bernardino : s.n., August 2020.

ATTACHMENT A:
PROJECT TRIP GENERATION

Project Trip Generation Summary

	AM Peak Hour			PM Peak Hour			
Land Use	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**Daily**
SBMWD Water Facilities Relocation							
Employees	49	0	49	0	98	98	196
Department Vehicle: Pick-Up Trucks/SUV/Vans	0	18	18	18	0	18	72
Department Vehicle: Flat-Bed/Utility Trucks	0	17	17	17	0	17	66
Department Vehicle: Dump/Water Trucks	0	0	0	0	0	0	10
Total Proposed Project (Actual Vehicles)	**49**	**35**	**84**	**35**	**98**	**133**	**344**

ATTACHMENT B:
SBCTA SCREENING TOOL RESULTS



Project Area VMT (2 of 2)

Assessor Parcel Number (APN)	014129107
Traffic Analysis Zone (TAZ)	53796402
TAZ VMT	76.5
Jurisdiction VMT	29.6
% Difference	158.73%
VMT Metric	OD VMT Per Service Population
Threshold	29.6