Draft Initial Study

Phase 1 of the State Street Extension (4 Lanes)
16th Street to Baseline Street (SS04-009)
City of San Bernardino

Prepared for:

City of San Bernardino
Community Development
201-B, N. “E” Street
San Bernardino, CA 92401-1507

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September 2019

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1 INTRODUCTION

The City of San Bernardino is proposing to construct a new, approximately one-half mile segment of State Street between 16th Street and Baseline Street in approximately 2020 (proposed Project, Figure 1 and Figure 2). This activity is part of a phased plan over the next 10 years to extend State Street from its present terminus at 16th Street to approximately 1.5 miles southerly to intersect with 5th Street (Figure 3). This new segment of roadway will be designed to be a 100 foot-wide, four-lane Major Arterial, in accordance with State Street's designation in the City's General Plan (Figure 3). There is currently no major north-south thoroughfare in the vicinity of 16th Street and 5th Street.

The Phase 1 segment between 16th Street and Baseline Street encompasses improving State Street from 16th Street to Baseline Street, with four lanes of travel, sidewalks, and curbs and gutters. All of the work will occur within the existing developed areas of the currently two-lane State Street and its existing right-of-way between 16th Street and the terminus of Hanford Street, and within new rights-of-way to be acquired between the terminus of Hanford Street and W. Baseline Street. The existing State Street is paved, approximately 70 feet wide and dedicated 100 feet wide to a distance of approximately 700 feet south of Hanford Street. An approximate 760 foot section of payment extends beyond Hanford but is not open to traffic. New rights-of-way will include an easement over a Department of Water Resources pipeline, a new easement adjacent to the San Bernardino County Flood Control channel, and acquisition of approximately 3.5 acres of right of way within an approximate 9-acre privately owned, vacant parcel.

Following this phase, the City's long term goal is to design and construct State Street t in three subsequent phases to provide a four-lane principal arterial with connections to Interstate 10 at Rancho Avenue (to the south) and Interstate 215 at University Parkway (to the north) over the next 10 years, depending on funding. State Street will also be an eventual interchange with Interstate 210 just south of Highland Avenue.

An approximately 700-foot-long section of State Street was constructed in 2001 south of Baseline Street, just west of the new Arroyo Vista High School property at Baseline Street, but dead ends into vacant lands. This section of State Street is also known as University Avenue.

The existing traffic signal at Baseline Street and State Street is proposed to be modified as part of the project to add a fourth leg to the signal. The signal was installed in 2001 and is new enough that complete replacement will not be necessary.

2 PROJECT LOCATION AND SETTING

The proposed Project is located in the City of San Bernardino, along State Street, beginning at approximately the intersection of 16th Street, and along a designed alignment to Baseline Street. The Project alignment traverses two USGS 7.5' quadrangles: the southwest one-quarter of *San Bernardino North* and the northwest one-quarter of *San Bernardino South*. Residential development generally exists along both sides of the northern half of the alignment. Within the southern half of the alignment, Lytle Creek wash exits on the west, and residential development and vacant land exist on the east.

For the purpose of analysis, the Project was divided into five segments based on their similar environmental features:

Segment 1 – Existing State Street, between the intersection of 16th Street and Hanford Street. This approximately 0.14 mile (about 700 feet) long section currently contains an approximately two-lane paved roadway, with curb and gutter, but no sidewalks. The backyards of residential properties exist on both the east and west sides.

Access to the residences along this section are from Grand Street on the west and Colorado Street on the east (Figure 4). The City's storm drain is located underground throughout this section.

Segment 2 – Existing State Street between Hanford Street and State Street terminus, approximately 700-feet south of Hanford Street. This approximately 0.15-mile (approximately 760 feet) segment is an existing, paved two-lane road, with no curb and gutter and no sidewalks. The pavement is in poor condition and is closed to through traffic between the intersection with Hanford Street and the terminus approximately 0.15-mile south of the intersection with Hanford Street. The backyards of residential properties exist along both the east and west sides of State Street in this segment. Access to residences in this segment are from Grand Street on the west and Colorado Street on the east (Figure 5). The City's storm drain is located underground throughout this section.

Segment 3 – New roadway from terminus of Segment 2 to approximately 0.13 mile southwesterly (a physical reference point being between the terminus of Lilian Court located approximately 250 feet to the east) (Figure 6). This approximate 0.14-mile long (approximately 715 feet) segment will generally follow an alignment between the San Bernardino Flood Control Channel and the backyards of residential property along Colorado Avenue. This segment lies entirely within Assessor's Parcel Number (APN) 0269-181-04, and the portion needed for the roadway will need to be acquired from the private property owner. Easements for the San Bernardino County Flood Control District (SBCFCD) and the Department of Water Resources (California Aqueduct Santa Ana Valley Unit) are also within this segment. The DWR will issue an encroachment permit for work and facilities to be located within the ROW for the Santa Ana Valley Pipeline (SAVP). The DWR holds an easement for the SAVP that extends from the eastern slope of the Lytle creek levee and 100 feet to the east. The City's storm drain is located underground throughout this section, and curves to the west at the end of this segment.

Segment 4 – New roadway from Section 3 to Baseline Street. This approximately 0.14-mile (approximately 800 feet) segment will bisect the approximate 9.7-acre vacant parcel, APN 0269-181-04. New rights-of-way, approximately 100- feet wide by approximately 800 feet long (approximately 1.8 acres) will be required from a private property owner (Figure 7). Easements for the San Bernardino County Flood Control District (SBCFCD) and the Department of Water Resources (California Aqueduct Santa Ana Valley Unit) are within this segment. The DWR will issue an encroachment permit for work and facilities to be located within the ROW for the Santa Ana Valley Pipeline (SAVP). The DWR holds an easement for the SAVP that extends from the eastern slope of the Lytle creek levee and 100 feet to the east. The City's storm drain is located above ground and outside of the right-of-way of this section.

Segment 5 –Baseline Street Intersection. This segment consists of the existing intersection of W. Baseline Street and State Street (Figure 8).

3 BACKGROUND

3.1 Purpose and Need

Presently, southbound traffic on State Street at Highland Avenue must detour to Medical Center Drive to reach destinations to the south. Truck traffic, which accounts for 6 to 8 percent of the roadway's Average Daily Traffic (ADT), is presently permitted to pass through residential neighborhoods and by Community Hospital. The closest north-south arterial designated for truck travel is Riverside Avenue, located 5 miles westerly of State Street in the City of Rialto. The extension of State Street would allow the City to restrict truck traffic on Medical Center Drive, thereby lessening the potential for truck-related traffic accidents, lowering the ADT by several thousand vehicles, and reducing noise levels around the hospital.

Vehicles also currently use California Street to travel southbound from the existing terminus of State Street. California Street is bordered by a city park, elementary school, and residential communities. The roadway terminates at Base Line. Completion of the State Street Extension would provide traffic relief to California Street and lessen the potential for pedestrian related accidents associated with activities occurring adjacent to schools, parks and residential streets.

There were numerous rear-end and right-angle accidents along this route that occurred during the three years of records reviewed (1997-1999). A quantitative analysis of accident reduction potential by City staff and San Bernardino Associated Governments ([SANBAG], now known as the San Bernardino County Transportation Authority [SBCTA]) staff resulted in the projection that with completion of the State Street Extension, rear-end and right-angle accidents along the above-defined route, could be reduced by as much as 20 percent. The rationale behind this analysis was:

- There are significantly fewer intersecting streets with traffic controls proposed along State Street than along the existing diverted trip route. Therefore, the theoretical accident potential for rear-end and right-angle accidents (right-of-way conflict) is lessened. The trip length would also be shortened from 3.3 miles to 1.9 miles.

- State Street is projected to have an ADT of 10,000 – 15,000 vehicles in the year 2020. Several thousand of these vehicles will have been previously driving on Medical Center Drive. Extending State Street to the south will help reduce traffic congestion on Medical Center Drive by providing another alternate route, and will therefore reduce the accident potential along Medical Center.

- The State Street alignment is essentially in a north/south direction. This “straight” route would result in conflicting turning movements and potential right-of-way conflict being significantly less than the present diverted trip route.

The City proposes to extend State Street from its present terminus at 16th Street, southerly to intersect with Baseline Road. The roadway is designated in the General Plan as Major Arterial. The City intends to enhance this new roadway with numerous safety improvements that would benefit all vehicular and pedestrian users and ultimately

3.2 Alternatives

The Proposed Action is a road extension public project being undertaken to complete another major north-south thoroughfare connecting both ends of the City of San Bernardino as well as eventual connection to three major interstate highways, and to potentially reduce the number of vehicle accidents that are occurring along the present diverted trip route.

The City evaluated alternative concepts to the proposed action. However, the limited right-of-way or unimproved land available for roadway construction did not allow for the development of numerous alternatives. The project is an extension of an existing roadway with a portion of the extension already in existence. Therefore, design of the road extension is limited to the completion and interconnectivity of the road as planned by the City of San Bernardino and included in the General Plan Circulation Element.

Alternative Designs

The terminus of State Street with Foothill Blvd. was originally conceived to be located further west than the proposed location. This alternative would require construction of a bridge crossing the Lytle Creek Channel. This alternative was rejected because of cost constraints. The City may determine the need for the bridge crossing at some time in the future, however that alternative was not given further consideration for the near-term due to the costs.

As a Major Arterial, State Street is designated for a design speed of up to 55 miles per hour and therefore few alternatives to the alignment of the road extension could be considered because of geometrics. Alignment further to the east was rejected because of the location of existing high voltage powerlines. Relocation of the power lines was considered cost prohibitive. Alignment further to the west was rejected because of the location of an existing pit that was mined and is now used as a construction debris disposal site. Clean-up and back filling the pit was considered cost prohibitive.

The proposed alignment connects two existing segments of the road and would utilize an existing County maintenance road to avoid additional disturbance in the area. No feasible and prudent alternatives exist for extending the existing State Street to provide connection between its existing terminus and planned terminus.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No extension of State Street would be made and public safety would continue to be compromised. Under this alternative, the City would continue to use non-designated truck routes for truck traffic.

4 PROJECT COMPONENTS

In general, the Project includes construction of a four-lane roadway with sidewalks and curb and gutter and striping within a total of a 100-foot-wide right-of-way. As a Major Arterial, the design speed of State Street would be up to 55 mph, therefore, the street would be striped with a double-yellow centerline, supplemented with two-way yellow reflective pavement markers and white reflective edge line markers. Concrete sidewalks are planned to be installed on both sides of the roadway.

Project design plans are provided in Appendix A.

4.1 Construction Scenario

Construction is anticipated to occur in the summer/fall of 2020 and will last approximately 12 months.

Project construction will generally occur within a 100 to 110-foot wide alignment area and consist of activities to construct a paved roadway, a combination of striped and raised concrete medians, curb and gutter, sidewalks, and streetlights. In general, construction consists of:

- Demolition of existing improvements (pavement, curb, gutter);
- Earthwork (over excavation, compaction, soil import, slope grading);
- Underground utilities (any relocations, storm drain,
- Electrical for storm drain and traffic signals);
- Paving/Concrete (base placement, pavement placement, curbs, surface drainage infrastructure, sidewalk)
- Traffic control (signal at Baseline and State Street, signing, striping).

Segment 1 – pavement rehabilitation (grind and overlay) and/or pavement replacement, construction of curb, gutter, sidewalks, and striping for a four-lane roadway in this approximately 700-foot-long segment. The existing pavement section is 70-feet wide which accommodates a two-lane roadway and no sidewalks or curb and gutter, and the new pavement section will be approximately 70-feet wide which will include four travel lanes separated by a striped, 14-foot-wide median (not concrete median), and 5-foot-wide sidewalks (one on each side of the roadway). The new sidewalks will abut the backyards of private residences, some of which are fenced with chain link or fencing. It will be the intent to avoid impacts to the fence lines during construction.

Segment 2 – pavement rehabilitation (grind and overlay), and/or pavement replacement construction of curb, gutter, sidewalks, and striping in this approximately 760-foot-long segment. The existing pavement section is approximately 72 feet wide, and the new pavement section will be approximately 76 to 82 feet wide, curb to curb. The new sidewalks will abut private residence backyards, some of which are fenced with chain link or fencing. It will be the intent to avoid impacts to the fence lines during construction.

Segment 3 – Grading in this approximately 715-foot-long segment, which is currently vacant, undeveloped land would be completed to accommodate a four-lane roadway and sidewalks. The entire width of the construction zone of impact would be approximately 110 feet for the entire length, or approximately 1.7 acres. New pavement will be installed at a width of 76 to 82 feet wide, curb to curb, with 5-foot-wide sidewalks on each side, and striping.

Segment 4 – Grading in this approximately 800-foot-long segment, which is currently vacant, undeveloped land would be completed to accommodate a four-lane roadway with a median and sidewalks. In order to establish the roadway grade near the Baseline intersection, approximately 20,000 cubic yards of fill will be imported to raise the roadbed approximately 12 feet over the length of the segment, to match the elevation of the roadway at the Baseline intersection. The slope of the raised roadway will be approximately 3:1 on each side. New pavement will be installed at a width of 76 to 82 feet wide, curb to curb, with striping and 5-foot-wide sidewalks on each side. The entire width of the construction zone of impact would be approximately 110 feet, or approximately 1.7 acres.

Segment 5 – Existing intersection improvements are anticipated to include interconnection of traffic signals to accommodate the new segment north of Baseline Street.

4.2 Potential Construction Equipment

Project construction will require the use of heavy equipment. While the final types and numbers of construction equipment will be determined by the construction contractor, Table 1 is an example of the types and numbers of equipment that will be utilized for this work.

Table 1
Potential Equipment for State Street Road Construction

Equipment Type	Numbers of Equipment	Duration
Motor Grader	1	3 months
D-9 Dozer	2	12 months
Scraper	1	3 months
Water Truck	2	12 months
Concrete Trucks (10 yard)	20	3 months
Dirt Haul Trucks (20,000 cy in 15 yard trucks)*	1,334	2 months
Pavement Ripper	1	3 months
Asphalt Roller	2	3 months

**Haul Rate Assumption: 360 cy per day, 24 trucks per day for 56 days.*

4.3 Right-of-Way Acquisition

All work in Segments 1 and 2 will be conducted within existing City-owned rights-of-way. The City will need to purchase rights-of-way within APN 026918104 within Segment 3 (approximately 2 acres) and within Segment 4 (approximately 1.79 acres).

New rights-of-way, approximately 100-feet wide by approximately 500 feet long will be required from the San Bernardino County Flood Control District (SBCFCD) and from the Department of Water Resources (Figure 9)

4.4 Utility Relocation

Southern California Edison (SCE) currently operates electrical transmission poles within the proposed Project alignment. While preliminary design anticipates that the poles will not require relocation to support the Project, final design may reveal that a minor relocation may be necessary to accommodate public safety.

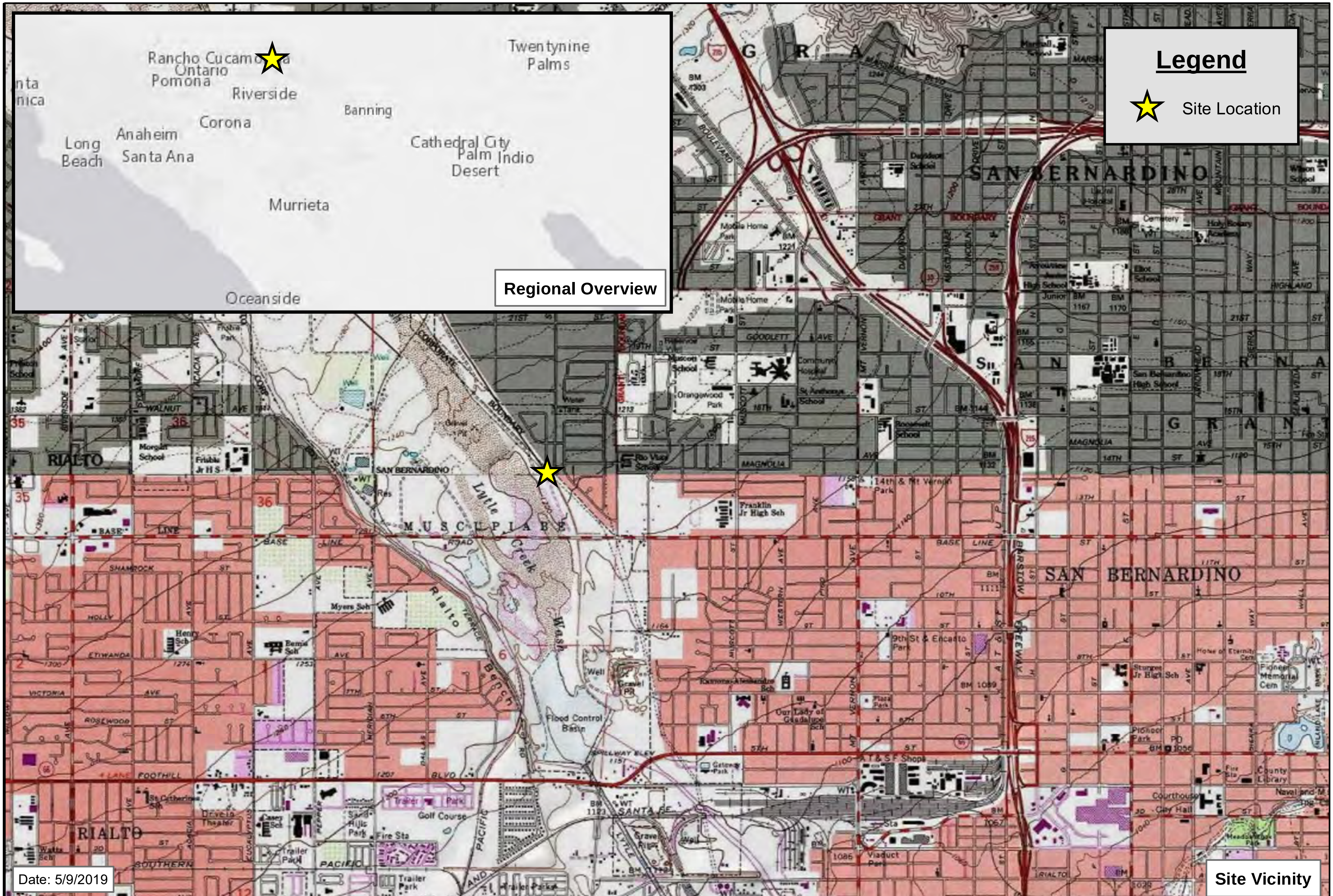
4.5 Construction Staging and Access

Construction Staging

All equipment will remain on-site throughout the Project. Equipment staging and material storage will most likely occur within the work area of Segment 4 and within the areas identified for construction improvements. This will reduce impacts to the SBCFCD channel and Lytle Creek that exist adjacent to the west of the construction area.

Construction Access

Construction access will be via the existing right-of-way and new right-of-way to be acquired. It is anticipated that heavy equipment will initially utilize the 210 Freeway, and exit State Street, or travel down Baseline, and be brought directly to the Project site. There will be no need to access the Project construction area from any of the residential properties to the west and east.



0 0.325 0.65 1.3 1.95 2.6 Miles

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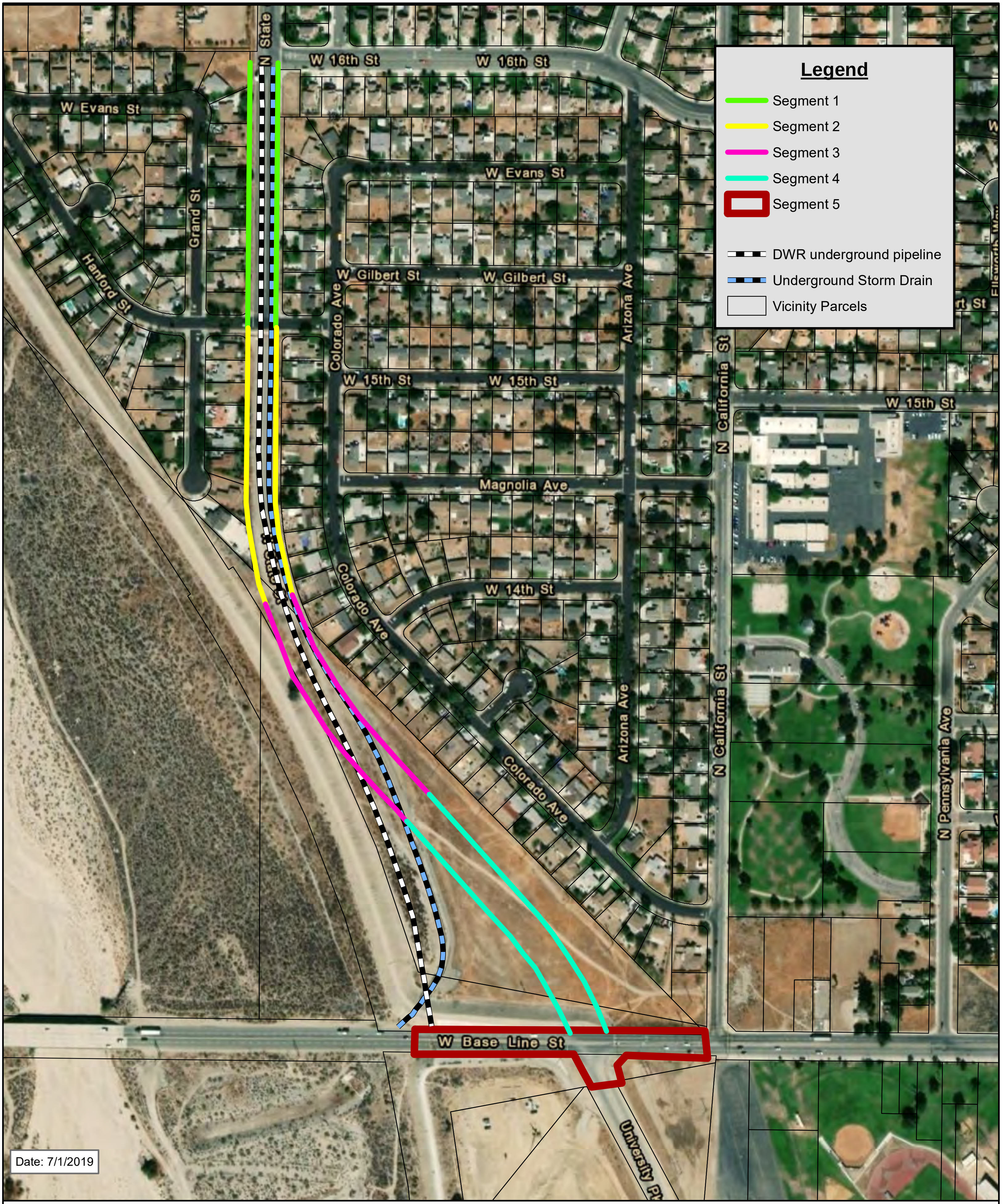
Figure 1 Regional Overview Site Vicinity	City of San Bernardino Phase 1 State Street Extension 16th Street to Baseline Street



0 0.025 0.05 0.1 0.15 0.2 Miles

Imagery Date: 10/7/2017

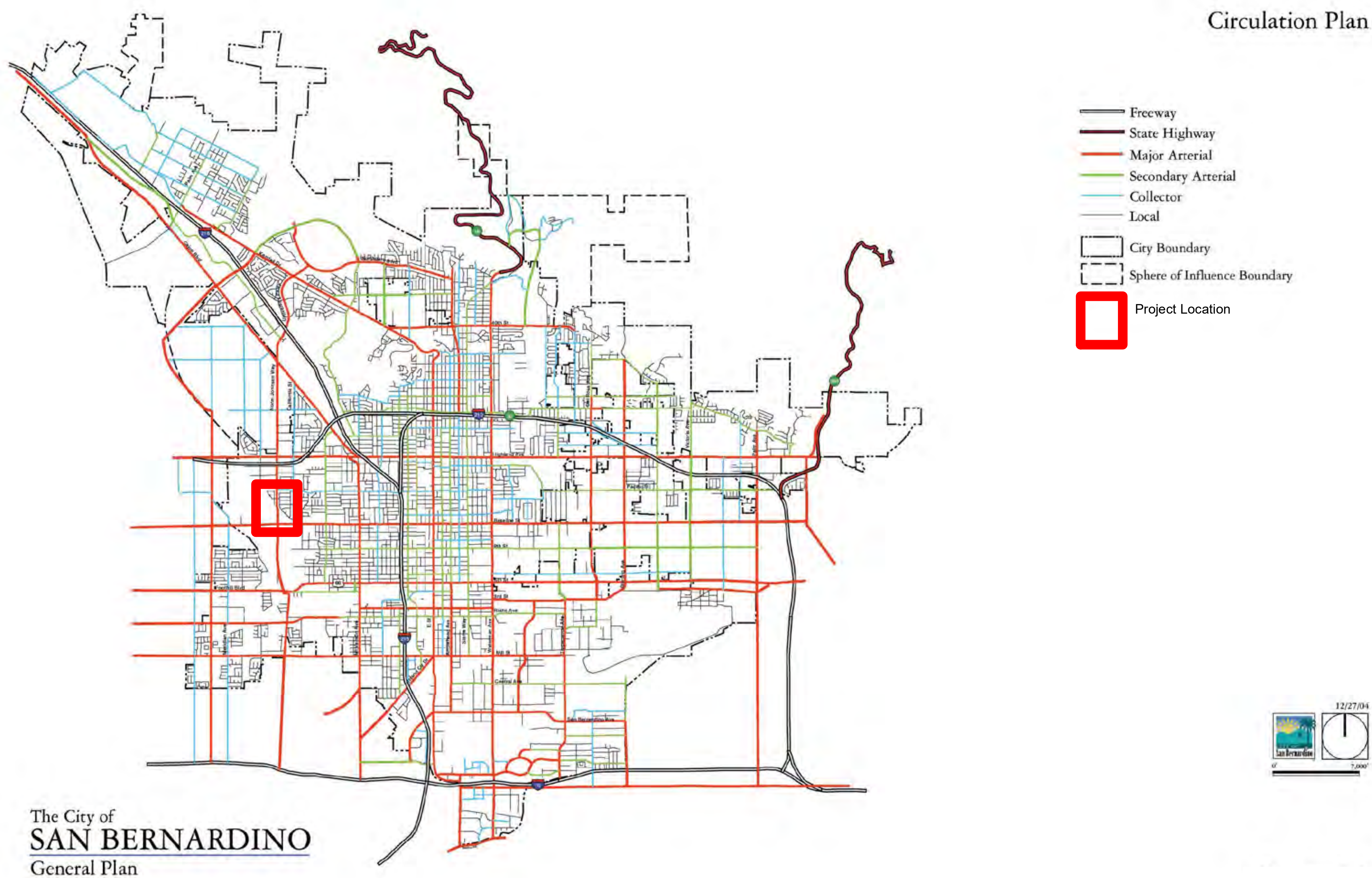
Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap

JERICHO SYSTEMS

1 inch = 341 feet

Figure 2
Site Location

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street



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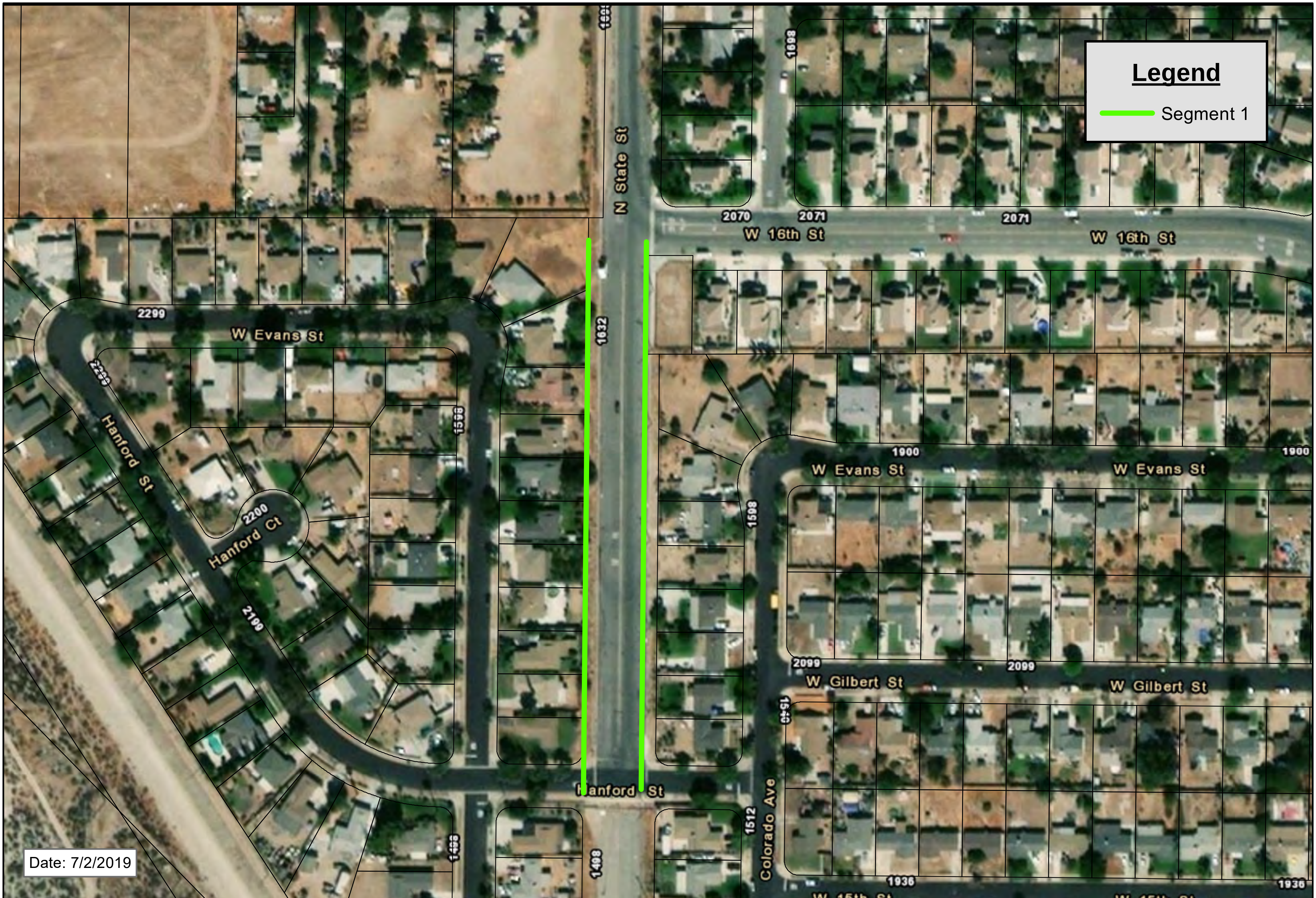
Imagery Date: 10/7/2017

Service Layer Credits:

1 inch = 500 feet

Figure 3
General Plan Circulation Map

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street



0 0.015 0.03 0.06 0.09 0.12 Miles

Imagery Date: 10/7/2017

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

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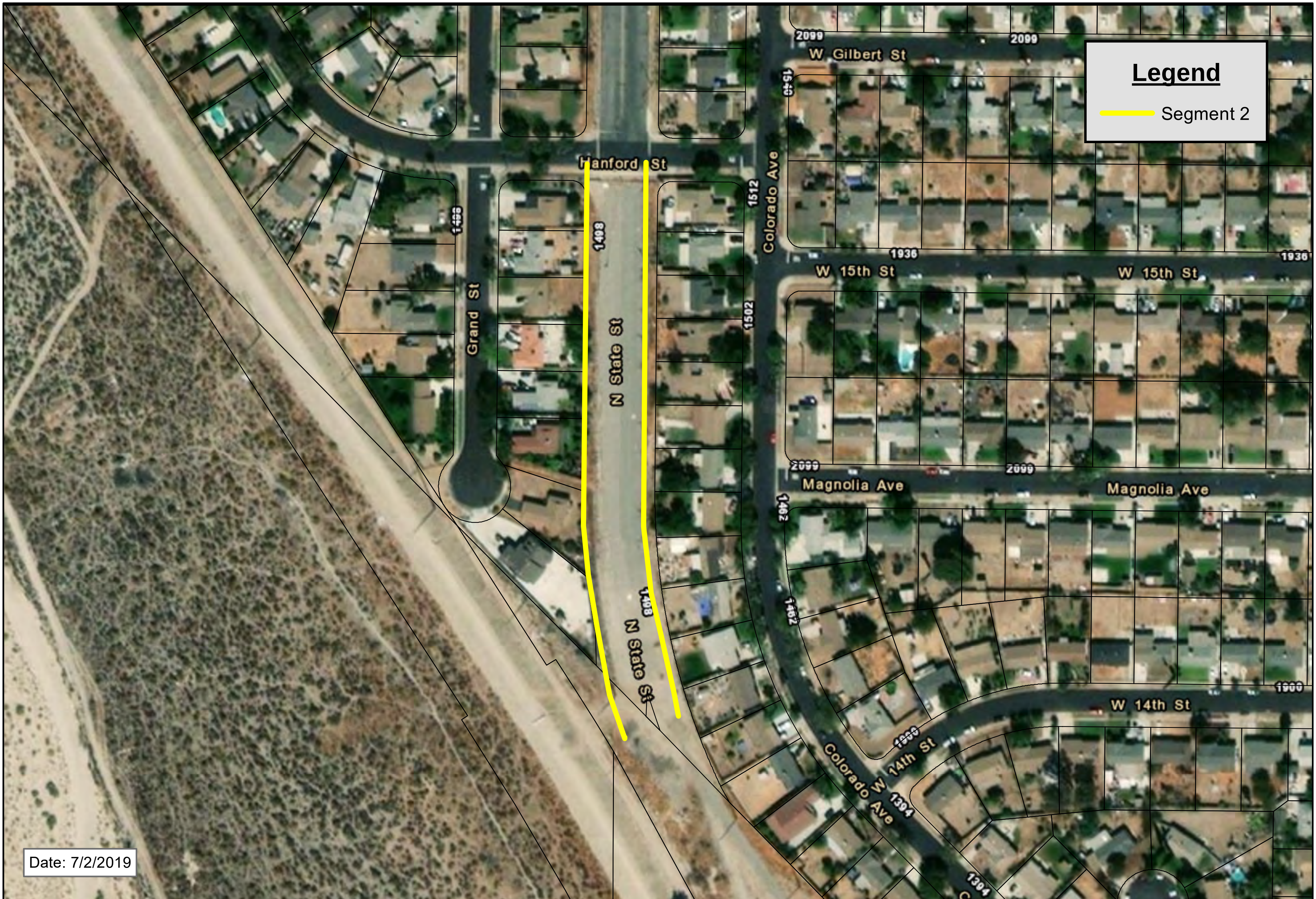
N

1 inch = 167 feet

Figure 4
Segment 1

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street



0 0.015 0.03 0.06 0.09 0.12 Miles

Imagery Date: 10/7/2017

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

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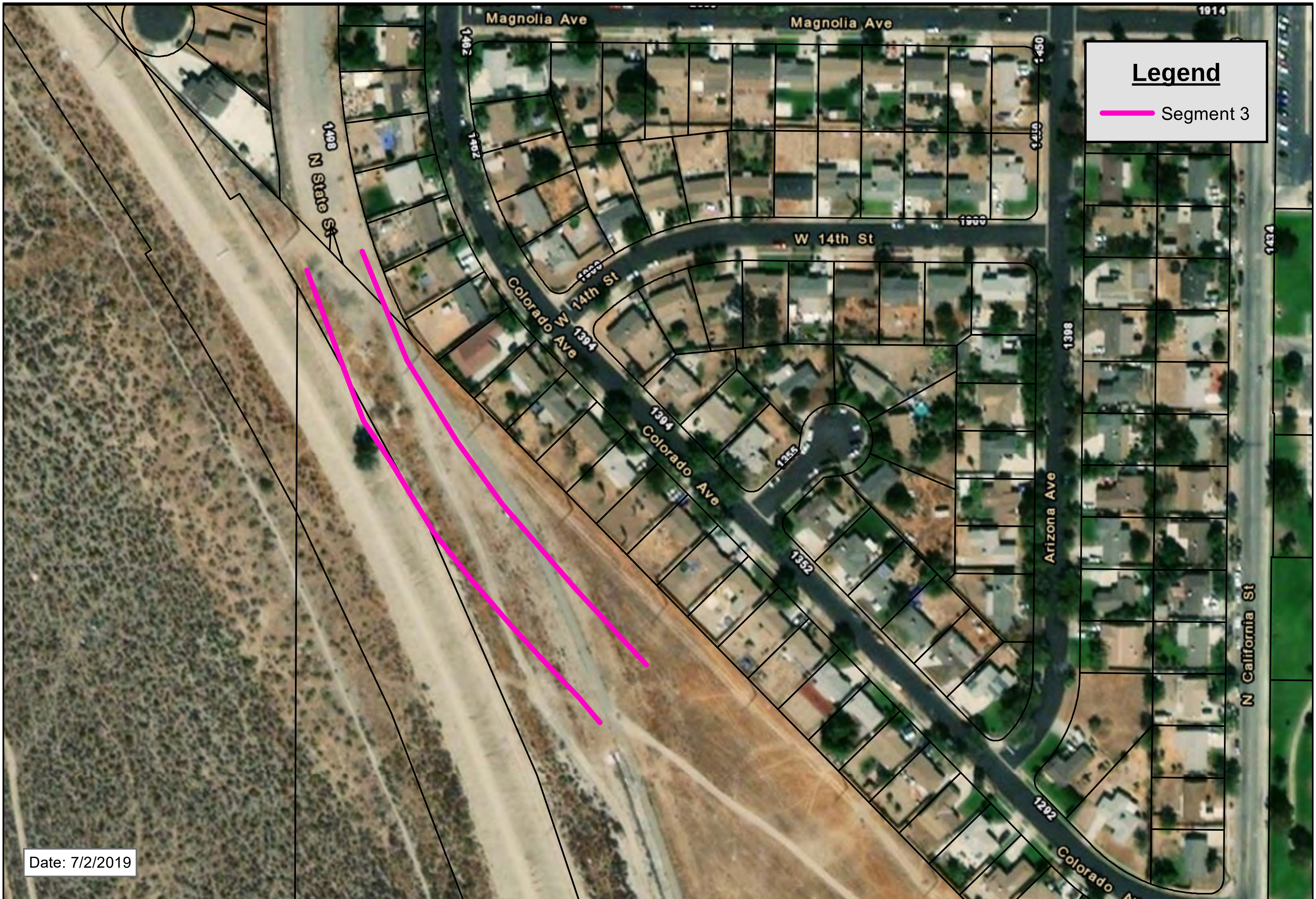
N

1 inch = 167 feet

Figure 5
Segment 2

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street



0 0.015 0.03 0.06 0.09 0.12 Miles

Imagery Date: 10/7/2017

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1 inch = 167 feet

Figure 6
Segment 3

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street

0 0.015 0.03 0.06 0.09 0.12 Miles

Imagery Date: 10/7/2017

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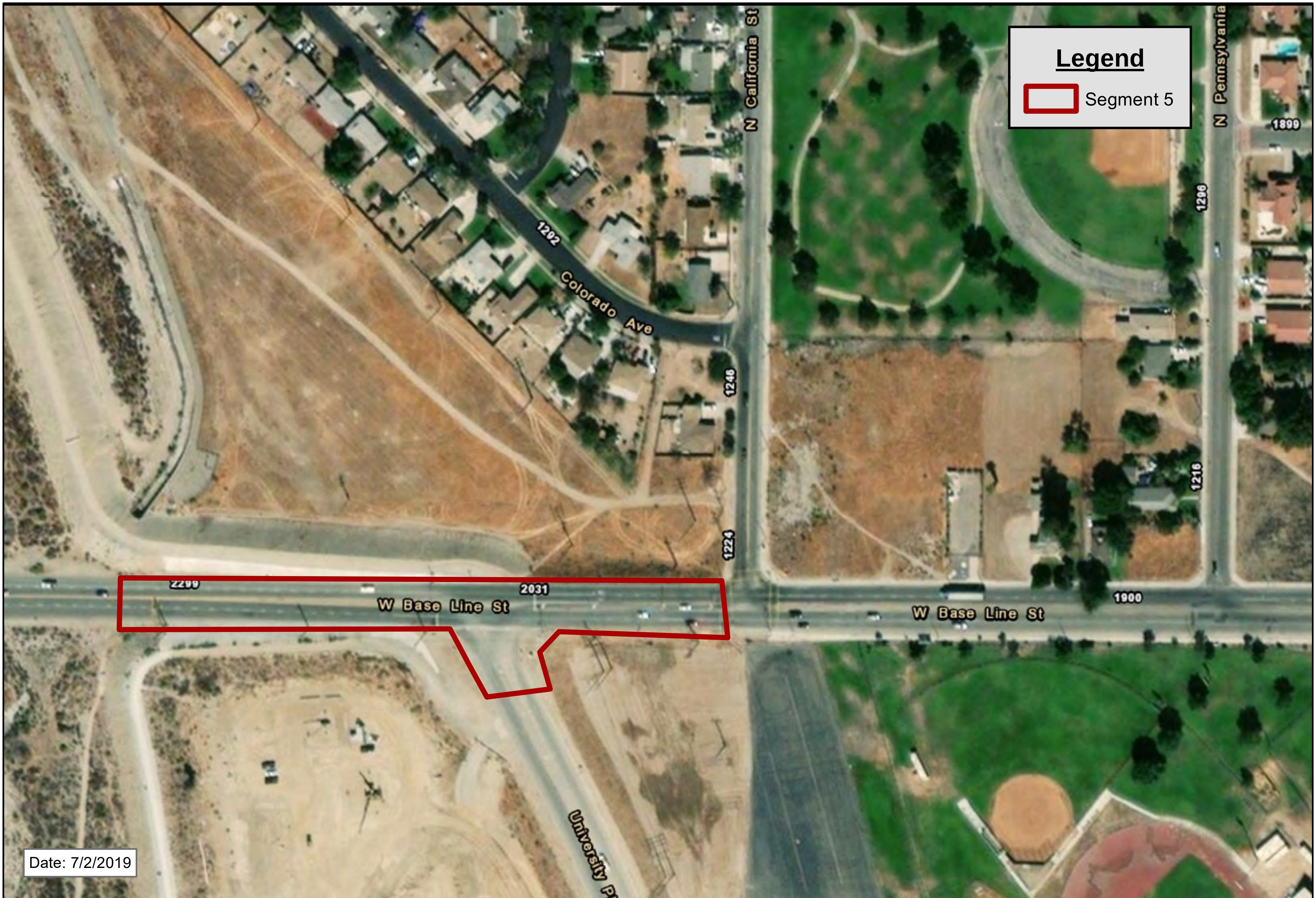
N

1 inch = 167 feet

Figure 7
Segment 4

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street



0 0.015 0.03 0.06 0.09 0.12 Miles

Imagery Date: 10/7/2017

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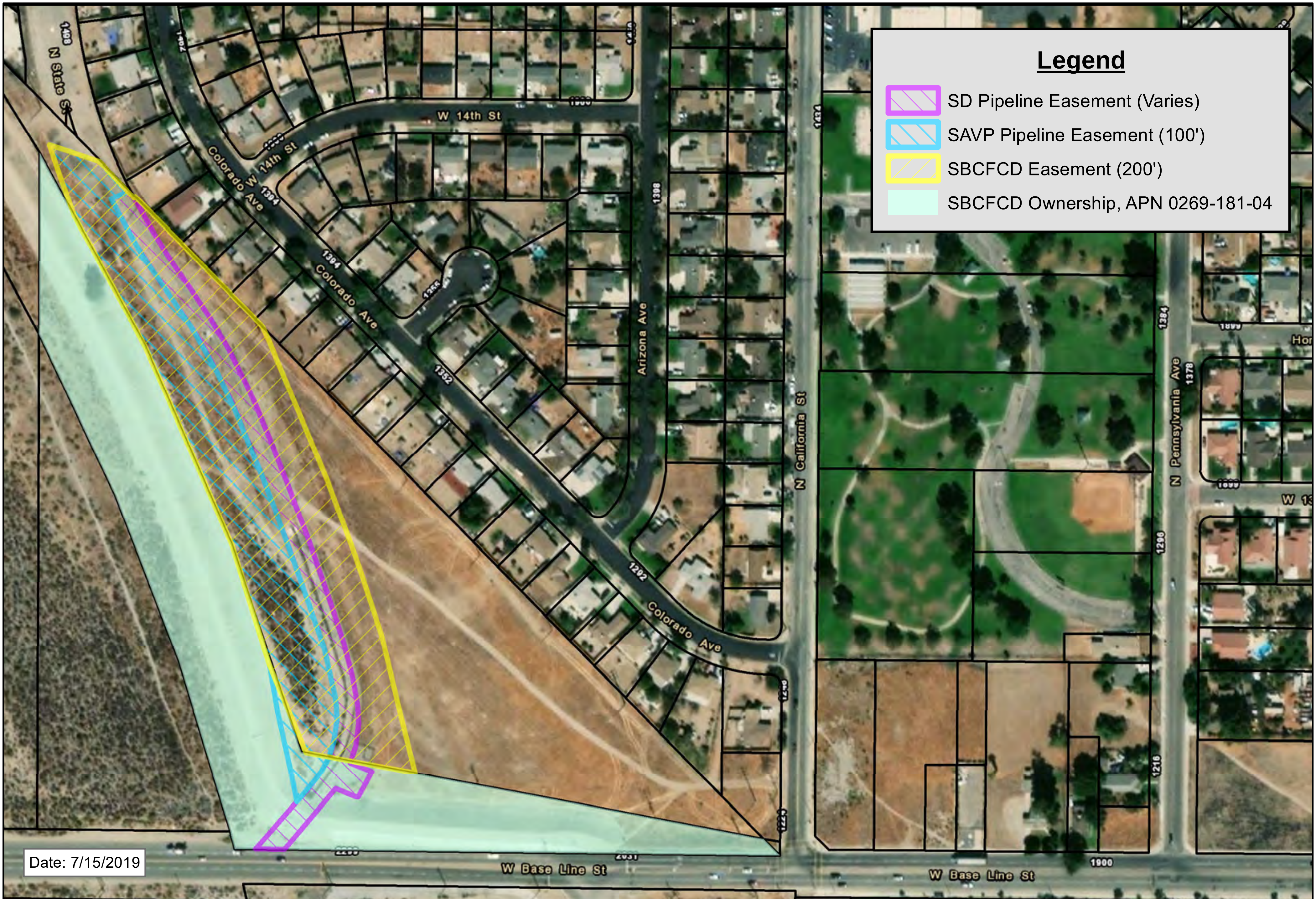
N

1 inch = 167 feet

Figure 8
Segment 5

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street



Imagery Date: 10/7/2017

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1 inch = 208 feet

Figure 9
Easements

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street

5 ENVIRONMENTAL CHECKLIST FORM

1. **Project Title:** Phase 1 of the State Street Extension (4 Lanes)
Baseline Street to 16th Street (SS04-009)

2. **Lead Agency Name:** City of San Bernardino Community Development
Address: 201-B, N. "E" Street, San Bernardino, CA 92401-1507

3. **Contact Person:** Chantal Power, Associate Planner
City of San Bernardino Community Development
201-B, N. "E" Street, San Bernardino, CA 92401-1507

Phone Number: (909) 384-7272

4. **Project Location:** Topographic Quad (USGS 7.5"): *San Bernardino South*
Topographic Quad Coordinates: Township 1 North, Range 4 West Section 31
Latitude: 34° 7'31.19"N, Longitude: 117°20'7.45" W

6. **General Plan Designation:** Roadway, Residential Suburban and Flood Control

7. **Zoning:** Roadway, Residential Suburban and Flood Control

8. **Description of project: (Describe the whole action involved, including but not limited to later phases of the project and any secondary, support, or off-site features necessary for its implementation).**

The City of San Bernardino proposes to improve State Street between Baseline Street and 16th Street to four lanes, a median, curb and gutter and sidewalks, consistent with the General Plan Circulation Element that identifies State Street as a Major Arterial. The existing portion of State Street between 16th Street and the end of the developed section of Handford will be widened from two lanes to four lanes New right-of-way will be obtained between the end of Hanford and Baseline to accommodate a the four-lane roadway, curb and gutter and sidewalks.

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

The Project will occur on portions of the existing State Street, between 16th Street (north Project terminus) and Baseline Street (south project terminus). The Project area is generally surrounded by residential properties vacant land, and stormwater facilities.

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

- Department of Water Resources. Encroachment permit and design review.
- San Bernardino County Flood Control District: Encroachment permit and design review.
- Construction Compliance – Stormwater Discharge. Construction projects that disturb 1 acre of land or more are required to obtain coverage under the NPDES General Permit for Construction Activities (General Construction Permit), which requires the applicant to file a notice of intent (NOI) to discharge stormwater and to prepare and implement a SWPPP. The SWPPP includes an overview of the Best Management Practices

(BMPs) that would be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. The SWPPP will also address post-construction measures for water quality protection.

Lead Agency Discretionary Actions:

Discretionary actions that may be taken by the Lead Agency include, but are not limited to, the following:

- Award contracts for construction
- Purchase property or easements

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

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 21080.3.2.) 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.

On January 21, 2019, CRM TECH submitted a written request to the Native American Heritage Commission (NAHC) for a records search in the commission's Sacred Lands File. Following the NAHC's recommendations and previously established consultation protocol, on February 1 CRM TECH further contacted a total of nine tribal representatives in the region in writing for additional information on potential Native American cultural resources in the project vicinity.

In response to CRM TECH's inquiry, the NAHC stated in a letter on January 23, 2019, that the Sacred Lands File indicated the presence of unspecified Native American cultural resource(s) in the general vicinity of the project area. For the specific location and nature of such resource(s), the NAHC referred further inquiry to tribes in the surrounding region and provided a list of potential contacts. Upon receiving the NAHC's reply, on February 1 CRM TECH contacted all nine tribal organizations on the referral list in writing. For some of the tribes, the designated spokespersons on cultural resources issues were contacted in lieu of the individuals on the referral list, as recommended in the past by the tribal government staff. The nine tribal representatives contacted during CRM Tech's Study are listed below:

- Andrew Salas, Chairperson, Gabrieleno Band of Mission Indians-Kizh Nation;
- Sandonne Goad, Chairperson, Gabrielino Tongva Nation;
- Anthony Morales, Chairperson, Gabrieleño/Tongva San Gabriel Band of Mission Indians;
- Robert Dorame, Chairperson, Gabrielino Tongva Indians of California Tribal Council;
- Charles Alvarez, Chairperson, Gabrielino Tongva Tribe;
- Travis Armstrong, Tribal Historic Preservation Officer, Morongo Band of Mission Indians;
- Donna Yocum, Chairperson, San Fernando Band of Mission Indians;
- Jessica Mauck, Cultural Resources Analyst, San Manuel Band of Mission Indians;
- Mark Cochrane, Chairperson, Serrano Nation of Mission Indians.

Three of the nine tribes have responded in writing to CRM Tech. Jessica Mauck of the San Manuel Band asked for clarification of the project location by telephone on February 4 to help identify the NAHC finding and better assess the potential for Native American cultural resources to be encountered in or near the project area. She suspected that the finding could represent Site 36-032705, the reburial site mentioned above. Later that day, Ms. Mauck stated by e-mail that the NAHC finding could also refer to the former Serrano village of *Apuritaimbit* and/or Site 36-001457, which was known to contain highly significant materials. As both of these were located on the west side of the Lytle Creek Wash, Ms. Mauck further stated that the tribe was not aware of any Native American cultural resources on the east side of the creek, where the project area lies.

Brandy Salas, Admin Specialist of the Gabrieleno Band of Mission Indians-Kizh Nation, indicated that her tribe would like to pursue government-to-government consultation with the City of San Bernardino since ground disturbance would take place during the project. Travis Armstrong stated that the Morongo Band had no additional information to provide and would likely defer to the San Manuel Band for further consultation regarding this project.

On July 1, 2019, the City notified the following tribal entity representatives of the Project and the timeframe in which to request consultation:

- Mr. Joseph Ontiveros, Director of Cultural Resources, Soboba Band of Luiseño Indians
- Mr. Daniel F. McCarthy, RPA, Director-CRM Department, San Manuel Band of Mission Indians
- Mr. Andrew Salas, Chairman, Gabrieleno Band of Mission Indians - Kizh Nation

On August 8, 2019, Ms. Mauck requested via email that mitigation measures be in place to protect potential tribal resources. These mitigation measures have been incorporated into this document. No other tribes provided comments.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The Proposed Project could potentially affect ("Potentially Significant" or "Less than Significant with Mitigation Incorporated") the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor and identifies where mitigation measures would be necessary to reduce all impacts to less than significant.

☐	Aesthetics	☐	Agricultural / Forest Resources	☒	Air Quality
☒	Biological Resources	☒	Cultural Resources	☐	Energy
☒	Geology / Soils	☐	Greenhouse Gas Emissions	☒	Hazards / Hazardous Materials
☒	Hydrology / Water Quality	☐	Land Use / Planning	☐	Mineral Resources
☒	Noise	☐	Population / Housing	☐	Public Services
☐	Recreation	☒	Transportation	☒	Tribal Cultural Resources
☐	Utilities / Service Systems	☒	Wildfire	☐	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.
X	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.

Jericho Systems, Inc.
Prepared by Date

Signature Date

EVALUATING 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 would 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 is 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 Section XVII, "Earlier Analyses," 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 Analyses 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?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) In nonurbanized 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 a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

SUBSTANTIATION: (Check ☐ if project is located within a view-shed of any Scenic Route listed in the General Plan.

Environmental Setting

The Project area is located in the eastern portion of the City of San Bernardino, within the San Bernardino Valley. The Valley floor is primarily developed with urban and suburban uses. The San Bernardino Mountains to the north provide a dramatic visual backdrop for the Valley.

The Project area is located in a relatively flat area, just east of Lytle Creek Wash, an important visual resource in the City of San Bernardino. However, views of the wash bottom and environment is obscured from the view of the immediate area by a tall berm that also provides flood protection.

Representative photos of the alignment are provided in Photos 1 through __ at the end of this section.

Impact Analysis

a) Have a substantial adverse effect on a scenic vista?

Less Than Significant. The CEQA Guidelines do not provide a definition of what constitutes a “scenic vista” or “scenic resource” or a reference as to from what vantage point(s) the scenic vista and/or resource, if any, should be observed. However, a scenic vista can generally be defined as a viewpoint from a public vantage that provides expansive views of a highly-valued landscape for the benefit of the general public. Common examples include undeveloped hillsides, ridgelines, and open space areas that provide a unifying visual backdrop to a developed area. Scenic resources are those landscape patterns and features that are visually or aesthetically pleasing and that contribute affirmatively to the definition of a distinct community or region such as trees, rock outcroppings, and historic buildings.

The Project site is within an urbanized area with medium-density housing along both sides in Segments 1 and 2, and housing along the east side of Segment 3 and 4. The new roadway elevation will gradually rise in Segments 4 and 5, to match the existing elevation of Baseline Street, however, the view of the mountains from the surrounding public areas will not be interrupted. The Project would have a less than significant impact on scenic vistas.

b) *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*

No Impact. The Department of Transportation (Caltrans) manages the State Scenic Highway Program, provides guidance, and assists local government agencies, community organizations, and citizens with the process to officially designate scenic highways. The closest state scenic highway to the Project area is State Route 38, located near Big Bear, about 20 miles east of the Project alignment. The Project does not occur within a state scenic highway, nor will it connect to any scenic highway, nor can the Project be viewed from a state scenic highway. The Project will have no impact on scenic resources 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 a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

Less Than Significant. The Project is located within an urbanized area. The City of San Bernardino's General Plan identifies the future extension of State Street as a Major Arterial, which will contain four lanes and sidewalks. The General Plan, Community Design section, also identifies specific corridors within the City that should have enhanced features such as street trees, street lighting, streetscape elements (such as sidewalk/crosswalk paving, street furniture), and public signage. And though the General Plan does not identify State Street as one of the mandated corridors, the Project plans include street lighting, sidewalks, and pedestrian crossings. Therefore, the Project is consistent with both the Major Arterial requirements as well as contains several Community Design elements to provide an aesthetically pleasing roadway. Therefore, there is a less than significant impact.

d) *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

Less Than Significant. The City of San Bernardino does not permit construction activities outside of daylight hours, so the construction associated with the proposed Project would not cause the emission of light beyond existing circumstances in that area. Within the City limits, the majority of lands are developed, and daytime and nighttime skies are already impacted to a limited extent by light and glare.

The proposed Project includes the installation of streetlights placed uniformly between 16th Street and Baseline Street. The street lighting will use Light Emitting Diode (LED) lamps and placed in a manner where the light will spread out uniformly across the lanes while maintaining a lower power density. LED lamps are naturally directional in that they emit light for 180 degrees by default, unlike the standard High Pressure Sodium (HPS) lamps used in most streetlights which emit light omnidirectionally, or 360 degrees. Therefore, the LED streetlights will emit almost no leakage onto off site areas, such as in the backyards of the adjacent residences. Therefore, the Project will not create a substantial source of light or glare that would adversely affect day or nighttime views and the impact is less than significant.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusions:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

Photo 1 – Segment 1 Looking south (Start of Project)

Photo 2 – Segment 1 Looking North (210 Freeway in background)

Photo 3 – Segment 2 Looking South

Photo 4 – Segment 4 Looking North (Segment 3 is noted by arrow in background, note Lytle Creek wash levee on west side)

	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?				X
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?				X
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))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
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?				X

SUBSTANTIATION: (Check ☐ if project is located in the Important Farmlands Overlay):

<u>Environmental Setting</u>

The Project alignment occurs within an urban area and vacant lands within the urban area.

Impact Analysis

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?*

No Impact. The Project alignment is not identified within the survey limits of California Department of Conservation, Farmland Mapping and Monitoring Important Farmland Finder. No land under Williamson Act Contract occurs at the Project alignment and no impacts will occur.

b) *Conflict with existing zoning for agricultural use or a Williamson Act contract?*

No Impact. None of the land on or near the Project alignment is currently under agricultural production, nor are any parcels under a Williamson Act contract. Therefore, no impact is anticipated from the proposed Project.

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))?*

No Impact. Forest land is defined in Public Resources Code section 12220(g) as "land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits." No timberland or lands zoned Timberland Production as defined above are within the Project sites. The Project is not located in an area zoned for forest land or timber production. Therefore, the Project will impact the ability of land's ability to support 10 percent native tree cover of any species; thus, no forest lands will be reclassified as non-forest lands under Public Resources Code Section 12220(g). Therefore, there will be no impacts under this criterion.

d) *Result in the loss of forest land or conversion of forest land to non-forest use?*

No Impact. As mentioned above, the disturbances associated with the Project activities would not impact the lands' ability to support 10-percent native tree cover of any species, and thus no forest lands as defined in Public Resources Code Section 12220(g) would be lost. In addition, no such lands would be converted to non-forest use as a result of the project construction and operations activities. Therefore, there will be no impacts under this criterion.

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?*

No Impact. The construction and operation of the proposed Project do not involve other changes in the existing environment that could result in the conversion of farmland to non-agricultural use or forest land to non-forest land use. Therefore, there will be no impacts to this criterion.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusions:

No significant adverse impacts are identified or anticipated, and no mitigation measures are 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?			X	
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?		X		
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people?			X	

SUBSTANTIATION: (Discuss conformity with the South Coast Air Quality Management Plan, if applicable):

A technical study of the Project's potential Air Quality impacts was prepared by Urban Crossroads in July 2019 and is contained in Appendix B.

Regulatory Setting

Air pollutants are regulated at the national, State, and air basin level; each agency has a different level of regulatory responsibility. The United States Environmental Protection Agency (EPA) regulates at the national level. The California Air Resources Board (CARB) regulates at the State level. The South Coast Air Quality Management District (SCAQMD) regulates at the air basin level.

Federal and State Regulations

EPA is responsible for global, international, and interstate air pollution issues and policies. EPA sets national vehicle and stationary source emission standards, oversees approval of all State Implementation Plans, provides research and guidance for air pollution programs, and sets National Air Quality Standards, also known as federal standards. There are six common air pollutants, called criteria pollutants, which were identified from the provisions of the Clean Air Act of 1970.

- Ozone (O_3)
- Nitrogen Dioxide (NO_x)
- Lead
- Particulate Matter (PM_{10} and $PM_{2.5}$)
- Carbon Monoxide (CO)
- Sulfur Dioxide (SO_2)

The federal standards were set to protect public health, including that of sensitive individuals; thus, the standards continue to change as more medical research is available regarding the health effects of the criteria pollutants. Primary federal standards are the levels of air quality necessary, with an adequate margin of safety, to project the public health.

Each state prepares State Implementation Plans (SIP) that describes existing air quality conditions and measures that will be followed to attain and maintain federal standards. The SIP for California is administered by the California Air Resources Board (CARB), which has overall responsibility for statewide air quality maintenance and air pollution prevention. The California SIP incorporates individual federal attainment plans for regional air districts – the air district prepares their federal attainment plan, which is sent to CARB to be approved and incorporated into the California SIP. Federal attainment plans include the technical foundation for understanding air quality (e.g., emission inventories and air quality monitoring), control measures and strategies, and enforcement mechanisms. See http://www.arb.ca.gov/research/aaqs/aaqs.htm for additional information on criteria pollutants and air quality standards.

The federal and state ambient air quality standards are summarized in Table 1.

Several pollutants listed in Table 1were not addressed in the project's *Air Quality Assessment* (Appendix B). For example, the analysis of lead is not included because the proposed project is not anticipated to emit lead. Visibility-reducing particles were not explicitly addressed because particulate matter is addressed (PM_{10} and $PM_{2.5}$).

South Coast Air Quality Management District (SCAQMD)

SCAQMD is responsible for controlling emissions primarily from stationary sources and maintains air quality monitoring stations throughout the air basin. SCAQMD, in coordination with the Southern California Association of Governments (SCAG), is also responsible for developing, updating, and implementing the Air Quality Management Plan (AQMP) for the air basin. An AQMP is a plan prepared and implemented by an air pollution district for a county or region designated as nonattainment of the federal and/or State ambient air quality standards. The term nonattainment area is used to refer to an air basin where one or more ambient air quality standards are exceeded.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentrations[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O3)	1-Hour	0.09 ppm	Ultraviolet Photometry	- -	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm		0.070 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)[8]	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µ/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		- -		
Fine Particulate Matter (PM2.5)[8]	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 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1-Hour	20 ppm (23 µg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 µg/m^3)	- -	Non-Dispersive Infrared Photometry (NDIR)
	8-Hour	9.0 ppm (10 µg/m^3)		9 ppm (10 µg/m^3)	- -	
	8-Hour (Lake Tahoe)	6 ppm (7 µg/m^3)		- -	- -	
Nitrogen Dioxide (NO_2)[9]	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 (357 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[10]	1-Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	- -	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3-Hour	- -		- -	0.5 ppm (1300 mg/m^3)	
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	- -	
	Annual Arithmetic Mean	- -		0.14 ppm (for certain areas)[10]	- -	
Lead[11,12]	30 Day Average	1.5 µg/m^3	Atomic Absorption	- -		
	Calendar Qrtr	- -		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average	- -		0.15 µg/m^3		
Visibility Reducing Particles[13]	8-Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No National 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[11]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Notes:

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 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 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 CARB 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 December 14, 2012, the national annual 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 (primary 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 (primary 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.
9. 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.

10. 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.
11. CARB 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.
12. 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.
13. In 1989, CARB 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.

Every three (3) years the SCAQMD updates the AQMP with a 20-year horizon.

On March 3, 2017, SCAQMD adopted the 2016 AQMP. The 2016 AQMP incorporates the latest scientific and technological information and planning assumptions, including the SCAG 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and updated emission inventory methodologies for various source categories. In addition, the 2016 AQMP includes the new and changing federal requirements, the implementation of new technology measures, and the continued development of economically sound, flexible compliance approaches

South Coast Air Quality Management District Rules

The AQMP for the basin establishes a program of rules and regulations administered by SCAQMD to obtain attainment of the State and federal standards. Some of the rules and regulations that apply to this project include, but are not limited to, the following:

SCAQMD Rule 402 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403 governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Applicable suppression techniques are indicated below and include but are not limited to the following:

- Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas in active for 10 days or more).
- Water active sites at least three times daily.

- Cover all trucks hauling dirt, san, soil, or other loose materials, or maintain at least 2 feet of freeboard in accordance with the requirements of California Vehicle Code (CVC) section 23114.
- Pave construction access roads at least 100 feet onto the site from the main road.
- Reduce traffic speeds on all unpaved roads to 15 mph or less.
- Suspension of all grading activities when wind speeds (including instantaneous wind gusts) exceed 25 mph.
- Bumper strips or similar best management practices shall be provided where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site each trip.
- Replanting disturbed areas as soon as practical.
- During all construction activities, construction contractors shall sweep on-site and off-iste streets if silt is carried to adjacent public thoroughfares, to reduce the amount of particulate matter on public streets.

<u>SCAQMD Rule 1113</u> governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and solvents used during construction and operation of project must comply with Rule 1113.

<u>Idling Diesel Vehicle Trucks</u> – Idling for more than 5 minutes in any one location is prohibited within California borders.

City of San Bernardino General Plan

Local jurisdictions, such as the City of San Bernardino, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. Specifically, the City is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The City is also responsible for the implementation of transportation control measures as outlined in the 2016 AQMP. Examples of such measures include bus turnouts, energy-efficient streetlights, and synchronized traffic signals. In accordance with CEQA requirements and the CEQA review process, the City assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits, and monitors and enforces implementation of such mitigation.

In accordance with the CEQA requirements, the City does not, however, have the expertise to develop plans, programs, procedures, and methodologies to ensure that air quality within the City and region will meet federal and state standards. Instead, the City relies on the expertise of the SCAQMD and utilizes the SCAQMD CEQA Handbook as the guidance document for the environmental review of plans and development proposals within its jurisdiction.

The City of San Bernardino General Plan Natural Resources and Conservation Element contains the following air quality-related goals and policies that are applicable to the proposed Project:

Goal 12.5 *Promote air quality that is compatible with the health, well being, and enjoyment of life.*

- Policy 12.5.1 Reduce the emission of pollutants including carbon monoxide, oxides of nitrogen, photochemical smog, and sulfate in accordance with South Coast Air Quality Management District (SCAQMD) standards.

- Policy 12.5.3 Require dust abatement measures during grading and construction operations. (LU-1)

The City of San Bernardino identified significant and unavoidable impacts to air quality with adoption of the City's General Plan in 2005. As a result, the City adopted a Statement of Overriding Considerations for Air Quality impacts when it certified the Final Environmental Impact Report (FEIR) prepared for the General Plan.

Air Basin Attainment Status

EPA and CARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the three-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard. Table 2, lists the attainment status for the criteria pollutants in the basin.

Table 2
South Coast Air Basin Attainment Status

Pollutant	Averaging Time	National Standards[1]	Attainment Date[2]	California Standards[3]
1979 1-Hour Ozone[4]	1-Hour (0.12 ppm)	Nonattainment (Extreme)	2/26/2023 (revised deadline[4])	Extreme Nonattainment
1997 8-Hour Ozone[5]	8-Hour (0.08 ppm)	Nonattainment (Extreme)	6/15/2024	Nonattainment
2008 8-Hour Ozone	8-Hour (0.075 ppm)	Nonattainment (Extreme)	7/20/2032	
2015 8-Hour Ozone	8-Hour (0.070 ppm)	Pending - Expect Nonattainment	Pending (beyond 2032)	
CO	1-Hour (35 ppm) 8-Hour (9 ppm)	Attainment (Maintenance)	6/11/2007 (Attained)	Maintenance
NO_2[6]	1-Hour (100 ppb) Annual (0.053 ppm)	Attainment (Maintenance)	9/22/1998 (Attained)	Attainment
SO_2[7]	1-Hour (75 ppb)	Designations Pending	Pending	Attainment
	24-Hour (0.14 ppm) Annual (0.03 ppm)	Unclassifiable/ Attainment	3/19/1979 (Attained)	
PM10	24-Hour (150 µg/m^3)	Attainment (Maintenance)	7/26/2013 (Attained)[8]	Nonattainment
PM2.5	24-Hour (35 µg/m^3)	Nonattainment (Serious)	12/31/2019	Unclassified
Lead	3-Months Rolling (0.15 µg/m^3)	Nonattainment (Partial)[9]	12/31/2015	Nonattainment (Partial)[9]

Notes:

1. Obtained from Draft 2016 AQMP, SCAQMD, 2016. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassified/Attainment or Unclassifiable.
2. A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for attainment demonstration.
3. Obtained from http://www.arb.ca.gov/desig/adm/adm.htm.
4. 1-hour O_3 standard (0.13 ppm) was revoked, effective June 15, 2005; however, the Basin has not attained this standard based on 2008-2010 data has some continuing obligations under the former standard.
5. 1997 8-hour O_3 standard (0.08 ppm) was reduced (0.075 ppm), effective May 27, 2008; the 1997 O3 standard and most related implementation rules remain in place until the 1997 standard is revoked by U.S. EPA.
6. New NO_2 1-hour standard, effective August 2, 2010; attainment designations June 2013; annual NO_2 standard retained.

7. The 1971 annual and 24-hour SO_2 standards were revoked, effective August 23, 2010; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard. Area designations expected in 2012, with SSAB designated Unclassifiable/Attainment.
8. The 1971 annual and 24-hour SO_2 standards were revoked, effective August 23, 2010; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard. Area designations expected in 2012, with SSAB designated Unclassifiable/Attainment.
9. Partial Nonattainment designation - Los Angeles County portion of Basin only.

Environmental Setting

The project site is located within the City of San Bernardino, in San Bernardino County, which is part of the South Coast Air Basin (SCAB) that includes all of Orange County as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The Air Basin is located on a coastal plain with connecting broad valleys and low hills to the east. Regionally, the Air Basin is bounded by the Pacific Ocean to the southwest and high mountains to the east forming the inland perimeter.

Local Air Quality

The Project site is located within the Source Receptor Area (SRA) 34 (South Coast Air Quality Management District, n.d.). Within SRA 34, the SCAQMD Central San Bernardino Valley monitoring station is located 3.55 miles south of the Project site and is the nearest long-term air quality monitoring site for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$.

The most recent three (3) years of data available is shown on Table 3, which identifies the number of days ambient air quality standards were exceeded for the study area, which is considered to be representative of the local air quality at the Project site. Data for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ for 2015 through 2017 was obtained from the SCAQMD Air Quality Data Tables (District). Additionally, data for SO_2 has been omitted as attainment is regularly met in the SCAB and few monitoring stations measure SO_2 concentrations.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases.

Residential areas are also considered to be sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Other sensitive receptors include retirement facilities, hospitals, and schools. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

Table 3
Project Area Air Quality Monitoring Summary 2015-2017

POLLUTANT	STANDARD	YEAR		
		2015	2016	2017
O_3				
Maximum Federal 1-Hour Concentration (ppm)		0.134	0.158	0.158
Maximum Federal 8-Hour Concentration (ppm)		0.117	0.118	0.136
Number of Days Exceeding Federal 1-Hour Standard	>0.07 ppm	6	10	14
Number of Days Exceeding State 1-Hour Standard	> 0.09 ppm	52	70	81
Number of Days Exceeding Federal 8-Hour Standard	> 0.070 ppm	78	106	112
Number of Days Exceeding State 8-Hour Standard	> 0.070 ppm	79	108	112
CO				
Maximum Federal 1-Hour Concentration	> 35 ppm	2.3	2.2	2.5
Maximum Federal 8-Hour Concentration	> 20 ppm	1.8	1.7	2.3
NO_2				
Maximum Federal 1-Hour Concentration	> 0.100 ppm	0.071	0.060	0.066
Annual Federal Standard Design Value		0.015	0.017	0.016
PM_{10}				
Maximum Federal 24-Hour Concentration (µg/m^3)	> 150 µg/m^3	78.0	91.0	86.0
Annual Federal Arithmetic Mean (µg/m^3)		30.7	33.1	30.9
Number of Days Exceeding Federal 24-Hour Standard	> 150 µg/m^3	0	0	0
Number of Days Exceeding State 24-Hour Standard	> 50 µg/m^3	17	33	35
$PM_{2.5}$				
Maximum Federal 24-Hour Concentration (µg/m^3)	> 35 µg/m^3	53.5	32.5	38.2
Annual Federal Arithmetic Mean (µg/m^3)	> 12 µg/m^3	10.7	10.8	11.4
Number of Days Exceeding Federal 24-Hour Standard	> 35 µg/m^3	2	0	1

Source: Data for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ was obtained from SCAQMD Air Quality Data Tables.

Project Emissions Assumptions

Project construction will require the use of heavy equipment which will emit constituents of concern as well as create dust over the approximately 7-acre Project work area. Detailed summaries of the construction duration and construction equipment is shown in Table 4 and Table 5. The site-specific construction fleet may vary due to specific project needs at the time of construction. The duration of construction activity and associated equipment both represent a reasonable approximation of the expected construction fleet.

Table 4
Construction Duration

Phase Name	Start Date	End Date	Days
Demolition	10/11/2021	01/07/2022	65
Earthwork[1]	01/08/2022	04/08/2022	65
Paving	04/09/2022	07/08/2022	65
Traffic Installations [2]	07/09/2022	10/07/2022	65

Source: Construction activity based the 2022 opening year.

Table 5
Construction Equipment Assumptions

Activity	Equipment	Number	Hours Per Day
Demolition	Concrete/Industrial Saws	1	8
	Excavators	3	8
	Rubber Tired Dozers	2	8
Earthwork	Excavators	1	8
	Graders	1	8
	Rubber Tired Dozers	2	8
	Scrapers	1	8
	Tractors/Loaders/Backhoes	3	8
Paving	Pavers	2	8
	Paving Equipment	2	8
	Rollers	2	8
Traffic Installations	Air Compressors	1	8

Source: Construction equipment based on the Project Description and CalEEMod defaults.

[1] It should be noted that CalEEMod does not provide an extensive selection of construction activity options. As such, for CalEEMod purposes, earthwork activities were modeled as grading/excavation.
[2] For CalEEMod purposes, traffic installation activities were modeled as drainage/utilities/sub-grade activities.

Standards of Significance

The SCAQMD has also developed regional significance thresholds for other regulated pollutants, as summarized at Table 6 (South Coast Air Quality Management District (SCAQMD)). The SCAQMD's CEQA Air Quality Significance Thresholds (March 2015) indicate that any projects in the SCAB with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

Table 6
Maximum Daily Regional Emissions Thresholds

Pollutant	Construction
NO_X	100 lbs/day
VOC	75 lbs/day
PM_{10}	150 lbs/day
$PM_{2.5}$	55 lbs/day
SO_X	150 lbs/day
CO	550 lbs/day
Lead	3 lbs/day

Source: Regional Thresholds presented in this table are based on the SCAQMD Air Quality Significance Thresholds, March 2015

Construction Emissions Modeling

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 California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (California Air Pollution Control Officers Association (CAPCOA), 2016). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine construction air quality emissions.

The Project is divided into five segments. Rather than modeling each segment separately, all segments will be modeled together in order to identify a "worst-case" analysis scenario. The construction schedule presented in Table 4 is based on the 2022 opening year and a 12-month construction period. It should be noted that 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.

Dust is typically a major concern during demolition and earthwork activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Fugitive dust emissions rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). The CalEEMod model was utilized to calculate fugitive dust emissions resulting from this phase of activity.

Construction activities associated with the Project will result in emissions of VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$. Construction related emissions are expected from the following construction activities:

- Demolition
- Earthwork
- Paving
- Traffic Installations

Construction is expected to commence in October 2021 and will last through October 2022.

Construction Emissions Results

Demolition. The Project will require demolition of existing improvements (pavement, curb, gutters). Based on information provided in the project description, the Project would result in approximately 5,003.33 tons of debris from demolition activities.

Earthwork Activities. Based on information provided by the Project applicant, the Project is expected require 20,000 cubic yards of imported soil. For purposes of analysis, the CalEEMod default hauling trip length of 20 miles will be utilized for analytical purposes. Dust is typically a major concern during rough grading activities.

Construction Worker Vehicle Trips. Construction emissions for construction worker vehicles traveling to and from the Project site, as well as vendor trips (construction materials delivered to the Project site) were estimated based on information from CalEEMod model defaults.

Fugitive Dust. The SCAQMD Rules that are currently applicable during construction activity for this Project include Rule 403 (Fugitive Dust) (South Coast Air Quality Management District) and Rule 1113 (Architectural Coatings) (South Coast Air Quality Management District). As such, credit for Rule 403 and Rule 1113 have been taken in the air quality modeling herein.

The estimated maximum daily construction emissions without mitigation are summarized on Table 7. Detailed construction model outputs are presented in Appendix B. Under the assumed scenarios, emissions resulting from the Project construction would not exceed criteria pollutant thresholds established by the SCAQMD for emissions of any criteria pollutant.

Table 7
Overall Construction Emissions Summary (Without Mitigation)

Year	Emissions (lbs/day)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2021	3.29	33.23	22.38	0.05	2.51	1.63
2022	3.94	47.25	27.45	0.09	8.42	4.55
Maximum Daily Emissions	**3.94**	**47.25**	**27.45**	**0.09**	**8.42**	**4.55**
SCAQMD Regional Threshold	75	100	550	150	150	55
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Source: The unmitigated CalEEMod regional construction-source emissions are presented in Appendix 3.1 of Appendix ___

Localized Significance Air Quality – Construction Activity

The SCAQMD established Localized Significance Thresholds (LSTs) in response to the SCAQMD Governing Board's Environmental Justice Initiative I-4[3]. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. The SCAQMD states that lead agencies can use the LSTs as another indicator of significance in its air quality impact analyses. LSTs were developed in response to environmental justice and health concerns raised by the public regarding exposure of individuals to criteria pollutants in local communities. To address the issue of localized significance, the SCAQMD adopted LSTs that show whether a project would cause or contribute to localized air quality impacts and thereby cause or contribute to potential localized adverse health effects. The analysis makes use of methodology included in the *LST Methodology* (Lake Environmental, n.d.).

For this Project, the appropriate Source Receptor Area (SRA) for the LST analysis is the SCAQMD Central San Bernardino Valley monitoring station (SRA 34). LSTs apply to CO, NO_2, PM_{10}, and $PM_{2.5}$. The SCAQMD produced look-up tables for projects less than or equal to 5 acres in size. SCAQMD's *LST Methodology* clearly states that "off-site mobile emissions from the Project should not be included in the emissions compared to LSTs (South Coast Air Quality Management District, 2003)." Therefore, for purposes of the construction LST analysis, only emissions included in the CalEEMod "on-site" emissions outputs were considered.

Sensitive receptors in the Project study area include existing residential homes located along the route between approximately 17 feet and 73 feet from the Project area (refer to Exhibit 3-A in Appendix B). The closest residential receptors are located in Segment 2, approximately 17 feet from the Project alignment.

Based on the air quality modeling, the localized significance does not exceed thresholds for any of the parameters, as identified in Table 8.

Table 8
Localized Significance Summary of Construction (Without Mitigation)

On-Site Demolition Emissions	**Emissions (lbs/day)**			
	NO_X	**CO**	**PM_{10}**	**$PM_{2.5}$**
Maximum Daily Emissions	**31.44**	**21.57**	**2.19**	**1.54**
SCAQMD Localized Threshold	118	667	4	3
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**
On-Site Earthwork Emissions	**Emissions (lbs/day)**			
	NO_X	**CO**	**PM_{10}**	**$PM_{2.5}$**
Maximum Daily Emissions	**38.59**	**25.23**	**7.45**	**4.27**
SCAQMD Localized Threshold	187	1,101	8	5
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod localized construction-source emissions are presented in Appendix ____.

[3] The purpose of SCAQMD's Environmental Justice program is to ensure that everyone has the right to equal protection from air pollution and fair access to the decision-making process that works to improve the quality of air within their communities. Further, the SCAQMD defines Environmental Justice as "…equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution."

CO "Hot Spot" Analysis

CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. In response, vehicle emissions standards have become increasingly stringent in the last twenty years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SCAB is now designated as attainment.

To establish a more accurate record of baseline CO concentrations affecting the SCAB, the SCAQMD conducted a CO "hot spot" analysis in 2003 for four busy intersections in Los Angeles at the peak morning and afternoon time periods. This "hot spot" analysis did not predict any violation of CO standards (refer to Appendix B for details)

At buildout of the State Street Extension Project, the highest daily traffic volumes generated at the roadways within the vicinity of the Project are expected to generate less than the highest daily traffic volumes generated at the busiest intersection in the CO "hot spot" analysis conducted in 2003. As such, the Project would not likely exceed the most stringent 1-hour CO standard.

Impact Analysis

a) Conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant. CEQA requires a discussion of any inconsistencies between a proposed project and applicable general plans and regional plans (CEQA Guidelines Section 15125). The applicable air quality plan is SCAQMD 2016 AQMP. The AQMP is a regional blueprint for achieving air quality standards and healthful air. Conflicts with the AQMP would arise if Project activities result in a substantial increase in employment or population that was not previously adopted and/or approved in a General Plan. Large population or employment increases could affect transportation control strategies, which are among the most important in the air quality plan, since transportation is a major contributor to particulates and ozone for which the SCAB is not in attainment.

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's CEQA Air Quality Handbook (1993) (South coast Air Quality Management District, 1993). These indicators are discussed below:

Consistency Criterion No. 1: The proposed Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

The violations that Consistency Criterion No. 1 refers to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if localized or regional significance thresholds were exceeded. The Project would not exceed the applicable LST thresholds or regional significance thresholds for construction activity after implementation of applicable mitigation measures. Therefore, the Project would not conflict with the AQMP according to this criterion.

Consistency Criterion No. 2: The Project will not exceed the assumptions in the AQMP based on the years of Project build-out phase.

The 2016 AQMP demonstrates that the applicable ambient air quality standards can be achieved within the timeframes required under federal law. Growth projections from local general plans adopted by cities in the district are provided to the SCAG, which develops regional growth forecasts, which are then used to develop future air quality forecasts for the AQMP. Development consistent with the growth projections in the General Plan is considered to be consistent with the AQMP.

<u>Construction Impacts</u>

Peak day emissions generated by construction activities are largely independent of land use assignments, but rather are a function of development scope and maximum area of disturbance. Irrespective of the site's land use designation, development of the site to its maximum potential would likely occur, with disturbance of the entire site occurring during construction activities. Development consistent with the growth projections in the General Plan is considered to be consistent with the AQMP. On the basis of the preceding discussion, the Project is determined to be consistent with the second criterion.

The Project would not result in or cause NAAQS or CAAQS violations. The Project does not propose a land use development but rather the widening of a road segment. The Project is therefore considered to be consistent with the AQMP. A less than significant impact is identified, and no mitigation measures are proposed.

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?

Less Than Significant With Mitigation Incorporated. The proposed construction of State Street between 16th and Baseline would require earthmoving, material removal, and other activities such as removal of plants and /or other organics. The project's construction activities were screened for emission generation using latest version of CalEEMod™ as required by the SCAQMD. The results are summarized in Table 7 and identified that none of the criteria pollutants would be exceeded. Therefore, there is a less than significant impact.

Compliance with SCAQMD Rules 402 and 403

Although the proposed project does not exceed SCAQMD thresholds during construction activities, the City and or its contractor is required to comply with all applicable SCAQMD rules and regulations as the SCAB is in non-attainment status for ozone and suspended particulates (PM_{10}). The project shall comply with, Rules 402 nuisance, and 403 fugitive dust, and Rule 1113 for paints to contain low volatile organic compounds, which require the implementation of Best Available Control Measures (BACM) for each fugitive dust source; and the Air Quality Management Plan (AMCP), which identifies Best Available Control Technologies (BACT) for area sources and point sources, respectively.

Therefore, to ensure compliance with Rule 403 and Rule 1113, **Mitigation Measures AIR-1** and **AIR-2** are included. Mitigation measures are located at the end of this section.

c) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant. The Project alignment is directly adjacent to residences in Segments 1 and 2, and residences lie within proximity to Segments 3 and 4. There are two schools and one large City park within approximately one-quarter of a mile east of the Project alignment.

Sensitive receptors in the Project study area include existing residential homes located along the route between approximately 17 feet and 73 feet from the Project area (refer to Exhibit 3-A in Appendix A). The closest residential receptors are located in Segment 2, approximately 17 feet from the Project alignment.

Based on the air quality modeling, the localized significance does not exceed thresholds for any of the parameters, as identified in Table 8.

Once operational, localized additional emissions from vehicles are anticipated. However the FEIR adopted for the General Plan identified State Street as a Major Arterial as part of the ultimate build-out of the City.

d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people?

Less Than Significant. Project construction equipment would generate odors from the combustion of fuels. The determination of an impact from Project-generated odors is dependent on a number of variables including:

- Nature of the odor source;
- Frequency of odor generation (e.g., daily, seasonal, activity-specific);
- Intensity of the odor (e.g., concentration);
- Wind direction (e.g., upwind or downwind); and
- Sensitivity of the receptor.

Impacts associated with odors from construction equipment and paving would be temporary during Project construction. It is also anticipated that any short-term odors generated by construction equipment would dissipate. Due to the temporary nature of Project activities impacts would be less than significant and no mitigation measures are proposed.

Mitigation Measures:

AIR-1 The contractor shall adhere to applicable measures contained in Table 1 of Rule 403 including, but not limited to:

- All clearing, grading, earth-moving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are limited to 15 miles per hour or less.

AIR-2 The following measures shall be incorporated into Project plans and specifications as implementation of SCAQMD Rule 1113:

- Only “Low-Volatile Organic Compounds” paints (no more than 50 gram/liter of VOC) consistent with SCAQMD Rule 1113 shall be used.

Impact Conclusions:

No significant adverse effects are anticipated with the inclusion of the above mitigation measures.

	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?		X		
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?			X	
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				X
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?		X		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
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?				X

SUBSTANTIATION: (☐ Check if project is located in the Biological Resources Overlay or Contains habitat for any species listed in the California Natural Diversity Database):

A biological resources assessment was conducted for this Project by Jericho Systems and is located in Appendix C.

Environmental Setting

The Project alignment traverses two USGS 7.5' quadrangles: the southwest one-quarter of *San Bernardino North* and the northwest one-quarter of *San Bernardino South*. Residential development generally exists along both sides of the northern half of the alignment. The Assessor's Parcel Numbers associated with the Project are APN 0269-181-02, 0269-181-03, 0269-181-04, and 0269-181-17.

According to the U.S. EPA Regional map, the Project site is located in the Inland Valleys Ecoregion. An Ecoregion is a regional area that has similar ecosystems in terms of type, quality, and quantity of environmental resources. The Inland Valleys Ecoregion consists of alluvial fans and basin floors immediately south of the San Gabriel and

San Bernardino Mountains of Southern California and includes the San Jacinto and Perris Valleys toward the south. This ecoregion includes some floodplains along the Santa Ana River. The soil moisture regime is xeric which is characterized by long periods of drought in the summer. Historically, vegetation in this Ecoregion included Riversidean coastal sage scrub, valley grasslands, and riparian woodlands. Currently, much of this Ecoregion, including the project site and surrounding vicinity is heavily urbanized (Jericho, 2019)

Hydrologically, the project site is located within the Bunker Hill Sub-Area (HSA 801.52) which is within the larger Upper Santa Anna River Watershed (HUC 180702030508). Soils in this area consist of Soboba stony loamy sand and Tujunga gravelly loamy sand from 0-9 percent slopes.

According to State and federal sensitive species database queries, 74 sensitive species (29 vertebrates, 2 invertebrates, and 30 plant species) and 3 sensitive habitats have been documented in the *San Bernardino North* and *San Bernardino South* USGS quadrangles (Jericho 2019). The database query identified three potential species that may occur within the Project area:

- San Bernardino kangaroo rat (*Dipodomys merriami parvus*; [SBKR] – Segments 3 and 4 are within federally-listed critical habitat for this federally-endangered species.

- Los Angeles Pocket Mouse (*Perognathus longimembris brevinasus*; [LAPM] - The is listed as a Critical Species of Concern by the California Department of Fish and Wildlife.

- Burrowing Owl (*Athene cunicularia*; [BUOW]) - The BUOW is not listed under the State or Federal Endangered Species Act but is considered both a State and federal Species of Special Concern (SSC). The BUOW is a protected by the international treaty under the Migratory Bird Treaty Act of 1918 and by State law under the California Fish and Game Code (CDFG Code #3513 & #3503.5).

In November 2016, Jericho Systems Inc (Jericho) conducted a SBKR protocol level presence/absence survey on what is currently known as Segment 4 as part of the City's previous analysis for a project to extend State Street. The area studied was approximately the entire 5.5-acre vacant parcel, which the roadway bisects in Segment 4, which is mapped within SBKR designated critical habitat. No SBKR were trapped during the 2016 survey and the negative finding determined SBKR were absent from the site (Jericho, 2016). Segment 4 of the Project site also contains habitat marginally suitable habitat for LAPM. Previous small mammal trapping of Segment 4 performed in 2016 targeting SBKR also determined LAPM to be absent.

On March 21, 2019 and April 2, 2019, Jericho conducted additional literature review and field surveys for the current Project area (Segments 1 through 5) for the purpose of re-assessing the potential effects of the proposed Project to designated critical habitats and/or any species currently listed or formally proposed for listing as endangered or threatened under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA) or species designated as sensitive by the California Department of Fish and Wildlife (CDFW) and/or the California Native Plant Society (CNPS). Special emphasis was also placed on BUOW and LAPM due to potential habitat and documented presence in the region. The 2019 survey effort included the current Project areas, including those areas previously not surveyed in the November 2016 effort.

Jericho also assessed the jurisdictional water resources in the March 2016 survey effort. The purpose of the jurisdictional delineation was to assess the extent of impacts, if any, to State and /or federal jurisdictional waters that are subject to Sections 404 and 401 of the federal Clean Water Act (CWA) regulated by the U.S. Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) respectively; and/or Section 1602 of the California Fish and Game Code (FCG) administered by the CDFW.

At the time of the March 2019 survey, site had evidence of recent disking for weed abatement and consisted mostly of non-native grasses regrowing over the disked area. A small patch of native vegetation remained on the western edge of the site.

The site contains residential and public structures (including roads), a vacant parcel and existing paved/concrete surfaces. The two segments of the Project site that have the potential to support biological resources are Segments 3 and 4. Segments 1 and 2 are paved.

The vegetation bordering Segments 1 and 2 is ornamental and the vegetation within Segments 3 and 4 is mostly ruderal consisting of ripgut brome (*Bromus diandrus*) and slender oat (*Avena barbata*). There is small approximate 25 square-foot patch of degraded sage scrub north of Baseline Road consisting of California sagebrush (*Artemesia californica*), mulefat (*Baccharis salicifolia*), California buckwheat (*Eriogonum fasciculatum*), scalebroom (*Lepidospartum squamatum*), woolly Indian paintbrush (*Castilleja foliolosa*), California brittlebush (*Encelia californica*), common fiddleneck (*Amsinckia menziesii*), and coastal heron's bill (*Erodium cicutarium*).

Relative to sensitive species, the March 2019 survey indicated the following:

- SBKR – No aspect of the Project site contains the habitat elements typically associated with SBKR. Further, the small mammal burrows on site were not the appropriate size, shape or aspect for SBKR. Previous trapping of Segment 4 determined SBKR to be absent. The site conditions had not changed or had been degraded since the last survey, and no presence-absence surveys were warranted.

- LAPM - The is listed as a Critical Species of Concern by the California Department of Fish and Wildlife.

- BUOW - No evidence of BUOW was found in the survey area. No BUOW pellets, feathers or white wash were found near existing burrows on site. No BUOW individuals were observed. Therefore, BUOW were considered absent from the site at the time of surveys,

Relative to the jurisdictional waters study, an underground reinforced concrete box (RCB) storm drain bisects Segment 3 and outlets above ground into Lytle Creek outside of the project area to the west. The RCB is not subject to the Clean Water Act or California Fish and Game Code regulations. The drain outlet into Lytle Creek is however subject to these regulations, but is not part of the Project. The soils within Segments 3 and 4, the vacant area of the Project, are Soboba stony loamy sand and Tujunga gravelly loamy sand, which are not identified as a hydric soil type according to the National List of Hydric Soils. No aspect of the Project proposes alterations to the Storm Drain outlet and no further discussion is necessary for a jurisdictional waters delineation.

<u>Impact Analysis</u>

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?*

Less Than Significant With Mitigation Incorporated. Segments 3 and 4 are located within the designated Critical Habitat for SBKR. The proposed Project will not affect State or federally listed endangered, threatened species because there is no habitat to support these species within, adjacent to, or in the broader vicinity of the Project area.

In addition, the proposed Project will not adversely affect the SBKR Critical Habitat in the Project area because no Primary Constituent Elements (PCEs) outlined in the critical habitat designation for SBKR occur on site. A PCE is a physical or biological feature essential to the conservation of a species for which its designated or proposed critical habitat is based on, such as space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the species historic geographic and ecological distribution.

The specific PCEs required for the SBKR are derived from the biological needs of the SBKR are alluvial fans, washes, and associated floodplain areas containing friable non-compacted soils consisting of sand, loamy sand, sandy loam, and loam, adjacent upland areas containing alluvial sage scrub habitat with approximately 50 percent shrub cover. Although the Project site is adjacent to Lytle Creek wash the soils on site are compacted due to weed abatement, homeless Segment 3 and 4 are and unauthorized ORV use. The small amount of vegetation on site is mostly non-native and ruderal with a very small patch of buckwheat. This vegetation on site is not associated with SBKR occupation.

Habitat conditions within Segment 3 and 4 are not suitable for SBKR. The 25 square foot patch of remnant coastal sage scrub habitat on site is surrounded by non-native ruderal vegetation. Further the Project site is surrounded by residential uses with feral predator animals such as dogs and cats. Previous trapping efforts in the Project area were negative for this species and no further studies are recommended.

As for LAPM, the habitat quality is marginally suitable at best. Previous trapping confirmed the absence of this species, and no further studies are recommended.

The habitat is marginally suitable for BUOW, but no BUOW individuals or sign of their past or current occupations was observed. This species was absent during the time of survey. To reduce the potential impacts to BUOW, **Mitigation Measure BIO-1** is recommended. Mitigation measures are located at the end of this section.

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?*

Less Than Significant. The vegetation bordering Segments 1 and 2 is ornamental and the vegetation within Segments 3 and 4 is mostly ruderal consisting of ripgut brome (*Bromus diandrus*) and slender oat (*Avena barbata*). There is small approximate 25 square-foot patch of degraded sage scrub north of Baseline Road consisting of California sagebrush (*Artemesia californica*), mulefat (*Baccharis salicifolia*), California buckwheat (*Eriogonum fasciculatum*), scalebroom (*Lepidospartum squamatum*), woolly Indian paintbrush (*Castilleja foliolosa*), California brittlebush (*Encelia californica*), common fiddleneck (*Amsinckia menziesii*), and coastal heron's bill (*Erodium cicutarium*). There is no riparian or other sensitive community that exists within the Project alignment. Some small patches of California buckwheat, sagebrush, and buckwheat appear with Segments 3 and 4, but the patches are low-quality and small and therefore does not represent a significant impact.

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*

No Impact. There are no wetlands on site. An underground reinforced concrete box (RCB) storm drain bisects Segment 3 and outlets above ground into Lytle Creek outside of the project area to the west. The RCB is not subject to the Clean Water Act or California Fish and Game Code regulations. Its outlet into Lytle Creek is however subject to these regulations. No aspect of the project proposes alterations to the Storm Drain outlet at Lytle Creek.

No hydric vegetation, hydric soils, and/or wetland hydrology are present in any segment of the Project alignment. Therefore, there is no impact.

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?

Less Than Significant With Mitigation Incorporated. Nestable vegetation occurs within and adjacent to the Project alignment. Pursuant to the Migratory Bird Treaty Act and California Fish and Wildlife Code, construction activities, demolition activities and/or the removal of any trees, shrubs, or any other potential nesting habitat should be conducted outside the avian nesting season to avoid impacts to nesting birds. The nesting season generally extends from February 1 through August 31, but can vary slightly from year to year based upon seasonal weather conditions.

Because construction may occur during the avian nesting season, **Mitigation Measure BIO-2** would reduce the potential impact to nesting birds to less than significant. Mitigation measures are located the end of this section.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. The Project does not propose to remove trees, therefore, there is no impact.

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?

No Impact. The Project alignment is not within any Habitat Conservation Plan or Natural Community Conservation Plan or other approved local, regional or state plan. Therefore, there is no impact.

Mitigation Measures:

BIO-1 Prior to construction, a 30-day pre-construction survey be conducted to confirm that BUOW are still absent.

BIO-2 Bird nesting season generally extends from February 1 through September 15 in southern California and specifically, April 15 through August 31 for migratory passerine birds. To avoid impacts to nesting birds (common and special status) during the nesting season, a qualified Avian Biologist will conduct pre-construction Nesting Bird Surveys (NBS) prior to project-related disturbance to nestable vegetation to identify any active nests. If no active nests are found, no further action will be required. If an active nest is found, the biologist will set appropriate no-work buffers around the nest which will be based upon the nesting species, its sensitivity to disturbance, nesting stage and expected types, intensity and duration of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved no-work buffer zone shall be clearly marked in the field, within which no disturbance activity shall commence until the qualified biologist has determined the young birds have successfully fledged and the nest is inactive.

Impact Conclusions:

No significant adverse effects are anticipated with the inclusion of the above mitigation measures.

	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 as defined in 15064.5?			X	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to 15064.5?		X		
c) Disturb any human remains, including those interred outside of formal cemeteries?		X		

SUBSTANTIATION: (Check if project is located in the Cultural Resources overlays ☐ or cite results of cultural resource review)

Between January and July 2019 CRM TECH performed a cultural resources study for the State Street Extension Project, Phase I, in the City of San Bernardino, San Bernardino County, California (CRM Tech, Appendix D). The subject property of the study consists mainly of the State Street right-of-way between Baseline Street and 16th Street. An additional area at the future intersection of State Street and Baseline Street, under consideration for a stormwater basin and a construction buffer, was also included in the study, however, the most recent Project designs have eliminated the basin. The Study area encompassed a total of 10.2 acres of vacant land located generally between 16th Street and Baseline and along the east side of the Lytle Creek Wash, in a portion of the Rancho Muscupiabe land grant lying within T1S R4W, San Bernardino Baseline and Meridian.

Environmental Setting

Historical 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 land holdings 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). The adjacent Muscupiabe land grant, which encompassed the project location, was awarded the next year to Michael C. White, a naturalized Englishman, but was abandoned a few months later (*ibid.*:35-36).

After the American annexation of Alta California in 1848, the Lugos sold the entire Rancho San Bernardino 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. 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. In 1857, however, half of the population was recalled to Utah by Mormon leaders, and the budding town was disincorporated.

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. The city reincorporated in 1886 and embarked on a period of steady growth. Together with the neighboring communities in the Inland Empire region, San Bernardino was one of the leading producers in the citrus industry for much of the ensuing century.

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. 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. 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. The Project area lies well to the west of the original townsite and was a much later addition to the city's urban core. Historically dominated by agriculture, the area began to take on its present-day suburban residential character only during the post-World War II boom.

Previous Studies

In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, contacted Native American representatives, pursued historical background research, and carried out an intensive-level field survey of the entire project area.

According to records from the South Central Coastal Information Center (SCCIC), various portions of the Project area were included in as many as 10 previous studies completed between 1978 and 2015, but the Project area as a whole had not been surveyed systematically prior to this study. Outside the Project area but within a 1-mile radius, SCCIC records show at least 37 other previous cultural resources studies on various tracts of land and linear features. Collectively, these past studies covered approximately 85% of the land within the scope of the records search and resulted in the identification of 18 historical/ archaeological sites.

Among the 18 sites, two were of prehistoric (i.e., Native American). The closer of the two, 36-001457, was original found in 1939 and was later described as a large habitation site that had been partially destroyed. Still, more than 20,000 artifacts were recorded at the site in 1987, including projectile points, pottery sherds, beads, milling stones, flaked-stone tools and debitage, and shells. The location of the site is more than a half-mile to the southwest of the project area, across the Lytle Creek Wash. The other prehistoric site, 36-032705, represents the reburial location of likely prehistoric human remains nearly a mile to the northwest of the project area.

The other 16 previously identified sites dated to the historic period and included residential buildings, farm complexes, structural remains, refuse scatters, and various infrastructure features such as roads, ditches, and power transmission lines. Four of these sites were recorded as lying partially within the project boundaries, as listed below:

Site No.	Description
36-006863	Historic-period refuse scatter
36-010315	132kV Hoover Dam Transmission Line

36-010316 Southern Sierra Power Company Control-San Bernardino Transmission Line
36-015497 San Bernardino Baseline/Baseline Street

Among these four sites, 36-010315 and 36-010316 were previously found to be eligible for the National Register of Historic Places, and 36-015497 has been designated a California Point of Historical Interest (CPHI-SBr-012).

Impact Analysis

a) Cause a substantial adverse change in the significance of a historical resource as defined in 15064.5?

Less Than Significant. A "historical resource" as defined in 15064.5 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)). Regarding the proper criteria for the evaluation of historical significance, CEQA guidelines mandate 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))

Based on the literature and site reviews, the following resources were identified:

Site 36-006863 - Historic-period refuse scatter (CA-SBR-6863H)

As noted above, one of the two loci comprising Site 36-006863 was recorded in the current project area. During this study, glass shards and a few other historic-period refuse items consistent with the previously recorded contents of the site were noted at that location. Surficial deposits of refuse like 36-006863, virtually ubiquitous in settled or frequently travelled areas, constitute the most common type of cultural remains from the historic period. This site, on land where episodic trash dumping appears to have been ongoing over time, bears no identifiable association with any person or event of recognized historic significance, nor does it demonstrate any potential for important archaeological data. Therefore, Site 36-006863 does not meet the criteria for listing in the California Register of Historical Resources and does not qualify as a "historical resource."

Sites 36-010315 - 132kV Hoover Dam Transmission Line (CA-SBR-10315H) and 36-010316 - Southern Sierra Power Company Control-San Bernardino Transmission Line (CA-SBR-10316H)

Sites 36-010315 and 36-010316 both represent major regional power transmission lines built in the early 20th century, and both were previously determined to be eligible for listing in the National Register of Historic Places. As such, they are automatically eligible for the California Register of Historical Resources, according to guidelines set forth by the Office of Historic Preservation, and thus meet the definition of "historical resources."

Nevertheless, the research results from this study further establish that all physical components of the two sites in the project area, primarily the concrete and wooden poles, are clearly modern replacements that are entirely different from the original steel towers in design, materials, workmanship, and feeling. These components do not contribute materially to the overall significance and integrity of the sites.

Any impact that the proposed project may have on the features of the sites within the project boundaries, including either direct, physical impact or indirect, visual impact, would not compromise the qualities and characteristics from which the sites obtain their eligibility to the National Register or the California Register, nor would it further diminish the historic integrity of the sites. Therefore, the Project as currently proposed has no potential to cause substantial adverse changes in the significance of these "historical resources."

Site 36-015497 - San Bernardino Baseline/Baseline Street (CPHI-SBr-012)

The San Bernardino Baseline, embodied by Baseline Street in the project vicinity, is an officially designated California Point of Historical Interest. As such, it meets the definition of a "historical resource" under CEQA provisions. The historic value of the site, however, is symbolic in nature. It is derived primarily from the conceptual line across the landscape instead of the existing roadway, a major local thoroughfare of entirely modern character that does not contribute to the historic value. Since Site 36-015497 exists in the project area largely on paper, CRM TECH concluded that the proposed Project has no potential to affect the significance or integrity of this "historical resource."

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to 15064.5?

Less Than Significant with Mitigation Incorporated. Because there are no archeological resources in the Project area, there will be no change in an archaeological resource. However, in the event an unanticipated resource is discovered, implementation of **Mitigation Measure CUL-1** and **CUL-2** are incorporated to ensure any potential impact will be less than significant. Mitigation measures are located at the end of this section.

c) Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant With Mitigation Incorporated. There are no known human remains within the vicinity of the project site, and no conditions exist that suggest human remains are likely to be found on the project site. It is not anticipated that implementation of the project would disturb human remains, including those interred outside of formal cemeteries. However, ground-disturbing activities, such as grading or excavation, have the potential to disturb human remains. If human remains are found, those remains would require proper treatment, in accordance with applicable laws. The Native American Graves Protection and Repatriation Act (NAGPRA) includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on federal and tribal lands, and penalties for noncompliance and illegal trafficking. State of California Public Resources Health and Safety Code Section 7050.5-7055 describes the general provisions regarding human remains, including the requirements if any human remains are accidentally discovered during excavation of a site. As required by state law, the requirements and procedures set forth in Section 5097.98 of the California Public Resources Code would be implemented, including notification of the County Coroner, notification of the Native American Heritage Commission and consultation with the individual identified by the Native American Heritage Commission to be the "most likely descendant." If human remains are found during excavation, excavation must stop in the vicinity of the find and any area that is reasonably suspected to overlie adjacent remains until the County Coroner has been called out by local law enforcement, and the remains have been investigated and appropriate recommendations have been made for the treatment and disposition of the remains.

Mitigation Measures CUL-3 would ensure the proper management of human remains if encountered on the project site. With the implementation of **Mitigation Measures CUL-1** through **CUL-3,** impacts would be less than significant. Mitigation measures are at the end of this section.

Mitigation Measures:

CUL-1 In the event that pre-contact 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 Mitigation Measure TCR-1, if any such find occurs 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-2 If significant 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-3 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 Public Resources Code Section 5097.98, and enforced for the duration of the project. These code provisions require notification of the County Coroner and the Native American Heritage Commission, who in turn must notify those persons believed to be most likely descended from the deceased Native American for appropriate disposition of the remains. Excavation or disturbance may continue in other areas of the project site that are not reasonably suspected to overlie adjacent remains or archaeological resources.

Impact Conclusions:

No significant adverse effects are anticipated with the inclusion of the above mitigation measures.

	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 operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

An energy analysis was performed for the Project by Urban Crossroads and is located in Appendix E. The purpose of the analysis was to ensure that energy implication is considered by the as the lead agency, and to quantify anticipated energy usage associated with construction 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.

Regulatory Setting

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 Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. Federal requirements and programs are generally related to the consumption of energy by vehicles. These include the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) to promote the development of intermodal transportation systems; and the Transportation Equity Act for the 21st Century (TEA-21) enacted in 1998, that ties transportation decisions and land use decisions in order to improve the environment.

Transportation projects developed as part of the intermodal transportation systems proposed in the region are the responsibility of the Southern California Association of Governments (SCAG) through its 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). The RTP/SCS provides objectives for meeting emissions reduction targets set forth by the California Air Resources Board (CARB) to reduce greenhouse gas emissions from automobiles and light trucks through integrated transportation, land use, housing, and environmental planning. The intent is to reduce the vehicles miles traveled thus resulting in lower GHG emissions and a reduction in the amount of fossil fuels used in the region.

The State's Regulations include the following:

California Energy Commission

The California Energy Commission is responsible for preparing the State Energy Plan in order to assist regional and local agencies with improvements to transportation systems that would result in reduced traffic congestion, improved air quality, and an increase in the efficiency of fuel supplies. The intent is to ultimately reduce vehicle miles traveled and increase the use of alternatives to cars including mass transit, and safer bicycles and pedestrian access.

California Energy Code

Title 24, Part 6 of the California Code of Regulations which is also referred to as the California Energy Code, enacted in 1978 sets forth the energy efficiency standards for residential and nonresidential buildings that are updated approximately every three years. The latest update took effect in January 2017.

California Air Resources Board

In June 2009, the USEPA granted California the authority to implement greenhouse gas (GHG) emission reduction standards for new passenger cars, pickup trucks and sport utility. In September 2009 the California Air Resources Board (CARB) adopted amendments to the "Pavley" regulations (AB 1493 enacted in 2002) that reduce GHG emissions in new passenger vehicles from 2009 through 2016. These amendments are part of California's commitment toward a nation-wide program to reduce new passenger vehicle GHGs from 2012 through 2016. CARB's September amendments will cement California's enforcement of the Pavley rule starting in 2009 while providing vehicle manufacturers with new compliance flexibility. The amendments will also prepare California to harmonize its rules with the federal rules for passenger vehicles. (https://www.arb.ca.gov/cc/ccms/ccms.htm)

California Renewable Portfolio Standards (SB 1078)

California Renewable Energy Portfolio (RPS) was first established in 2002 under SB 1078. In 2006 the RPS was modified to require that 20 percent of electricity retail sales come from renewable energy resources by 2010. In 2011 the goal was increased to 33 percent by 2020 with all electricity providers required to adopt the new RPS goals by 2013. Implementation goals are to be met in phases with 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020. In 2015, the RPS goal was increased to require retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030 (https://www.energy.ca.gov/portfolio/).

Environmental Setting

The most recent data for California's estimated annual energy use is from 2016 and included:

- Approximately 7,830 trillion British Thermal Unit (BTU) of energy was consumed;
- Approximately 2,115 billion cubic feet of natural gas; and
- Approximately 15.8 billion gallons of transportation fuel (for the year 2017)

The most recent data provided by the United States Energy Information Administration (EIA) is from 2016 and illustrates energy use in California by demand sector as follows:

- Approximately 39.8 percent transportation;
- Approximately 23.7 percent industrial;
- Approximately 17.7 percent residential; and
- Approximately 18.9 percent commercial

In 2017, total system electric generation for California was 292,039 gigawatt-hours (GWh). California's massive electricity in-state generation system generated approximately 206,336 GWh which accounted for approximately 71% of the electricity it uses; the rest was imported from the Pacific Northwest (14%) and the U.S. Southwest (16%). Natural gas is the main source for electricity generation at 50% of the total in-state electric generation system power (refer to Table 2-1 in Appendix E).

Assessment Methodology

Information from the CalEEMod 2016.3.2 outputs for the *Air Quality Impact Analysis* (Urban Crossroads, Inc., 2019, Appendix A) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands.

In summary, energy and fuel used by the Project is summarized as follows and detailed in Appendix E.

- Project Construction Power Costs: $8,378
- Project Construction Electricity Usage: 119,696 kWh
- Construction Equipment Fuel: 38,156 est. gallons
- Construction Worker Fuel Consumption: 2,199 gallons
- Construction hauling Fuel Consumption: 9,902 gallons

Impact Analysis

a) Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less Than Significant. As supported by the Project analyses, Project construction would not result in the inefficient, wasteful or unnecessary consumption of energy. Further, the energy demands of the Project can be accommodated within the context of available resources and energy delivery systems. 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 of California.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less Than Significant. Transportation and access to the Project site is provided primarily 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. Regarding the State's Energy Plan and compliance with Title 24 CCR energy efficiency standards, the applicant is required to comply with the California Energy Code requirements for energy efficient buildings and appliances as well as utility energy efficiency programs implemented by Southern California Edison (SCE) and Southern California Gas Company. The Project will utilize LED streetlights, which are considered energy efficient by SCE.

Regarding Pavley (AB 1493) regulations, an individual project does not have the ability to comply or conflict with these regulations because they are intended for agencies and their adoption of procedures and protocols for reporting and certifying GHG emission reductions from mobile sources.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusions:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

	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:				
• 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.			X	
• Strong seismic ground shaking?			X	
• Seismic-related ground failure, including liquefaction?			X	
• Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?		X		
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 on- site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
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?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		

SUBSTANTIATION: (☐ Check if project is located in the Geologic Hazards Overlay District):

Environmental Setting

The City of San Bernardino lies at the southern base of the San Bernardino Mountains in the upper Santa Ana River Valley and the Santa Ana River Basin. The formations that underlie the lowland areas of the San Bernardino area are primarily sedimentary formations, composed of gravel, sand, sandy silt, clay and conglomerates that date from the younger Holocene to the Mesozoic age.

The Project area is located immediately east and adjacent to Lytle Creek Wash, one of the several perennial streams that emanate from the San Bernardino Mountains.

A geotechnical evaluation was prepared for this Project to evaluate the nature and pertinent engineering properties of the subsurface materials (Converse Consultants, May 14, 2019).

Soils

Soils in the San Bernardino area formed primarily from alluvial sediments that either eroded from bedrock in the adjacent mountains or were washed by rivers and creeks into the valley region. Soils in the Project area consist of Tujunga gravelly loamy sand (TvC) in Project Sections 1 and 2 and Soboba stony loamy sand (SpC) in Project Sections 3, 4, and 5. The Tujunga series consists of very deep, somewhat excessively drained soils that formed in alluvium from granitic sources. Tujunga soils are on alluvial fans and floodplains, including urban areas. Slopes range from 0 to 12 percent. The Soboba series consists of deep, excessively drained soils that formed in alluvium from predominantly granitic rock sources. Soboba soils are on alluvial fans and flood plains and have slopes of 0 to 30 percent. The soils are usually moist in some or all parts between depths of 12 and 35 inches from about December 1 to April 15.

Expansive soils are considered those that contain a significant amount of clay and are subject to swelling as a response to changes in water content. Soils with a high content of expansive material can form cracks in drier seasons, and impact building loads. In the Project area, expansive soils are not considered a hazard because the soils contain little clay and are primarily derived from the regional granitic bedrock. The geotechnical test conducted for the Project identified a expansion index of “0” indicating a very low expansion potential.

Faults

The San Bernardino Mountains are part of the Transverse Ranges of Southern California, a mountain chain formed by tectonic forces between the North American and Pacific Plates along the San Andreas Fault. Within the San Bernardino Mountains area, the San Andreas fault makes a left-step and bends to trend in a more westerly direction

San Bernardino is located between several active fault zones including: the San Andreas Fault, the San Jacinto Fault, the Glen Helen Fault, and the Loma Linda Fault. Each of these faults is classified as Alquist Priolo Special Study Zones under the Alquist-Priolo Earthquake Fault Zoning Act. The California Department of Conservation has designated certain faults within the planning area as part of the State of California Alquist-Priolo Special Study Zones. These zones extend parallel to and extend from approximately 200 to 500 feet from designated faults.

The Project Study Area is within seismically active southern California, with several active faults in the vicinity. However, the Project Study Area is not within a known earthquake fault or an Alquist-Priolo Study Zone, nor is it included within the Seismic Hazards Mapping Act. The closest fault to the Project is the San Jacinto fault (San Bernardino section), which is parallels the alignment, approximately 1,800 feet to the west, in Lytle Creek.

Landslides

Seismically induced landslides and rock falls may occur in areas with steep slopes. The County of San Bernardino Geologic Hazard Overlay for San Bernardino does not indicate that there are areas of landslides in the Project area.

Liquefaction and Lateral Spreading

Liquefaction is a term used to describe a condition that occurs when saturated sandy soil loses strength and cohesion due to ground shaking during an earthquake. Groundwater saturation of sediments is required in order for earthquake- induced liquefaction to occur. Groundwater depth shallower than 10 feet to the surface is considered to have the highest liquefaction susceptibility. Groundwater ten to 30 feet below the surface is considered to have a moderately high to moderate susceptibility. Groundwater 30 to 50 feet deep can create a moderate to low susceptibility to liquefaction. The County of San Bernardino Geologic Hazard Overlay maps for the City of San Bernardino identify that the Project alignment has a low potential for susceptibility to liquefaction.

Lateral spreading occurs when liquefaction of a subsurface layer causes the mass to flow down the slope, moving blocks of ground at the surface. Areas at risk of lateral spreading are generally considered to be coincident with potential liquefaction areas.

Impact Analysis

a) *Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*

- *Rupture of a known earthquake fault, as delineated on the most recent Alquist Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*
- *Strong seismic ground shaking?*
- *Seismic related ground failure, including liquefaction?*
- *Landslides?*

Less Than Significant. The Project alignment occurs within the San Bernardino valley, a seismically active region. However, the Project alignment is not within an Alquist-Priolo Earthquake Fault Zone as the San Jacinto Fault is located nearly 1,800 feet from the Project alignment. However, the fault zone for the San Jacinto Fault is mapped adjacent to the Project alignment (CGS, July 1, 2019).

The Project alignment is located adjacent to Lytle Creek (on the west) and has a low potential for liquefaction, (County of San Bernardino, March 9, 2010). Segment 4 traverses a vacant parcel and is approximately 15 feet lower than Segment 5, which is the intersection of Baseline. In order for the new roadway to match the elevation of Baseline, approximately 41,000 cubic yards of fill will be placed within the Project alignment in Segment 4, and feathered to meet the elevation in Segment 3, at the terminus of Hanover. The roadway will generally be approximately 100 feet wide and contain four travel lanes, a raised concrete median, curb and gutter, and sidewalks on each side. The outer slope adjacent to the outer edges of the sidewalk will generally be approximately 3:1. The potential for liquefaction to occur during fault rupture or strong ground shaking exists throughout much of the City of San Bernardino because of high groundwater tables. These geologic and seismic hazards can affect the structural integrity of buildings and utilities, and, in turn, cause severe property damage and potential loss of life. Impacts to the proposed street extension are considered less than significant.

The area is not subject to landslides as the Project area is relatively flat, and there are no hills directly above the Project alignment that could pose a landslide threat.

b) *Result in substantial soil erosion or the loss of topsoil?*

Less Than Significant With Mitigation Incorporated. Proposed construction activities include the removal of existing pavement, soil and vegetation which could expose soils to erosion. To ensure the control of erosion, the City is required to implement Best Management Practices (BMPs) for both wind and water erosion. For potential wind erosion, during construction, contractors will be required to use water trucks to control dust and stabilize any temporary stockpiles of soil (until removed from the sites). Dust control is evaluated in more detail in Section III, Air Quality. For potential soil erosion associated with storm events and runoff during construction, contractors will be required to comply with each site's Stormwater Pollution Prevention Plan (SWPPP) BMPs that may include a combination of erosion control blankets, fiber rolls, silt fences, and stabilized construction methods to prevent trackout of soil onto roadways. Also see Section X, Hydrology and Water Quality for a discussion of these requirements and mitigation measures, which if implemented, will reduce impacts to less than significant.

For potential wind erosion, contractors must comply with SCAQMD Rule 403 which requires the implementation of best available dust control measures (BACM) during active operations that are capable of generating fugitive dust. These may include but are not limited to applying water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes and using tarps or other suitable enclosures on haul trucks.

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 on- site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant. The Project alignment is located within Quaternary alluvium and marine deposits (CAQ) that are primarily unconsolidated that are primarily alluvial terrace. The geotechnical report (Converse Consultants, May 19, 2019) identified that variations in subsurface conditions are anticipated due to the soil types and that gravel, cobble and boulders could possibly be encountered during subsurface excavation.

The Project alignment has not been identified by the County of San Bernardino or the US Geological Survey to be within an area that would be subject to landslides, lateral spreading, subsidence or collapse. There is a low potential for liquefaction; however, the potential for liquefaction to occur during fault rupture or strong ground shaking exists throughout much of the City of San Bernardino because of high groundwater tables. These geologic and seismic hazards can affect the structural integrity of buildings and utilities, and, in turn, cause severe property damage and potential loss of life. Impacts to the proposed street extension are considered less than significant.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Less Than Significant. Expansive soils are considered those that contain a significant amount of clay and are subject to swelling as a response to changes in water content. Soils with a high content of expansive material can form cracks in drier seasons, and impact building loads. In the Project area, expansive soils are not considered a hazard because the soils contain little clay and are primarily derived from the regional granitic bedrock. Therefore, there is a less than significant impact.

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?

No Impact. None of the Project activities propose or involve the use of septic tanks or alternative wastewater disposal systems. Therefore, there is no impact.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant With Mitigation. There are no unique geological features that have been identified in the Project alignment. Paleontological resources may occur within the soils found within the Project alignment, however, Project excavations will generally be shallow (not greater than 15 inches), where there is little likelihood of unearthing paleontological resources. Therefore, the impacts are anticipated to be less than significant. However, accommodate any unanticipated resources **Mitigation Measure GEO-1** is required:

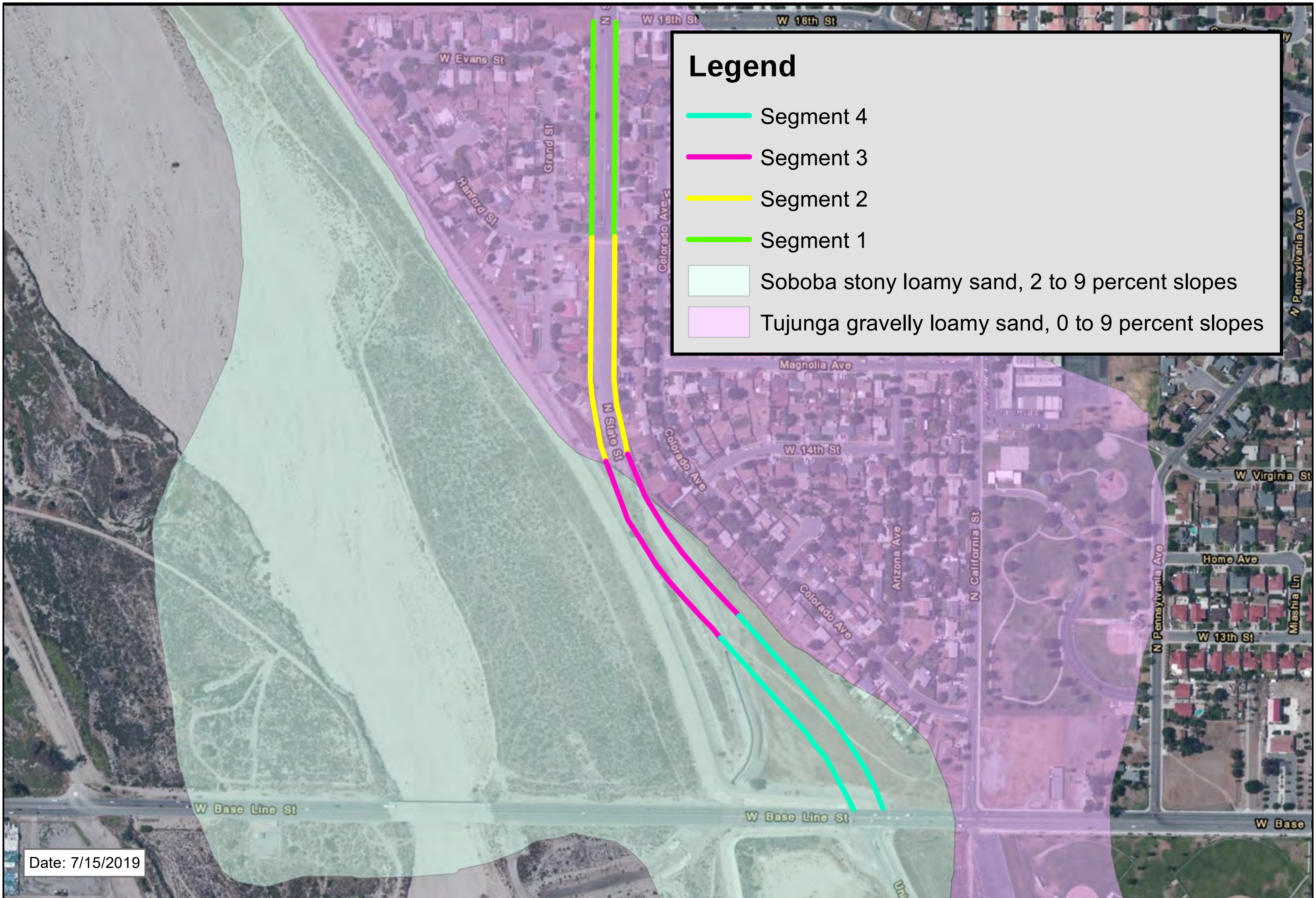
Mitigation Measures:

Mitigation measures are required to reduce potential impacts of topsoil erosion to less than significant, however, these measures are identified in Section III, Air Quality and Section X, Hydrology and Water Quality.

GEO-1 **Paleontological Resources**. Any substantial excavations (i.e. over 5 feet in depth) in the proposed Project area should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed Project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

Impact Conclusions:

No significant adverse effects are anticipated with the inclusion of the above mitigation measures.



0 0.04 0.08 0.16 0.24 0.32 Miles

Imagery Date: 8/6/2017

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

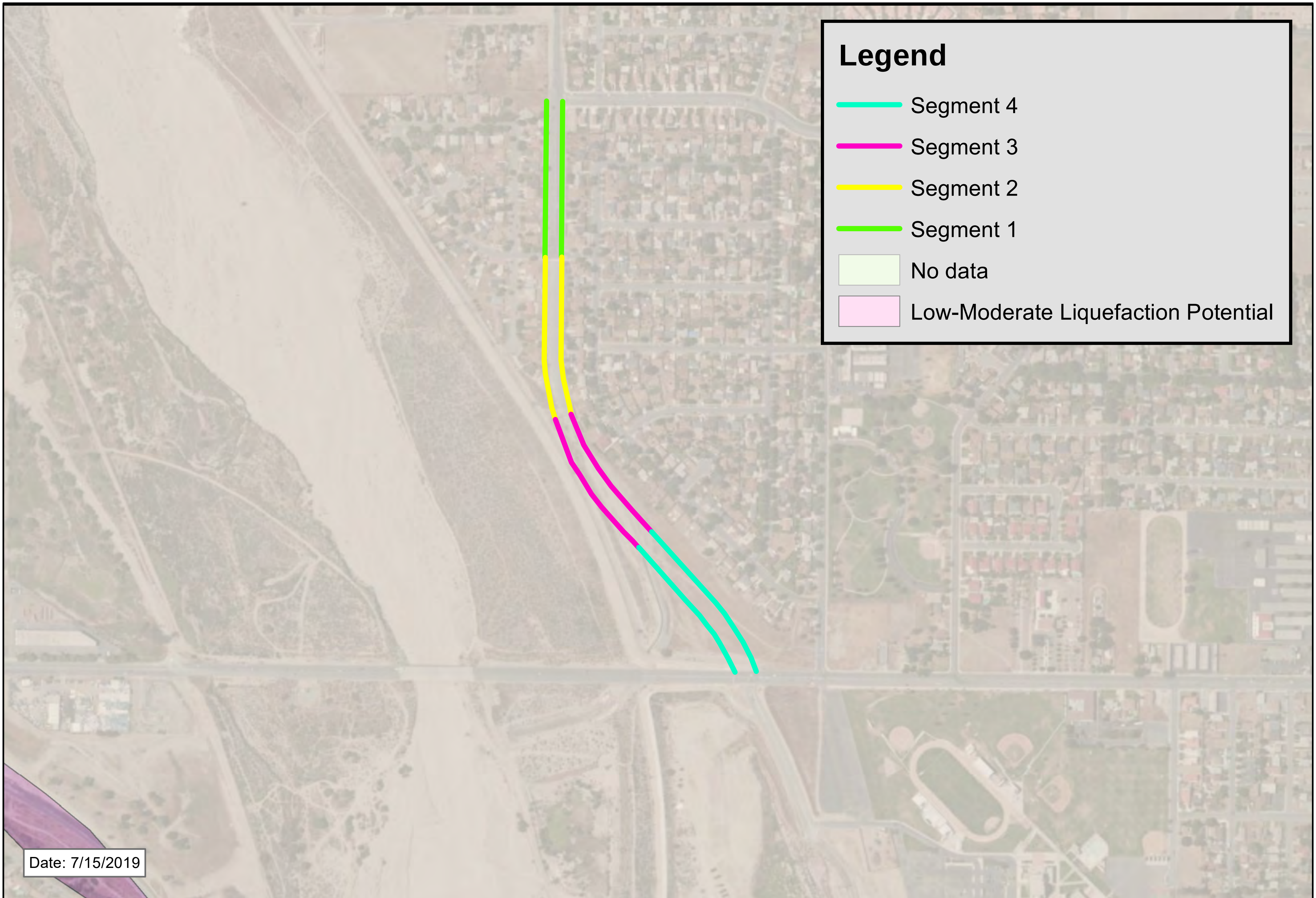
JERICHO SYSTEMS INCORPORATED

N

1 inch = 426 feet

Figure VII-1
Soils Overlay

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street



0 0.05 0.1 0.2 0.3 0.4 Miles

Imagery Date: 8/6/2017

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

JERICHO SYSTEMS INCORPORATED

N

1 inch = 587 feet

Section Figure VII- 2
Liquefaction Susceptibility

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street

	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?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

According to CEQA Guidelines Section 15064.4, when making a determination of the significance of greenhouse gas emissions, the "lead agency shall have discretion to determine, in the context of a particular project, whether to (1) use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use." In addition, CEQA Guidelines section 15064.7(c) provides that "a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts" on the condition that "the decision of the lead agency to adopt such thresholds is supported by substantial evidence." For the purpose of this initial study SCAQMD guideline will be adhered to.

Greenhouse gas emissions were analyzed for this Project by Urban Crossroads in July 2019, and the results are provided in Appendix F.

Regulatory Setting

The Project would be required to comply with regulations imposed by the State of California and the South Coast Air Quality Management District (SCAQMD) aimed at the reduction of air pollutant emissions. Those that are directly and indirectly applicable to the Project and that would assist in the reduction of greenhouse gas emissions include but are not limited to:

State Executive Orders and Legislation

Executive Order S-3-05. California Governor issued Executive Order S-3-05, GHG Emission, in June 2005, which established the following targets:

- By 2010, California shall reduce greenhouse gas emissions to 2000 levels;
- By 2020, California shall reduce greenhouse gas emissions to 1990 levels.
- By 2050, California shall reduce greenhouse gas emissions to 80 percent below 1990 levels.

The executive order directed the secretary of CalEPA to coordinate a multi-agency effort to reduce GHG emissions to the target levels. To comply with the Executive Order, the secretary of CalEPA created the California Climate Action Team (CAT), made up of members from various State agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of businesses, local governments, and communities and through State incentive and regulatory programs.

Executive Order S-01-07. Executive Order S-1-07 was issued in 2007 and proclaims that the transportation sector is the main source of GHG emissions in the State, since it generates more than 40 percent of the State's GHG emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in the State by at least ten percent by 2020. This Order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

<u>SB 97</u>. Senate Bill 97 (SB 97) was adopted August 2007 and acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. SB 97 directed the Governor's Office of Planning and Research (OPR), which is part of the State Resource Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, by July 1, 2009. The Resources Agency was required to certify and adopt those guidelines by January 1, 2010.

Pursuant to the requirements of SB 97 as stated above, on December 30, 2009 the Natural Resources Agency adopted amendments to the state CEQA guidelines that address GHG emissions. The GHG emission reduction amendments went into effect on March 18, 2010 and include the use of climate action plans to evaluate a project's impacts and methods to mitigate a project's GHG emissions.

<u>AB 32</u>. The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. "Greenhouse gases" as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. CARB is the State agency charged with monitoring and regulating sources of greenhouse gases.

The CARB Board approved the 1990 greenhouse gas emissions level of 427 million metric tons of carbon dioxide equivalent (MMTCO2e) on December 6, 2007 (California Air Resources Board 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 MMTCO2e. Emissions in 2020 in a "business as usual" scenario are estimated to be 596 MMTCO2e.

CARB's Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 (California Air Resources Board 2008). The Scoping Plan identifies recommended measures for multiple greenhouse gas emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors.

<u>SB 375</u>. Senate Bill 375 (SB 375) was adopted September 2008 and aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPO) to adopt a sustainable communities strategy (SCS) or alternate planning strategy (APS) that will prescribe land use allocation in that MPOs Regional Transportation Plan (RTP). CARB, in consultation with each MPO, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's sustainable communities strategy or alternate planning strategy for consistency with its assigned targets.

The proposed project is located within the Southern California Association of Governments (SCAG), which has authority to develop the SCS or APS. For the SCAG region, the targets set by CARB are at eight percent below 2005 per capita GHG emissions levels by 2020 and 13 percent below 2005 per capita GHG emissions levels by 2035. On April 4, 2012, SCAG adopted the *2012-2035 Regional Transportation Plan / Sustainable Communities Strategy* (RTP/SCS), which meets the CARB emission reduction requirements.

City and County land use policies, including General Plans, are not required to be consistent with the RTP and associated SCS or APS. However, new provisions of CEQA would incentivize, through streamlining and other provisions, qualified projects that are consistent with an approved SCS or APS and categorized as "transit priority projects."

Assembly Bill 939 and Senate Bill 1374. Assembly Bill 939 (AB 939) requires that each jurisdiction in California to divert at least 50 percent of its waste away from landfills, whether through waste reduction, recycling or other means. Senate Bill 1374 (SB 1374) requires the California Integrated Waste Management Board to adopt a model ordinance by March 1, 2004 suitable for adoption by any local agency to require 50 to 75 percent diversion of construction and demolition of waste materials from landfills.

Executive Order S-13-08. Executive Order S-13-08 indicates that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resource Agency 2009) was adopted, which is the "… first statewide, multi-sector, region-specific, and information-based climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order B-30-15. Executive Order B-30-15, establishing a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030, was signed by Governor Brown in April 2015.

Executive Order B-29-15. Executive Order B-29-15, mandates a statewide 25% reduction in potable water usage and was signed into law on April 1, 2015.

Executive Order B-37-16. Executive Order B-37-16, continuing the State's adopted water reduction, was signed into law on May 9, 2016. The water reduction builds off the mandatory 25 percent reduction called for in EO B-29-15.

South Coast Air Quality Management District

The Project is within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). SCAQMD Regulation XXVII currently includes three rules:

- The purpose of Rule 2700 is to define terms and post global warming potentials.
- The purpose of Rule 2701, SoCal Climate Solutions Exchange, is to establish a voluntary program to encourage, quantify, and certify voluntary, high quality certified greenhouse gas emission reductions in the SCAQMD.
- Rule 2702, Greenhouse Gas Reduction Program, was adopted on February 6, 2009. The purpose of this rule is to create a Greenhouse Gas Reduction Program for greenhouse gas emission reductions in the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

SCAQMD Threshold Development

SCAQMD has established recommended significance thresholds for greenhouse gases for local lead agency consideration. SCAQMD has published a five-tiered draft GHG threshold which includes a 10,000 metric ton of CO_2e per year for stationary/industrial sources and 3,000 metric tons of CO_2e per year significance threshold for residential/commercial projects. Tier 3 is anticipated to be the primary tier by which the SCAQMD will determine significance for projects. The Tier 3 screening level for stationary sources is based on an emission capture rate of 90 percent for all new or modified projects. A 90-precent emission capture rate means that 90 percent of total emissions from all new or modified stationary source projects would be subject to CEQA analysis. The 90-percent capture rate GHG significance screening level in Tier 3 for stationary sources was derived using the SCAQMD's annual Emissions Reporting Program.

The current draft thresholds consist of the following tiered approach:

Tier 1	consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
Tier 2	consists of determining whether or not the project is consistent with a greenhouse gas reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions.
Tier 3	consists of screening values, which the lead agency can choose but must be consistent. A project's construction emissions are averaged over 30 years and are added to a project's operational emissions. If a project's emissions are under one of the following screening thresholds, then the project is less than significant: - All land use types: 3,000 MTCO2e per year - Based on land use types: residential is 3,500 MTCO2e per year; commercial is 1,400 MTCO2e per year; and mixed use is 3,000 MTCO2e per year
Tier 4	has the following options: - Option 1: Reduce emissions from business as usual by a certain percentage; this percentage is currently undefined - Option 2: Early implementation of applicable AB 32 Scoping Plan measures - Option 3: Year 2020 target for service populations (SP), which includes residents and employees: 4.8 MTCO2e/SP/year for projects and 6.6 MTCO2e/SP/year for plans; - Option 3, 2035 target: 3.0 MTCO2e/SP/year for projects and 4.1 MTCO2e/SP/year for plans
Tier 5	involves mitigation offsets to achieve target significance threshold.

California Code of Regulations (CCR) Title 24, Part 6. CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) were first established 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 efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009. CalEEMod modeling defaults to 2008 standards. 2013 Standards have been approved and became effective July 1, 2014.

California Code of Regulations (CCR) Title 24, Part 11. All buildings for which an application for a building permit is submitted on or after January 1, 2014 must follow the 2013 standards. The 2013 commercial standards are estimated to be 30 percent more efficient than the 2008 standards; residential standards are 25 percent more efficient. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions.

California Green Building Standards. California Green Building Standards Code went into effect on January 1, 2011. The Code is a comprehensive and uniform regulatory code for all residential, commercial and school buildings. in response to continued efforts to reduce GHG emissions associated with energy consumption, CCR Title 24, Part 11 requires that new buildings reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials. One focus of CCR Title 24, Part 11 is water conservation measures, which reduce GHG emissions by reducing electrical consumption associated with pumping and treating water. CCR Title 24, Part 11 has approximately 52 nonresidential mandatory measures and an additional 130 provisions for optional use. Some key mandatory measures for commercial occupancies include specified parking for clean air vehicles, a 20 percent reduction of potable water use within buildings, a 50 percent construction waste diversion from landfills, use of building finish materials that emit low levels of volatile organic compounds, and commissioning for new, nonresidential buildings over 10,000 square feet.

Environmental Setting

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHG), play a critical role in the Earth's radiation amount by trapping infrared radiation emitted from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO_2), methane (CH_4), ozone, water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate.

Anthropogenic (caused or produced by humans) emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses.

Transportation is responsible for 41 percent of the State's greenhouse gas emissions, followed by electricity generation. Emissions of CO_2 and nitrous oxide (NOx) are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2, where CO_2 is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. Table 9, provides a description of each of the greenhouse gases and their global warming potential.

Table 9
Description of Greenhouse Gases

GHG	Description and Physical Properties	Sources
Nitrous oxide	Nitrous oxide (N_20), also known as laughing gas is a colorless gas. It has a lifetime of 114 years. Its global warming potential is 298	Microbial processes in soil and water, fuel combustion, and industrial processes. In addition to agricultural sources, some industrial processes (nylon production, nitric acid production) also emit N_20.
Methane	Methane (CH_4) is a flammable gas and is the main component of natural gas. It has a lifetime of 12 years. Its global warming potential is 28-36.	A natural source of CH_4 is from the decay of organic matter. Methane is extracted from geological deposits (natural gas fields). Other sources are from the decay of organic material in landfills, fermentation of manure, and cattle farming.
Carbon dioxide	Carbon dioxide (CO_2) is an odorless, colorless, natural greenhouse gas. Carbon dioxide's global warming potential is 1. The concentration in 2005 was 379 parts per million (ppm), which is an increase of about 1.4 ppm per year since 1960.	Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood.
Chlorofluorocarbons	CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). They are gases formed synthetically by replacing all hydrogen atoms in methane or methane with chlorine and/or fluorine atoms. Global warming potentials range from 3,800 to 8,100.	Chlorofluorocarbons were synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone, therefore their production was stopped as required by the Montreal Protocol.
Hydrofluorocarbons	Hydrofluorocarbons (HFCs) are a group of greenhouse gases containing carbon, chlorine, and at least one hydrogen atom. Global warming potentials range from 140 to 14,800.	Hydrofluorocarbons are synthetic manmade chemicals used as a substitute for chlorofluorocarbons in applications such as automobile air conditioners and refrigerants.
Sulfur hexafluoride	Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, and nontoxic, nonflammable gas. It has a lifetime of 3,200 years. It has a high global warming potential, 22,800.	This gas is manmade and used for insulation in electric power transmission equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

GHG Modeling and Results

Construction activities associated with the Project would result in emissions of CO_2 and CH_4 from construction activities. The report *Air Quality Impact Analysis Report* (Urban Crossroads, Inc., 2019, Appendix B) contains detailed information regarding construction activity.

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. To amortize the emissions over the life of the Project, the SCAQMD recommends calculating the total greenhouse gas emissions for the construction activities, dividing it by a 30-year project life. As such, construction emissions were amortized over a 30-year period.

The results are summarized in Table 10.

Table 10
Project GHG emissions

Emission Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total CO_2E
Annual construction-related emissions amortized over 30 years	15.88	0.00	0.00	15.97
Total CO_2E (All Sources)	15.97			
Screening Threshold (CO_2e)	3,000			
Threshold Exceeded?	NO			

Source: CalEEMod™ model output, Refer to Appendix F for detailed model outputs.

Impact Analysis

a) *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

Less Than Significant. The Project construction would require earthmoving, material removal, and other activities such as removal of plants and /or other organics. The project's construction activities were screened for emission generation using SCAQMD "Air Quality Handbook" guidelines, Emission Factors for On-Road Heavy-Heavy Duty Diesel Trucks (2018), SCAQMD Off-Road Mobile Source Emissions Factors (2018) and California Climate Action Registry General Reporting Protocol, 2009I; Table A9-8-C. These tables are used to generate emissions estimates for development projects. Many gases make up the group of pollutants that are believed to contribute to global climate change. However, three gases are currently evaluated and represent the highest concertation of GHG: Carbon dioxide (CO_2), Methane (CH_4), and Nitrous oxide (N_2O). SCAQMD provides guidance methods and/or Emission Factors that are used for evaluating a project's emissions in relation to the thresholds. A threshold of 3,000 $MTCO_2E$ per year has been adopted by SCAQMD for non-industrial type projects as potentially significant or global warming (Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, SCAQMD, October 2008).

The City of San Bernardino has not adopted its own numeric threshold of significance for determining impacts with respect to GHG emissions. A screening threshold of 3,000 MTCO2e per year to determine if additional analysis is required is an acceptable approach for small projects. This approach is a widely accepted screening threshold used by numerous cities in the South Coast Air Basin and is based on the SCAQMD staff's proposed GHG screening threshold for stationary source emissions for non-industrial projects, as described in the SCAQMD's Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans ("SCAQMD Interim GHG Threshold"). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required (South Coast Air Quality Management District, n.d.).

The Project will result in approximately 15.97 MTCO2e per year from construction activities. As such, the Project would not exceed the SCAQMD's recommended numeric threshold of 3,000 MTCO2e if it were applied. Thus, project-related emissions would not have a significant direct or indirect impact on GHG and climate change and no mitigation or further analysis is required.

b) *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

Less Than Significant. There are no existing GHG plans, policies, or regulations that have been adopted by CARB or SCAQMD that would apply to this type of emissions source. However, the operator shall comply with CARB and SCAQMD regulations related to diesel-fueled trucks, which may include among others: (1) meeting more stringent emission standards; (2) retrofitting existing engines with particulate traps; (3) use of low sulfur fuel; and (4) use of alternative fuels or equipment.

The San Bernardino County Transportation Authority (SBCTA, formerly known as the San Bernardino Associated Governments) developed a Regional Greenhouse Gas Reduction Plan of which the City of San Bernardino is a Partnership city. As a partner City, the City could reduce its community Greenhouse Gas (GHG) emissions to a level that is 15% below its 2008 emissions level by 2020, consistent with the recommendations in the SBCTA plan.

It is possible that CARB may develop performance standards for Project-related activities prior to construction of the Proposed Project. In this event, these performance standards would be implemented and adhered to, and there would be no conflict with any applicable plan, policy, or regulation; therefore, impacts would be less than significant, and no mitigation would be required. The Proposed Project is consistent with CARB scoping measures and therefore does not conflict with local or regional greenhouse gas plans.

2008 Scoping Plan Consistency

ARB's *Scoping Plan* identifies strategies to reduce California's greenhouse gas emissions in support of AB32 which requires the State to reduce its GHG emissions to 1990 levels by 2020. Many of the strategies identified in the Scoping Plan are not applicable at the project level, such as long-term technological improvements to reduce emissions from vehicles. Some measures are applicable and supported by the project, such as energy efficiency. Finally, while some measures are not directly applicable, the project would not conflict with their implementation (refer to Table 3-2 in Appendix F).

SB 32/2017 Scoping Plan Consistency

The 2017 Scoping Plan Update reflects the 2030 target of a 40 percent reduction below 1990 levels, set by Executive Order B-30-15 and codified by SB 32. Table 3-3 in Appendix F summarizes the project's consistency with the 2017 Scoping Plan. As summarized, the project will not conflict with any of the provisions of the Scoping Plan and in fact supports seven of the action categories.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusions:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

	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?		X		
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?		X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?		X		
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?				X
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 for people residing or working in the project area?			X	
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly to a significant risk of loss, injury or death involving wildland fires?			X	

Environmental Setting

The section was developed by reviewing general and comprehensive plans, county and city websites, querying Federal and State databases, and evaluating aerial imagery.

The City of San Bernardino defines hazardous materials are any materials that, because of their quantity, concentration, physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released into the environment (General Plan, City of San Bernardino, November 1, 2005).

Regulatory Setting

Hazardous materials and hazardous wastes are heavily regulated by a range of federal, State and local agencies. One of the primary hazardous materials regulatory agencies is the California Environmental Protection Agency

(EPA) Department of Toxic Substances Control (DTSC). DTSC is authorized by the U.S. EPA to enforce and implement federal hazardous materials laws and regulations.

Federal and State hazardous materials regulations require all businesses that handle more than a specified amount of hazardous materials or extremely hazardous materials to obtain a hazardous materials permit and submit a business plan to its local Certified Unified Program Agency (CUPA). The CUPA also ensures local compliance with all applicable hazardous materials regulations. For the City of San Bernardino, the CUPA is the San Bernardino County Fire Department, Hazardous Materials Division which also manages the following hazardous waste programs:

- Hazardous Materials Release Response Plans and Inventory
- California Accidental Release Program
- Underground Storage Tanks
- Aboveground Petroleum Storage Act/Spill Prevention, Control, and Countermeasure Plan
- Hazardous Waste Generation and Onsite Treatment
- Hazardous Materials Management Plans and Inventory

Hazardous Waste Sites Near the Project Area

State and Federal databases were reviewed to identify hazardous waste facilities including Federal Superfund sites, State Response sites, Voluntary Cleanup sites, School Cleanup sites, Permitted Operating sites, Corrective Action sites, and Tiered Permit sites within or adjacent to the Project. The database search revealed that there were no sites of concern within the Project area.

Impact Analysis

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant. Project construction would involve the use of heavy equipment, which would contain fuels, oils, lubricants, solvents, and various other possible contaminants. Temporary storage tanks necessary to store fuel and/or other flammable or combustible liquids required on the Project Site during construction would be regulated through the applicable federal, State, and local regulations as overseen by agencies such as the State Department of Health Services and San Bernardino County. Therefore, impacts related to construction hazards are considered less than significant with mitigation incorporated.

The Proposed Project would involve the removal of existing asphalt roadway and historical asphalt road sections. Asphalt is not currently regulated as a hazardous material, but potential contaminants in the asphalt binder require off-site disposal restrictions imposed by the State of California Integrated Waste Management Board. The asphalt removed may be ground on-site and reused in the road base material. Or, the asphalt may be hauled for disposal. Implementation of **Mitigation Measure HAZ – 1** would ensure that all asphalt removed from the Proposed Project would be disposed of in accordance with current regulations at a permitted facility. Mitigation measures are located at the end of this section.

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?

Less Than Significant With Mitigation Incorporated. The potential exists for localized spills of petroleum-based products or other chemicals during construction. These spills could expose construction workers and the public to hazardous materials either directly, at the site of the spill, or indirectly, by introducing these substances into stormwater runoff. Additionally, in Segment 4, the Project will be constructed adjacent to the City's open stormdrain and Lytle Creek wash. Lytle Creek wash is separated from the construction area by a tall berm, and the City's stormdrain also contains a concrete wall and fence. It is unlikely that any spills that occur would reach either the stormdrain or the wash.

All development requiring ground disturbance would be subject to regional and local regulations, including the need for an SWPPP under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (Construction General Permit) (Order No. 2009-0009-DWQ, NPDES No. CAR000002). Compliance with SWRCB's General Construction Activity Stormwater Permit regulations requiring a SWPPP would ensure hazardous materials generated during construction would not create a significant impact. Additionally, construction is anticipated be temporary, therefore any potential impacts would have a limited and temporary timeframe to occur. However, to ensure that potential impacts would be less than significant, implementation of **Mitigation Measures HAZ-2** and **HAZ-3** is required. Mitigation Measures are located at the end of this section.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

Less Than Significant With Mitigation Incorporated. The Rio Vista Elementary School exists approximately one-quarter mile east of the Project alignment, and the Arroyo Valley High School exists approximately one-quarter miles southeast of the Project alignment, just south of Baseline. The proposed Project does not involve transporting or emitting acutely hazardous materials that could result in a danger to the school. Because of this, and implementation of **Mitigation Measures HAZ-2** and **HAZ-3,** the resulting impacts would be less than significant impact with mitigation incorporated.

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?*

No Impact. The proposed Project is not located on a site which is included on a list of hazardous materials sites. An Environmental Data Resources, Inc. (EDR) Corridor Study Report (EDR, September 8, 2006) listed the hazardous sites found on environmental databases within a 1-mile radius of the proposed Project alignment. The EDR report listed 185 sites, of which only 11 sites could be considered for potentially causing environmental impacts to the project location, based on their location and past/present activities on-site. However, none of the sites identified are within the Project alignment north of Baseline, and as a result would not create a significant hazard to the public or environment. Therefore, there is no impact.

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 for people residing or working in the project area?*

No Impact. There are several airports in the vicinity, but none are located within two miles of the Project site. These airports include: the San Bernardino International Airport, located approximately 5 miles southeast of the Project alignment, the Rialto Airport, located approximately 4 miles west of the Project alignment, and the Ontario International Airport, located approximately 15 miles southwest of the Project alignment.

f) *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

Less Than Significant. No Impact. The project alignment is currently vacant, and does not include facilities for emergency response. Additionally, no part of the Project construction or design would impede or redirect emergency response within the area.
The ultimate Project will likely improve emergency response times as it will provide for a more direct route from the areas immediately south of Baseline and all of the neighborhoods near the Project alignment to emergency facilities. Therefore, there is no impact

g) Expose people or structures, either directly or indirectly to a significant risk of loss, injury or death involving wildland fires?

Less Than Significant. The Project site is located in an area that consists of vacant land and commercial uses in an urban setting, and not located adjacent to an area susceptible to wildland fires. Therefore, there is a less than significant impact.

Mitigation Measures:

HAZ – 1 All asphalt requiring removal from the Project Site shall be disposed of in accordance with current regulatory standards

HAZ – 2 A hazardous spill prevention plan shall be prepared by the Applicant and submitted to the City for approval to minimize the likelihood of a spill shall be prepared prior to construction. The plan shall state the actions that would be required if a spill occurs to prevent contamination of surface waters and provide for cleanup of the spill. The plan shall follow Federal, state, and local safety guidelines and standards to avoid increased exposure to these pollutants.

HAZ – 3 If a contaminated area is encountered during construction, construction shall cease in the vicinity of the contaminated area. The construction contractor shall notify all appropriate authorities, including the EPA and the City. If necessary, the contaminated site shall be remediated to minimize the potential for exposure of the public and to allow the Project to be safety constructed.

Impact Conclusion:

No significant adverse effects are anticipated with the inclusion of the above mitigation measures.

	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?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?				X
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:			X	
• result in substantial erosion or siltation onsite or offsite;			X	
• substantially increase the rate or amount of surface water runoff in a manner which would result in flooding on or offsite;			X	
• create or contribute to runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or				X
• impede or redirect flood flows?				X
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation??				X
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			X	

An analysis of the Project’s hydrology was performed by ERSC in July 2019 and is included in Appendix G.

Environmental Setting

Groundwater from the Bunker Hill Basin is the primary source of water supply for the City of San Bernardino, and is supplied by the City of San Bernardino Municipal Water Department. Groundwater recharge occurs by water conducting through the precipitation and by stream flow from rain and snowmelt from the San Bernardino Mountains. The average annual rainfall for the City is 16 inches a year. The Bunker Hill Basin has the capacity to provide 70,000 acre-foot per year of water from groundwater and surface water sources. While groundwater is the principal source of supply in the planning area, other sources of water supply include: the State Water Project (SWP), the Santa Ana River, Mill Creek, and Lytle Creek (City of San Bernardino, November 1, 205).

The west bank of the Lytle Creek wash is located immediately to the east of the Project alignment. Lytle Creek wash is an approximately 20-mile-long natural braided channel that extends from the mountains to the north to the Santa Ana River to the south and is approximately one-half mile wide in the area of the Project alignment. A mining operation and a mitigation bank for endangered species exists within the wash, approximately 1 mile north of the Project alignment.

The Proposed alignment runs parallel to the east of the Lytle Creek Channel Flood Control Levee. The Flood Control Levee, constructed by the US Army Corps of Engineers, separates the wash and potential flood flows from the road alignment. All segments are identified by Federal Emergency Management Agency (FEMA) as Flood Zone X, or "Area of Minimal Flood Hazard" (FEMA, 9/1/2016).

The City's State Street Storm Drain, which outlets to Lytle Creek directly southwest and adjacent to the Baseline intersection, is also located adjacent to the Project alignment. Stormwater runoff from the new roadway will be channeled into this existing stormdrain. The stormdrain along the street alignment in Segments 1, 2 and 3 is comprised mostly of an underground 118-inch reinforced concrete pipe (RCP). In Segment 4, it transitions to an open 13-foot high x 7-foot wide rectangular concrete channel. Near the intersection of Baseline, it transitions to a 13-foot by 5.58-foot reinforced concrete box (RCB) to traverse under Baseline, then becomes a trapezoidal earthen channel at the confluence of Lytle Creek where it discharges.

Additionally, California Aqueduct Santa Ana Valley Unit water supply pipeline also traverses underground within the alignment. The existing pipe is a 108-inch (inside diameter) concrete pipe.

The Project alignment is located within the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB). The site and vicinity ultimately drain into the Santa Ana River via the Lytle Creek wash which is located immediately east of the project site.

Construction activities would require the storage and use of hazardous materials and other urban pollutants such as gasoline, diesel fuel, oils, solvents, and trash, which could enter drainages and degrade downstream water quality and/or violate applicable water quality standards or waste discharge requirements.

However, the RWQCB requires that dischargers whose construction projects disturb one (1) or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation. The Construction General Permit requires the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer (QSD). The SWPPP would include BMPs to be implemented during and after project construction to minimize erosion and sedimentation of downstream watercourses.

Project Hydrology

A hydrologic analysis was conducted for the Project to determine the post-development runoff generated by 100-year storm event within the drainage area as well as to determine if the existing State Street Storm Drain had adequate capacity to accept the post-Project flows (Appendix G).

The new roadway will remain at the existing grade north of Hanford Street but begin rising south of Hanford to ultimately 12 feet high at the intersection with Baseline in order to maintain a smooth transition through the intersection with Baseline. Essentially, the proposed grade will remain constant from Hanford Street to 1,800 south of Hanford Street before entering a sag vertical curve to transition to Baseline Road intersection. The proposed site condition will experience approximately 33 cfs of runoff generated by a 100-year storm event. The proposed State Street extension will include 8-inch curb and gutter and four 7-foot wide catch basins under the street. The low point of the proposed street is approximately located at Station 14+00 (State St. Stationing) at the sag vertical curve, in which two catch basins will be placed to intercept and convey runoff to the existing storm drain system. Two other catch basins will be placed at approximately Station 25+00 and Station 30+50 (State St. Stationing).

Approximately 3.5 acres of undeveloped land will be replaced with an impervious surface for the proposed extension of State Street. Of the total 23-acre drainage area, the estimated impervious cover for the pre-development condition is 6.9 acres. The estimated percent of impervious cover for the post- development condition is approximately 8.1 acres. Therefore, the project increases the impervious cover of the drainage area by approximately 17%.

Using hydraulic modeling software and record drawing information, the existing storm drain system along State Street was found to be operating at approximately 1,340 cfs for the 100-year storm event. The existing storm drain system operates under pressure from Station 35+95 to Station 49+40 (storm drain stationing). However, there is sufficient ground cover above the pipe that permits flows to be added. Additional flow may be added to the storm drain system under the condition that the storm water surface elevation be a minimum of 1 foot below the existing ground surface. The flow lines of existing catch basins on Hanford Street at approximately Station 49+30 (storm drain stationing) are located approximately 4 feet above the hydraulic grade line during the 100-year storm event. Therefore, the existing storm drain system has the capacity to convey an additional 3 feet of hydraulic head, respectively.

The hydrology study determined that the post-Project peak flows would be approximately 33 cubic feet per second (cfs) and the runoff generated from a 100- year storm event will be sufficiently intercepted and conveyed through the proposed new catch basins and the existing State Street storm drain storm drain to Lytle Creek.

Impact Analysis

a) Violate any water quality standards or waste discharge requirements?

Less Than Significant With Mitigation Incorporated. The project impacts are anticipated to include:

Construction

Potential short-term surface water quality impacts related to Project construction activities include runoff of loose soils and/or construction wastes and fuels that could potentially percolate into the ground. Because the construction disturbance is greater than 1 acre, the contractor will need to comply with Construction General Permit Order 2009-0009-DWQ by preparing a SWPPP. To ensure that the construction related impacts remain at a level of less than significant, **Mitigation Measure HYD-1** is required. Mitigation Measures are located at the end of this section.

Operations

The proposed Project would increase impervious surfaces due to paving four lanes within Section 4, where only small amounts of old pavement exist. The Project alignment is not located near any surface water bodies that could be directly impacted by runoff. The Lytle Creek levee separates the road alignment from the creek. Drainage from the street after construction however would be collected in a new storm drain constructed within the road’s right-of-way as described above, with eventual discharge to Lytle Creek. These discharges would be permitted under the citywide storm drain permit and would be a less than significant impact. The Regional Water Quality Control Board (RWQCB), Santa Ana Region has issued a area-wide National Pollutant Discharge Elimination System (NPDES) Storm Water Permit for the County of San Bernardino, the San Bernardino County Flood Control District, and the incorporated cities of San Bernardino County within the Santa Ana Region. The City is responsible for implementing measures to comply with the area-wide permit requirements. The road alignment would be designed to result in no changes to the location or structure of any surface water bodies, flood control facilities, or groundwater.

b) *Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?*

Less Than Significant Impact. The Project would not result in an increased demand for or use of groundwater. Development of the Proposed Project would result in a new four-lane roadway and intersection. The approximate 3.4 acres of disturbance and new roadway section in Segments 3 and 4 will not create a significant amount of new impervious surfaces that would impede surface water drainage into the soil, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level, and impacts are therefore considered less than significant.

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:*

- *result in substantial erosion or siltation onsite or offsite;*
- *substantially increase the rate or amount of surface water runoff in a manner which would result in flooding on or offsite;*
- *create or contribute to runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or*
- *impede or redirect flood flows?*

Less Than Significant. No stream or river exists on the Project site. The existing site drainage involves sheet flow into the City's municipal separate storm sewer system (MS4), commonly referred to as the storm drain system. In its built condition, the proposed Project would slightly increase impervious surface by approximately 1.4 acres with the construction of a four-lane roadway on the vacant parcel. Necessary BMP's such as storm drain filters would be placed into the catch basins to mitigate pollutants of concern as well as trash. Storm flows would continue to be accommodated by the City's storm drain system and impacts would be less than significant.

d) *In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?*

No Impact. All segments of the Project are identified by Federal Emergency Management Agency (FEMA) as Flood Zone X, or "Area of Minimal Flood Hazard" (FEMA, 9/1/2016). The Project area is not near a lake or the coast, therefore, there is no impact to this criterion.

e) *Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

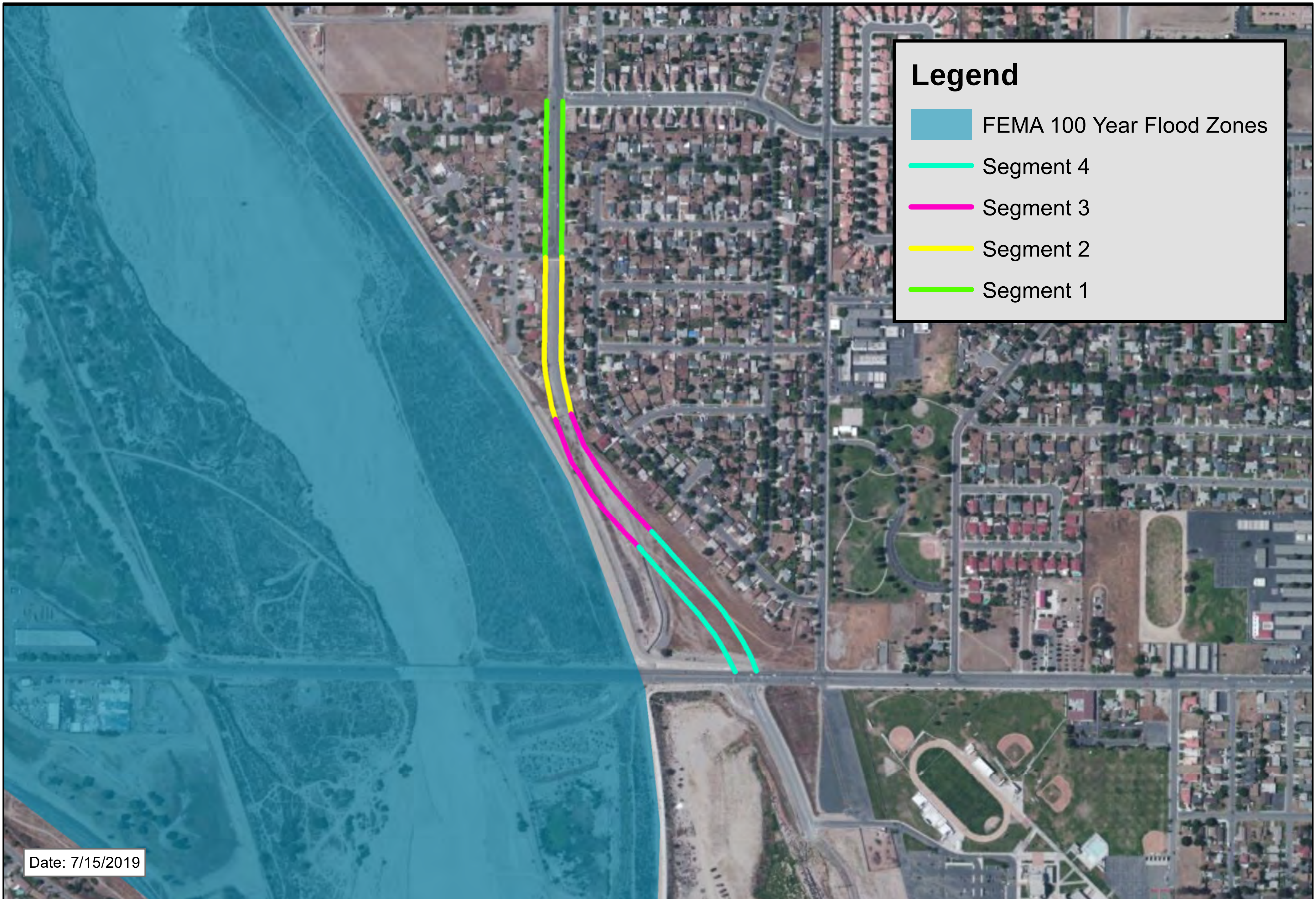
Less Than Significant. The State Street project does not require a project specific WQMP. The Santa Ana Watershed WQMP Templates (guidance document) does not require new arterial roadways of less than one-half mile complete a project specific WQMP. Due to the connection to the existing State Street Storm Drain, the project will still be required to adhere to the City of San Bernardino General Permit for Areawide Urban Storm Water Run-Off (NPDES Permit No. CAS618036, Order No. R8-2002-0012. The project will still be required to mitigate for trash control BMP's through the use of physical devices in the catch basin inlets.

Mitigation Measures:

HYD-1 **Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP)**. Prior to issuance of any Grading Permit, and as part of the future development's compliance with the NPDES requirements, a Notice of Intent shall be prepared and submitted to the Santa Ana Regional Water Quality Control Board (RWQCB) providing notification and intent to comply with the State of California General Construction Permit. Also, a SWPPP shall be reviewed and approved by the Director of Public Works and the City Engineer for water quality construction activities on-site. A copy of the SWPPP shall be available and implemented at the construction site at all times. The SWPPP shall outline the source control and/or treatment control BMPs to avoid or mitigate runoff pollutants at the construction site to the "maximum extent practicable." All recommendations in the Plan shall be implemented during area demolition/preparation, grading, and construction. The Project shall comply with each of the recommendations detailed in the Plan, and other such measure(s) as the City deems necessary to mitigate potential storm water runoff impacts.

Impact Conclusions:

No significant adverse effects are anticipated with the inclusion of the above mitigation measure.



Imagery Date: 8/6/2017

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

Section Figure X 1
FEMA 100 Year Flood Zones

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street

	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?			X	
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?				X

Environmental Setting

The entire Project area is located in the City of San Bernardino. Segments 1 and 2 of the Project alignment are bordered on both sides by residential development. Segments 3 and 4 are bordered by Lytle Creek and the City's storm drain on the west and vacant land and residential development to the east. The existing State Street right-of-way in Segments 1 and 2 are owned by the City of San Bernardino and therefore have no land use designation.

Properties adjacent to all segments are zoned for residential, RS-Suburban (City of San Bernardino Zoning, 2007).

State Street is identified in the City of San Bernardino's General Plan Circulation Map as a Major Arterial, from the 210 freeway to the 10 Freeway, even though there are segments such as the current Project, that are not yet constructed (identified as North Johnson Parkway, City of San Bernardino, *Circulation Plan,* 12/27/2004). Figure ___ of this document identifies the Project location in relation to the City's *Circulation Plan* map. As a Major Arterial, State Street is designated for a design speed of up to 55 miles per hour, accommodate six or eight travel lanes and may have raised medians. These facilities carry high traffic volumes and are the primary thoroughfares linking San Bernardino with adjacent cities and the regional highway system. By design, driveway access to these roadways is typically limited to provide efficient high volume traffic flow. There is currently no driveway access along the existing Project segments, and none are planned.

The Project is designed with sidewalks and a combination of a striped median and raised median.

Impact Analysis

a) Physically divide an established community?

Less Than Significant. State Street exists in Segments 1 and 2. Segments 3 and 4 are bordered by Lytle Creek and the City's storm drain on the west and residential development on the east. The entire alignment area is residential zoning. Project development would require the City to acquire easements in Segment 3 and right-of-way acquisition of portions of APN 0269-181-04 in Segment 4, which is zoned residential and flood control. Project development will significantly reduce the cut-through traffic that currently exits State Street/University and travel south to Baseline. Less Than Significant impacts would result from development of the Proposed Project.

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?

No Impact. The Proposed Project would involve the construction of a portion of a Major Arterial as identified in the City's General Plan. The Proposed Project would be developed in conformance with all applicable land use plans and ordinances, and would not conflict with any agency's plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. No impact would result from development of the Proposed Project.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusions:

No significant adverse impacts are identified or anticipated, and no mitigation measures are 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?				X
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?				X

Environmental Setting

Mineral extraction is an important component of San Bernardino's economy. In the San Bernardino City area, the bulk of the construction aggregate is found in the natural sand and gravel deposits of Cajon Wash, Lytle Creek, Warm Creek, City Creek, and the Santa Ana River (City of San Bernardino, November 1, 2005). The Lytle Creek Wash is located immediately to the west of the Project alignment. Aggregate processing exists within the Lytle Creek Wash north of the 210 Freeway, approximately 1.5 miles north of the Project area, by the Vulcan Materials Company.

Mineral deposits are important to many industries, including construction, transportation, and chemical processing. The value of mineral deposits is enhanced by their close proximity to urban areas. However, these mineral deposits are endangered by the same urbanization that enhances their value (City of San Bernardino, November 1, 2005). The non-renewable characteristic of mineral deposits necessitates careful and efficient development to prevent the unnecessary waste of these deposits due to careless exploitation and uncontrolled urbanization.

Segments 1 and 2 are paved and located in an urban area surrounded by residential uses. Segment 3 and 4 will be constructed within an approximate 9.7-acre vacant parcel. The soils within Segments 3 and 4 are classified as Soboba stony loamy sand and Tujunga gravelly loamy sand. In Segment 4, approximately 41,150 cubic yards of fill will be imported along the roadway in order to establish the roadway grade near the intersection at Baseline, which is significantly higher than the Segment 4 parcel.

The State of California Department of Conservation classifies areas of important minerals:

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.

MRZ-2: Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists.

MRZ-3: Areas containing mineral deposits, the significance of which cannot be evaluated from available data.

MRZ-4: Areas of no known mineral occurrences where geologic information does not rule out the presence or absence of significant mineral resources.

The Department of Conservation has mapped the areas of the Project as MRZ-2, where significant mineral deposits are present. The MRZ-2 designation in this area primarily follows the Lytle Creek wash alignment, and its historic floodplain.

Impact Analysis

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?*

Less Than Significant. The Project area is classified as MRZ-2 by the State of California Department of Conservation, as are many areas within the within the San Bernardino region. Segments 1 and 2 are paved and located in an urban area surrounded by residential uses. Segments 3 and 4 will bisect an approximate 9.7-acre parcel. In Segment 4, approximately 41,150 cubic yards of fill will be imported along the new roadway alignment in order to establish the roadway grade near the intersection at Baseline, which is significantly higher than the Segment 4 parcel. And though the Project alignment will create an urban use within a vacant parcel within the MRZ-2 zone, which is adjacent to Lytle Creek, the vacant parcel is too small for a typical mining operation. Fill dirt and sand and gravel from local mines will be used in the road construction, however, the entire roadway Project is approximately one-half mile long by approximately 100 feet wide, or approximately 6 acres. Therefore, because the Project will utilize a small quantity of construction fill, there is a less than significant impact to this criterion.

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?*

Less Than Significant. The Project area is classified as MRZ-2 by the State of California Department of Conservation, and is included in the City's General Plan. As discussed in XII(a), the Project will utilize a small quantity of construction fill materials, and the vacant parcel to be utilized for the roadway alignment is too small to develop a materials mine. Therefore, there is a less than significant impact.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusion:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

	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 the project site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
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?			X	

An analysis of the Project's potential noise was conducted by Urban Crossroads in July 2019 and is provided in Appendix H.

Noise is generally described as unwanted sound. Sound is a physical disturbance in a medium, such as air, that is capable of being detected by the human ear. Sound waves in air are caused by variations in pressure above and below the static value of atmospheric pressure. The unit of sound pressure ratio to the faintest sound detectable to a person with normal hearing is called a decibel (dB) on a logarithmic scale. The "pitch" (high or low) of the sound is a description of the frequency, which is measured in Hertz (Hz). Most common environmental sounds are a composite of frequencies. A normal human ear can usually detect sounds within frequencies from 20 to 20,000 Hz. However, humans are most sensitive to frequencies in the range of 500 to 4,000 Hz.

Certain frequencies are given more "weight" during assessment because human hearing is not equally sensitive to all frequencies of sound. The A-weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA. A noise level change of 3 dBA or less is barely perceptible to average human hearing. However, a 5 dBA change in noise level is clearly noticeable. A 10 dBA change is perceived as a doubling or halving of noise loudness, while a 20 dBA change is considered a "dramatic change" in loudness. The Community Noise Equivalent Level (CNEL) is a weighted average of noise level over time. It is used to compare the noisiness of neighborhoods. A CNEL exceeding 60db is generally considered unacceptable for a residential neighborhood.

Sound from a source spreads out as it travels away from the source, and the sound pressure level diminishes with distance. Individual sound sources are considered "point sources" when the distance from the source is large compared to the size of the source (e.g., construction equipment, and turbines). Sound from a point source radiates hemispherically, which yields a 6 dB sound level reduction for each doubling of the distance from the source. If the sound source is long in one dimension, the source is considered a "line source," (i.e., roadways and railroads). Sound from a line source radiates cylindrically, which typically yields a 3 dB sound level reduction for each doubling of the distance from the source.

Regulatory Setting

City of San Bernardino General Plan Noise Element

The City of San Bernardino General Plan Noise Element identifies several policies to minimize the impacts of excessive noise levels throughout the community. The Noise Element provides policy guidance which addresses the generation, mitigation, avoidance, and the control of excessive noise. To protect City of San Bernardino residents from excessive noise levels, the Noise Element contains the following three goals:

14.1 Ensure that residents are protected from excessive noise through careful land planning.
14.2 Encourage the reduction of noise from transportation-related noise sources such as motor vehicles, aircraft operations, and railroad movements.
14.3 Protect residents from the negative effects of "spill over" or nuisance noise.

Land Use Compatibility

The noise criteria identified in the City of San Bernardino Noise Element are guidelines to evaluate the land use compatibility of transportation-related noise. The compatibility criteria, shown on Table 11, provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

The *Land Use Compatibility for Community Noise Exposure* guidelines indicate that residential land uses, such as the existing residential homes in the Project study area, are considered *normally acceptable* with noise levels below 60 dBA Community Noise Equivalent Level (CNEL) and *conditionally acceptable* with noise levels of less than 70 dBA CNEL.

Transportation Noise Standards

To encourage the reduction of noise from transportation-related noise sources such as motor vehicles, aircraft operations and railroad movements (Goal 14.2), Table N-3 of the City of San Bernardino General Plan Noise Element, shown on

Table 12, identifies allowable exterior noise level of 65 dBA CNEL and an interior noise level limit of 45 dBA CNEL for new residential developments.

Construction Noise Standards

To analyze noise impacts originating from the construction of the State Street Extension Project, noise standards for construction activities are typically found in a jurisdiction's Municipal Code. However, neither the City of San Bernardino General Plan or Development Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*.

Vibration Standards

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, no specific vibration standards are identified.

Table 11
Land Use Compatibility for Community Noise Exposure

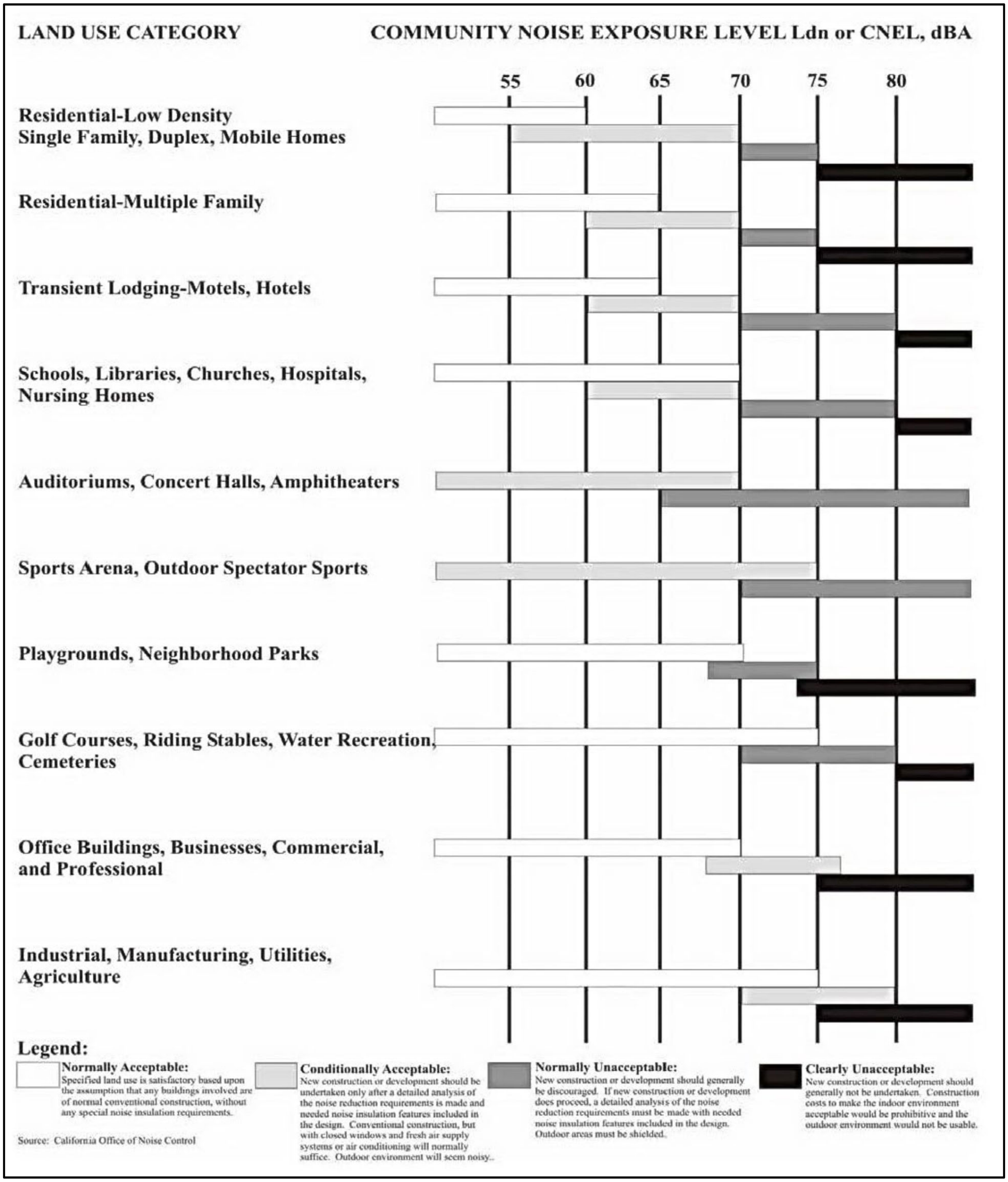

Table 12
Interior and Exterior Noise Standards

Land Use		*CNEL (dBA)*	
Categories	***Uses***	***Interior*** [1]	***Exterior*** [2]
Residential	Single and multi-family, duplex	45[3]	65
	Mobile homes	----	65[4]
Commercial	Hotel, motel, transient housing	45	---
	Commercial retail, bank, restaurant	55	---
	Office building, research and development, professional offices	50	---
	Amphitheater, concert hall, auditorium, movie theater	45	---
	Gymnasium (Multipurpose)	50	---
	Sports Club	55	---
	Manufacturing, warehousing, wholesale, utilities	65	---
	Movie Theaters	45	---
Institutional/ Public	Hospital, school classrooms/playgrounds	45	65
	Church, library	45	---
Open Space	Parks	---	65

[1] Indoor environment excluding: bathrooms, kitchens, toilets, closets, and corridors
[2] Outdoor environment limited to:

- Private yard of single-family dwellings
- Multi-family private patios or balconies accessed from within the dwelling (Balconies 6 feet deep or less are exempt)
- Mobile home parks
- Park picnic areas
- School playgrounds
- Hospital patios

[3] Noise level requirement with closed windows, mechanical ventilation or other means of natural ventilation shall be provided as per Chapter 12, Section 1205 of the Uniform Building Code.
[4] Exterior noise levels should be such that interior noise levels will not exceed 45 dBA CNEL.

Source: City of San Bernardino General Plan Noise Element, Table N-3.

Environmental Setting

The Project proposes to construct a new, approximately one-half mile segment of State Street between 16th Street and Baseline Street in approximately 2020. For analysis, the Project was divided into segments where either the adjacent environment and/or the proposed work was similar in nature.

Study Methodology and Results

To assess the existing noise level environment, four 24-hour noise level measurements were taken at receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A within Appendix H provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, June 12th, 2019.

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site, and noise measurement guidelines from both Caltrans and the Federal Transportation Authority (FTA) were utilized.

The noise measurements presented below focus on the average or equivalent sound levels (Leq). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 13 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location.

Table 13
24-Hour Ambient Noise Level Measurements

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located on State Street, adjacent to Segment 1 of the Project and existing single-family residential homes.	61.1	59.4	66.6
L2	Located on Colorado Avenue, northeast of Segment 3 of the Project, adjacent to existing single-family residential homes.	60.6	58.7	66.0
L3	Located on 9th Street, south of the Project, near existing single-family residential homes and Arroyo Valley High School.	53.1	49.6	56.9
L4	Located on Baseline Street, adjacent to Segment 5 of the Project, near vacant land and existing residential homes.	75.2	71.5	79.1

[1] See Exhibit 4-A in Appendix H for the noise level measurement locations.
[2] Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix 4.2. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

Off-Site Traffic Noise Impacts

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the Project's *Traffic Impact Analysis* (refer to Appendix I). Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the same traffic scenarios as used in the Traffic Impact Report in Appendix I, and the results are as follows:

- Existing Without the Project - The City of San Bernardino General Plan Noise Element, Figure N-1, identifies land use compatibility criteria based on transportation noise levels at various land uses throughout the City. Based on the traffic noise levels calculated under existing conditions, existing residential properties adjacent to State Street experience exterior traffic noise levels approaching 59.6 dBA CNEL at the right-of-way of the road, south of 16th Street, which are considered *normally acceptable* under the General Plan Noise Element compatibility criteria.

- Opening Year 2022 With the Project - Under Opening Year 2022 conditions with the Project, traffic noise levels on State Street south of 16th Street are anticipated to increase to 60.0 dBA CNEL at the right-of-way of the road, and are considered *normally acceptable* for residential uses. Under Opening Year 2022 conditions with the Project, traffic noise levels on the new extension of State Street, north of Baseline Street, are anticipated to approach 66.9 dBA CNEL at the right-of-way of the road, and are considered *conditionally acceptable* for residential uses. While the City's General Plan land use compatibility criteria for noise identifies requirements for new development experiencing exterior traffic noise levels in the *conditionally acceptable* range, the City does not identify any requirements for existing uses.

- Buildout 2040 With the Project - Under Buildout 2040 conditions with the Project, traffic noise levels are shown to range from 67.8 to 68.4 dBA CNEL at the right-of-way of State Street, between 16th Street and Baseline Street, which represents conditionally acceptable residential use. While Project traffic noise levels are anticipated to increase due to the Project at the right-of-way of State Street, adjacent to existing residential properties, exterior traffic noise levels would remain within conditionally acceptable ranges for residential uses. It is important to note that the traffic noise levels described above do not include any additional attenuation provided by existing barriers, berms, or intervening structures in the Project study area. Moreover, it is anticipated that interior noise levels within existing residential homes would be reduced by approximately 25 dBA, as typical building construction will provide a minimum noise reduction of 25 dBA with "windows closed, and therefore, would be expected to remain below the City's 45 dBA CNEL interior noise level standard for residential uses.

Construction Noise Analysis

Since the City of San Bernardino General Plan and Municipal Codes do not identify specific construction noise level thresholds, a threshold is identified based on the National Institute for Occupational Safety and Health (NIOSH) limits for construction noise. The worst-case Project-related short-term construction noise levels are expected to range from 49.7 to 82.8 dBA L_{eq} and will satisfy the 85 dBA L_{eq} threshold identified by NIOSH at the nearby sensitive receiver locations.

Construction Vibration Analysis

Sources of vibration can include geotechnical drill rigs, excavators, dump trucks, backhoes, and other general construction equipment. According to the Federal Transportation Administration (FTA) guidelines, a vibration level of 65 decibel notation (VdB) is the threshold of perceptibility for humans. The FTA guidelines also state that, for a significant impact to occur, vibration levels must exceed 80 VdB during infrequent events (FTA 2006). Based on the approach set forth in the FTA guidelines, this analysis adopts a threshold of significance of 80 VdB for groundborne vibration impacts. Table 14 identifies typical construction equipment and vibration levels.

Table 14
Vibration Source Levels for Typical Construction Equipment

Equipment	Vibration Level at 25 feet (VdB)
Large bulldozer	87
Caisson drilling	87
Loaded trucks	86
Jackhammer	79
Small bulldozer	58

Source: FTA 2011

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. At distances ranging from 17 to 420 feet from Project construction activity, root-mean-square (RMS) construction vibration levels are expected to approach 0.11 in/sec RMS. This is less than the vibration standard of 0.7 in/sec RMS, identified in Section 15.68.020 of the City of San Bernardino Municipal Code. Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter.

Impact Analysis

a) *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Less Than Significant With Mitigation Incorporated. Based on the results of the Project noise analysis, the Project will not generate a substantial temporary or permanent increase in ambient noise in the vicinity of the Project.

Construction Noise

The Project will create temporary noise during construction. Since the City of San Bernardino General Plan and Municipal Codes do not identify specific construction noise level thresholds, the Noise Analysis in Appendix Hutilized a NIOSH limit for construction noise. The worst-case Project-related short-term construction noise levels are expected to range from 49.7 to 82.8 dBA L_{eq} and will satisfy the 85 dBA L_{eq} threshold identified by NIOSH at the nearby sensitive receiver locations.

Operational Noise

Noise levels of the existing conditions were determined to be 59.6 dBA, which is considered normally acceptable under the City of San Bernardino's General Plan Noise Element. Once the Project has been constructed, noise levels are anticipated to range from approximately 67.8 to 68.4 dBA CNEL at the right-of-way of State Street, which is considered "conditionally acceptable" for residential uses according to the City's General Plan.

Therefore, the impact is less than significant. However, to ensure that noise levels produced by the construction equipment are reduced for nearby receptors during construction, **Mitigation Measures NOI-1, NOI-2 and NOI-3** are incorporated. Mitigation measures are at the end of this section.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant. The Noise Analysis in Appendix Hidentified that at distances ranging from 17 to 420 feet from Project construction activity, root-mean-square (RMS) construction vibration levels are expected to approach 0.11 in/sec RMS, which is less than the vibration standard of 0.7 in/sec RMS, identified in Section 15.68.020 of the City of San Bernardino Municipal Code. Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter. Therefore, there is a less than significant impact.

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?

No Impact. There are no airports or private airstrips within 2 miles of the Project alignment. The closest airport is the San Bernardino International Airport, located more than 4 miles southeast of the Project alignment. Therefore, there is no impact.

<u>Mitigation Measures:</u>

NOI-1 During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.

NOI-2 The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction (i.e., to the center).

NOI-3 The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

<u>Impact Conclusions:</u>

No significant adverse effects are anticipated with the inclusion of the above mitigation measure.

	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)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X

Environmental Setting

The Project is within an urban area. Provisions for accommodating population growth and economic development within City of San Bernardino are delegated through land use designations in the City's General Plan and respective Zoning Ordinances. State Street, between the 210 Freeway and the 10 Freeway is identified as a Major Arterial in the City's General Plan. The current Project will construct Phase 1, which is from 16th Street to Baseline.

Impact Analysis

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)?

No Impact. The Project involves completing the first segment of a designated Major Arterial. This segment will reduce the cut-through traffic currently experienced in the adjoining neighborhoods for travelers exiting the 210 Freeway at State Street/University Avenue, who must use the neighborhood streets to go south to Baseline, a major east-west thoroughfare, and continue south on State Street. The Project is designed to improve service and safety. The Project would not introduce population growth to the area. No impact is anticipated.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. The Project involves improvements to an existing street and development of a street within a vacant parcel. The Project would not result in displacement of residential land uses, including homeless camps; therefore, no impact would occur.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusions:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XV. PUBLIC SERVICES: a) 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:				
Fire protection?			X	
Police protection?			X	
Schools?				X
Recreation/Parks?				X
Other public facilities?			X	

Environmental Setting

The City of San Bernardino has a population of approximately 2000,000 people within approximately 99.6 square miles, supported by attended to by a variety of public services designed to maintain and improve the public welfare. Table 15 identifies the public services closest to the Project site.

Fire services are provided for the entire City by the San Bernardino Fire District, specifically Division 6. The City of San Bernardino provides police services; the Project area is part of the Western Division of the San Bernardino City Police Department. All police services are dispatched from a central location.

Table 15
Public Services

Public Service Type	Name/Address	Distance from Project Site
Fire Protection	San Bernardino County Fire Station 222, 1201 W. 9th Street, San Bernardino	Approx. 1.5 miles southeast
Police Station	710 N. D Street, San Bernardino	Approx. 3 miles west
Schools	Rio Vista Elementary School, 1451 N California St San Bernardino Arroyo Valley High School 1881 W Base Line St, San Bernardino	Approx. 0.25 mile east Approx. 0.25 mile southeast
Recreation/Parks	Anne Shirrells Park, 1367 N California St, San Bernardino	Approx. 0.5 mile east

Impact Analysis

a) 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: Fire Protection, Police Protection, Schools, Recreation/Parks, or Other Public Facilities.*

Less Than Significant. The Proposed project may utilize public services of Fire and Police in the event of an emergency such as a worker injury or theft. However, the needs of the proposed Project can be handled with the existing public services and not result in the need for any of the public service facilities to expand facilities. The proposed Project will not utilize schools or public parks, nor will the proposed Project increase the need for these facilities in a manner that would exceed existing capacity.

Additionally, existing traffic along State Street, near 16th Street and the intersection with Baseline would be accommodated during project construction pursuant to a Traffic Control Plan to be prepared by the contractor. The Project is not expected to require closure of either road. Traffic would be diverted onto the half-road section to allow construction of new facilities on the opposite side. Therefore, the proposed Traffic Control Plan would have potential to temporarily impact fire protection emergency service response times during construction. However, the Project would not result in significant threats of deterioration to the existing levels of service at public service facilities nor the need to build additional public service facilities. A less than significant impact to public services would occur as a result of the Project.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusion:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

	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?				X
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?				X

Environmental Setting

The City of San Bernardino Parks, Recreation and Community Services Department offers 38 parks, (includes open spaces and ballfields), 31 playground areas and several park locations with walking tracks for recreational activities. Anne Shirrells Park, located at 1367 N California Street, is situated approximately 0.25 mile east of the Project alignment. The approximate 12-acre park has a number of community amenities, such as a community center, two picnic shelters, two basketball courts, 13 picnic tables, a 0.25-mile walking track and restrooms.

Impact Analysis

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?

No Impact. The Proposed Project would include signal installation and widening of the intersection at Baseline and the new State Street. The Proposed Project does not include the construction of recreational facilities and does not include a housing component that would result in population growth. There are no components of the project that would require the construction or expansion of new parks or recreational facilities, nor would development of the Proposed Project result in residential or commercial land uses generating population growth, facilitating increased use of existing facilities which would cause or accelerate substantial physical deterioration of existing facilities. Therefore, no impact related to recreational facilities would result from development of the Proposed Project

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?

No Impact. See answer to subsection a), above

Mitigation Measures:

No mitigation measures are required.

Impact Conclusion:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

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

Environmental Setting

The 0.5-mile Project alignment is located in the City of San Bernardino, in the County of San Bernardino. As the County's largest city and given its location, San Bernardino's transportation system serves the mobility of over 186,000 residents, according to the City of San Bernardino's General Plan.

State Street is identified in the City of San Bernardino's General Plan as a Major Arterial, between Interstate 215 and Interstate 10 although some sections are not yet constructed, such as this Project section between 16th Street and Baseline. The State Street/University Avenue exit from Interstate 210 provides access to surface streets north and south of Interstate 210, including direct access to the Project alignment. Therefore, because there are only partially constructed portions of the roadway planned to connect Interstate 210 and Interstate 10, motorists must use alternative routes, which contributes to the additional traffic and congestion in residential neighborhoods and on other arterials.

On the General Plan, the ultimate alignment is known as University Parkway and North Johnson Way north of Interstate 210. South of Interstate 210 it is known as State Street to Baseline, then University Parkway south of Baseline. Currently, State Street/University Parkway south of Baseline ends approximately 800 feet south of the intersection of Baseline and will be the subject of a future roadway development phase, the construction timing of which has not yet been identified.

The General Plan defines a Major Arterial as roadways that can accommodate six or eight travel lanes and may have raised medians. These facilities carry high traffic volumes and are the primary thoroughfares linking San Bernardino with adjacent cities and the regional highway system. Driveway access to these roadways is typically limited to provide efficient high volume traffic flow.

Examples of Major Arterials currently include:

- Waterman Avenue
- Mount Vernon Avenue
- Highland Avenue
- Baseline Street

Rail Service

Freight rail is provided in the City of San Bernardino by the Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) railroads, and the rail lines traverse the City in various areas. Rail service provide by UP is expected to grow from approximately 24 trains per day to approximately 132 trains per day, according to the City's General Plan.

Passenger rail service is provided by both Amtrak and the Southern California Regional Rail Authority (SCRRA), which operates the Metrolink. Passenger rail service operates from the depo near downtown San Bernardino, and is located approximately 1 mile directly south of the Project alignment. The San Bernardino Line is currently the only line with service seven days a week. On weekdays, there are 15 round trips per day on the San Bernardino Line with about half of them during commute hours, but with close to hourly service in the mid-day. Travel time between San Bernardino and LA Union Station is about one hour and 30 minutes. On weekends, there are eight round trips on Saturday and four on Sunday. The City's General Plan identified that SCRRA has plans to nearly double the amount of service on it lines over the next 20 years.

Public Transit

Public transportation in the San Bernardino area is provided by Omnitrans, the regional Public Transit operator for San Bernardino County. Omnitrans also provides weekend express bus service between San Bernardino, Riverside and Los Angeles, through a contract with the Southern California Rapid Transit District.

Omnitrans also operates a bus rapid transit service (BRT) throughout San Bernardino and Loma Linda, known as "sbX" or the Green Line. The sbX Green Line travels a 15.7 mile route along the E Street Corridor, from Cal State University San Bernardino at the north to Loma Linda University and Medical Center at the south. The sbX operates Mondays through Fridays, with limited service on Saturdays. Buses run very frequently throughout service times with headways of every ten minutes during peak hours, 15 minutes during midday, and 20 minutes at night. Numerous surface streets in San Bernardino have been modified to accommodate a dedicated lane for the sbX. The closest route to the Project area is Bus Route 2 which travels along E Street in the vicinity of Baseline and 10^{th} Street, approximately 2.3 miles east of the Project alignment.

Bike and Pedestrian Trails

The off-street recreational trail system combines hiking, equestrian, and bike trails into Multi-Purpose trails. The on-street trail system consists of dedicated bike lanes along the pavement edge of streets. Pedestrian access and recreation is provided through the City's sidewalks and hiking trails.

Within the Project area, the Cajon/Lytle Creek Trail is proposed near the edge of Lytle Creek, and is adjacent to the Project alignment near the intersection of Baseline. Baseline is identified in the City's General Plan as a bicycle route to connect Tippecanoe Avenue and Meridian Avenue.

Aviation

The San Bernardino International Airport and Trade Center (SBIA) is located approximately five miles southeast of the Project alignment. The SBIA includes two distinct components: 1) the airport portions (and related facilities) of the former Norton Air Force Base, and 2) the Trade Center, which encompasses the non-airport related portions of the former base. The SBIA currently only serves air cargo and does not provide passenger service.

Existing and Proposed Traffic Conditions

The City of San Bernardino's General Plan identifies Level of Service (LOS) to characterize traffic congestion on a scale of A to F with LOS A being a "free-flow" condition and LOS F representing extreme congestion. In summary, this scale is defined as:

- LOS A - No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation.

- LOS B - Represents stable operation. An occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted within platoons of vehicles.

- LOS C - Stable operation continues, however full signal cycle loading is intermittent, but more frequent. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles.

- LOS D - Encompasses a zone of increasing restriction approaching instability. Delays to approaching vehicles may be substantial during short peaks with the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups.

- LOS E - Represents the most vehicles that any particular intersection approach can accommodate. At capacity, there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles).

- LOS F - Represents jammed conditions. Backups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration.

The City of San Bernardino's General Plan establishes LOS C for roadways and LOS D for intersections as the minimum acceptable level of service. When traffic conditions are forecasted to decline from a LOS D to poorer levels of service, mitigation measures are necessary. In the case of existing deficiency where existing without Project Conditions is already below LOS D (i.e., LOS E or F), the Project will be required to mitigate its incremental transportation related impacts to level of service that's equal to or better than the LOS identified under without Project Conditions.

A Traffic Impact Study (TIA) was prepared for this Project in May 2019 by Integrated Engineering Group (Appendix I) to identify and document potential traffic impacts. Based on the current lack of connectivity between the State Street/University interchange and Baseline and points farther south such as Rancho Avenue, the TIA studied traffic at 11 intersections along State Street, State Street/University Parkway, and Rancho Avenue. Two intersections, Pepper Avenue and Baseline and Medical Center Drive and Baseline, were also analyzed due to potential traffic diversion that may occur once the Project is constructed. Pepper Avenue at Baseline is located approximately 1 mile west of the State Street/Baseline intersection and offers a south connection to Foothill Blvd, but does not extend north past Baseline. Medical Center Drive is located approximately 0.5 mile east of the State Street/University Parkway intersection and also offers a south connection to Foothill Blvd, as well as offers a north connector to Highland Avenue.

The study analyzed traffic under the following conditions:

- Existing Conditions (2019)

- Opening Year (2022) Phase 1 – Existing Traffic plus ambient growth (3% compounded for 3 years)

- Buildout Conditions (2040) – State Street/University Parkway would be fully constructed between Interstate 210 and Interstate 10.

The TIA concluded the following:

Existing Conditions (2019)

The Rancho Avenue and 5th Street/Foothill Boulevard intersection currently operates at an unacceptable LOS under Existing Conditions, and a traffic signal is necessary to mitigate the intersection operation. This intersection was also identified in the City's General Plan published in 2005 as operating at LOS D or below ad requiring modification to relieve congestion.

Opening Year (2022) Phase 1

All study intersections within the Project alignment would operate at acceptable LOS under Opening Year Phase 1 Conditions.

Buildout Conditions (2040)

The following intersections would operate at an unacceptable LOS under Buildout Conditions and require modifications to relieve congestion.

- State Street and 16th Street – a traffic signal would be required at this intersection to mitigate the condition.
- State Street/University Parkway and Baseline Street – a northbound exclusive right turn lane would need to be constructed, as well as modified signal timing would be necessary to mitigate this condition.
- Rancho Avenue and Foothill Boulevard - – a traffic signal would be necessary to mitigate this condition.
- Rancho Avenue and Valley Boulevard – construct an eastbound exclusive right turn lane

<u>**Impact Analysis**</u>

a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less Than Significant With Mitigation Incorporated. The Project alignment is located in an area without access to public transit or bicycle/pedestrian facilities. There is no plan to provide public transit infrastructure to the area at this time. No pedestrian or bicycle infrastructure is proposed at the project site. And though the Project alignment is adjacent to a proposed regional trail, there is adequate room between the roadway and the proposed trail along Lytle Creek to construct a trail.

In the City of San Bernardino, the minimum acceptable level of service is established as LOS C for roadways and LOS D for intersections. Based on the TIA prepared for the Project, several intersections along the new State Street/University arterial between Interstate 210 and Interstate 10 require modification at full build-out, assumed to be 2040. In order to compliant with the City's standards, implementation of **Mitigation Measure TRA-1**, located at the end of this section, will reduce impacts to less than significant.

b) Conflict or be inconsistent with CEQA Guidelines § 15064.3,subdivision (b)?

Less Than Significant. Prior to January 2019, traffic impacts were assessed using the LOS methodology. Senate Bill 743 (SB 743, 2013) required that the analysis be examined, and an alternative method adopted. In December 2018, the California Governor's Office of Planning and Research issued revised CEQA Guidelines Section 15064.3(b) which sets forth the criteria for analyzing transportation impacts. Specifically, this section of the Guidelines focuses on assessing land use projects and transportation projects through associated vehicle miles traveled (VMT), and not LOS. Subsection (b)(4) and subsection (c) allows a lead agency to chose the most appropriate method to evaluate VMT, but all agencies must have their methodology adopted by July 1, 2020, in accordance with SB 743.

Subsection (b)(2) states that transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. It further states that to the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.

The Project alignment is identified as a Major Arterial in the City's General Plan, adopted in 2005, even though portions of the roadway are incomplete. The identification of State Street/University Avenue as a Major Arterial signifies the intent of the City to complete this thoroughfare to relieve motorists usage of residential streets and traffic congestion at surrounding intersections in order to travel the city on a north/south connector.

The Draft Environmental Impact Report ([DEIR] The Planning Center, July 2005) provided an analysis of the City's General Plan components, including the Circulation plan that identified the vision for all major and secondary arterial roadways. The analysis identified that the only Waterman Avenue @ Interstate 210 (formerly known as State Route 30) eastbound ramps would not meet an acceptable LOS of E or better. Pepper Avenue between I-10 and Foothill would function at an unacceptable LOS F and several freeway segments would function at an unacceptable LOS F. The study identified that Rancho Avenue at 5th Street/Foothill Blvd currently, and was projected to, function at a LOS F.

The Project TIA used study methodology similar to that used in the DEIR, focused to address the intersections that were relevant to the Project alignment and key adjacent intersections. The Project TIA also identified that Rancho Avenue at 5th Street/Foothill Blvd currently, and was projected to, function at a LOS F. The Project is considered a transportation project under CEQA Guidelines 15064.3(b)(2) and is designed to reduce VMT by offering motorists a major north-south connector roadway from Interstate 210 directly to Baseline, an east-west Major Arterial. Therefore, the Project is consistent with CEQA Guidelines § 15064.3,subdivision (b) and there is a less than significant impact.

c) *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

Less Than Significant. Segment 4 of the Project, in the vicinity of the Baseline intersection, is approximately 12 feet lower than Baseline. Therefore, the Project includes importing approximately 20,000 cubic yards of fill to gradually raise the roadbed from the ground level in Segment 3 to 12 feet above ground surface level at the intersection of Baseline. This gradient to achieve this is within engineering standards used by Caltrans and the City of San Bernardino. The roadbed slope will be approximately 3:1 and will be separated from the traveled way by raised curb and gutter, 5-foot-wide sidewalks on each side, and a raised concrete median that will divide the opposing travel lanes. Therefore, the Project does not contain a design feature that would pose a hazard; the impact is less than significant.

d) Result in inadequate emergency access?

Less Than Significant. Only Segment 1 of State Street, between 16th Street and Hanover Street, has paved access. The remainder of the project is not open to the public or is vacant. Construction will occur in Segment 1 will follow a traffic control plan that will be developed prior to construction. Once constructed, the roadway will continue to provide access to the backyards of residences within the existing Segments 1 and 2. Additionally, the roadway will provide better access for emergency vehicles and area residents to access the State Street/University Parkway on/off ramp at Interstate 210. Therefore, there will be a less than significant impact.

Mitigation Measures:

TRA-1 Conduct a traffic analysis every 10 years, until Project build-out, at the key intersections that were the subject of the Project TIA to refine growth rates and actual traffic congestion. Implement modifications to the roadways and signals as necessary to maintain adequate levels of service.

Impact Conclusion:

No significant adverse effects are anticipated with the inclusion of the above mitigation measure.

	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 adverse change in the significance of a tribal cultural resource, 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 a 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		X		
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 subdivision (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.		X		

CRM Tech (CRM) completed a cultural resources records search to identify prehistoric or historic-period resources within 1 mile of the Project site (Appendix D).

On January 21, 2019, CRM TECH submitted a written request to the Native American Heritage Commission (NAHC) for a records search in the commission's Sacred Lands File. Following the NAHC's recommendations and previously established consultation protocol, on February 1 CRM TECH further contacted a total of nine tribal representatives in the region in writing for additional information on potential Native American cultural resources in the project vicinity. A complete record of correspondence between CRM TECH and the Native American representatives is contained within the report in Appendix D.

In response to CRM TECH's inquiry, the NAHC stated in a letter on January 23, 2019, that the Sacred Lands File indicated the presence of unspecified Native American cultural resource(s) in the general vicinity of the project area. For the specific location and nature of such resource(s), the NAHC referred further inquiry to tribes in the surrounding region and provided a list of potential contacts (refer to report in Appendix D). Upon receiving the NAHC's reply, on February 1 CRM TECH contacted all nine tribal organizations on the referral list in writing.

<u>Environmental Setting</u>

The San Bernardino area is a part of the homeland of the Serrano people, which is centered in the San Bernardino Mountains. Together with that of the Vanyume people, linguistically a subgroup, the traditional territory of the Serrano also includes part of the San Gabriel Mountains, much of the San Bernardino Valley, 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 and cultivated 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 negligible 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.

Cultural Resources Study

In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, contacted Native American representatives, pursued historical background research, and carried out an intensive-level field survey of the entire project area.

According to records from the South Central Coastal Information Center (SCCIC), various portions of the Project area were included in as many as 10 previous studies completed between 1978 and 2015, but the Project area as a whole had not been surveyed systematically prior to this study. Outside the Project area but within a 1-mile radius, SCCIC records show at least 37 other previous cultural resources studies on various tracts of land and linear features. Collectively, these past studies covered approximately 85% of the land within the scope of the records search and resulted in the identification of 18 historical/ archaeological sites.

Among the 18 sites, two were of prehistoric (i.e., Native American). The closer of the two, 36-001457, was original found in 1939 and was later described as a large habitation site that had been partially destroyed. Still, more than 20,000 artifacts were recorded at the site in 1987, including projectile points, pottery sherds, beads, milling stones, flaked-stone tools and debitage, and shells. The location of the site is more than a half-mile to the southwest of the project area, across the Lytle Creek Wash. The other prehistoric site, 36-032705, represents the reburial location of likely prehistoric human remains nearly a mile to the northwest of the project area.

During the cultural resources study performed by CRM Tech, Jessica Mauck of the San Manuel Band identified that both of the sites were located on the west side of the Lytle Creek Wash, and that the tribe was not aware of any Native American cultural resources on the east side of the creek, where the project area lies.

In compliance with AB 52 regarding consultation with Native American Tribes, the City of San Bernardino sent letters to potentially affected tribes describing the proposed Project and its location and requested a response regarding the potential for impacts to Tribal Cultural Resources to occur. Only the San Manuel Band of Mission Indians responded and requested that mitigation measures be added to reduce potential impacts to undetermined Native American resources.

<u>Impact Analysis</u>

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),

Less Than Significant Impact With Mitigation Incorporated. There are no resources that have been identified as eligible for listing to the California Register of Historic Places within or near the Project alignment. However, 36-001457 and 36-032705 have been determined to exist on the west side of Lytle Creek, most likely approximately one mile from the Project site. However, based on AB 52 tribal consultation, the San Manuel Band of Mission Indians (SMBMI) requested that **Mitigation Measure TCR-1** and **TCR-2** be included to reduce potential impacts to potential Native American resources.

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 subdivision (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.

Less Than Significant Impact With Mitigation Incorporated. CRM Tech's communication with the San Manuel Band of Mission Indians identified potential resources on the west side of Lytle Creek, but none on the east side, in the location of the Project alignment. There are no resources supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. However, based on AB 52 tribal consultation, the San Manuel Band of Mission Indians (SMBMI) requested that **Mitigation Measure TCR-1** and **TCR-2** be included to reduce potential impacts to potential Native American resources.

<u>Mitigation Measures:</u>

TCR-1 The San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed in CR-1, of any pre-contact 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.

TCR-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.

<u>Impact Conclusions:</u>

No significant adverse effects are anticipated with the inclusion of the above mitigation measures.

	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 storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			X	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
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?			X	
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?			X	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?				X

Environmental Setting

The City of San Bernardino Municipal Water Department owns and operates water and wastewater systems that service the City of San Bernardino. The City of San Bernardino Public Works Department maintains the City's network of storm drains. Solid waste collection within much of the City and a portion of the unincorporated planning area is provided by the Solid Waste Services and Refuse and Recycling Division of the City of San Bernardino Department of Public Services.

Southern California Edison (SCE) provides electrical utility service, and the Southern California Gas Company (SCG) provides natural gas.

The County of San Bernardino Solid Waste Management Division (SWMD) is responsible for the operation and management of the solid waste disposal system which consists of six regional landfills, eight transfer stations and five community collection centers throughout the County. The closest landfills to the Project site include the Mid-Valley Landfill in Fontana and the San Timoteo Landfill in Redlands.

Impact Analysis

a) *Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?*

Less Than Significant. The Project will construct a new roadway with sidewalks, curb and gutter, cross drains a and catch basins to handle stormwater, and LED streetlights.

Stormwater runoff from the new roadway will be channeled to the City's existing State Street stormdrain located adjacent to the west of the Project alignment, which outlets directly to Lytle Creek just south of the intersection of Baseline. The stormdrain along the street alignment in Segments 1, 2 and 3 is comprised mostly of an underground 118-inch reinforced concrete pipe (RCP). In Segment 4, it transitions to an open 13-foot high x 7-foot wide rectangular concrete channel. Near the intersection of Baseline, it transitions to a 13-foot by 5.58-foot reinforced concrete box (RCB) to traverse under Baseline, then becomes a trapezoidal earthen channel at the confluence of Lytle Creek where it discharges. The hydrology report prepared for the Project (ERSC, July 2019, Appendix G) determined that the existing storm drain has sufficient capacity with the proposed catch basins to intercept runoff and maintain an acceptable level of service. Therefore, the Project will not significantly impact stormwater facilities.

Several of SCE's subtransmission and distribution line facilities are located parallel and immediately adjacent to the Project alignment in Segments 1, 2 and 3. In these segments, the Project alignment is designed in a manner that will not require relocation. One SCE line runs parallel to Baseline near the proposed new intersection where the roadway surface will be approximately 12 feet above the current ground surface. It is anticipated these facilities in the immediate Project area may need to be relocated underground, or the poles raised, to meet safe utility clearances. The impact of the relocation is not significant.

Water will be used for construction, primarily for dust control, and the City has ample rights and supplies to service the Project needs. The Project's wastewater need is only anticipated during construction in the form of "porta-potties" for construction workers. These impacts are less than significant.

Therefore, the overall impact to this criterion is less than significant.

b) *Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*

Less Than Significant. The Project will only require water during construction. Operation of the new roadway is not anticipated to require continued water supply beyond establishing slope revegetation in Segment 4. The City has ample water rights and supplies to support the water needs in the reasonably foreseeable future, during normal dry and multiple dry years. Therefore, the impact is less than significant.

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?*

Less Than Significant. The Project will not require the use of wastewater treatment services beyond providing wastewater for construction workers during construction. Therefore, the impact is less than significant.

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?*

Less Than Significant. Construction activities may generate small quantities of solid waste, inert materials, and green waste. All waste would be properly disposed of in accordance with all local statutes and regulations. Therefore, the impact is less than significant.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. The small quantities of solid waste generated by the Project during construction activities would be handled in accordance with all applicable Federal, State, and local statutes and regulations. No impacts would occur under this criterion.

Mitigation Measures:

No mitigation measures are required.

Impact Conclusion:

No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

	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?			X	
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?		X		
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?			X	
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?			X	

Environmental Setting

The fire hazard of an area is typically based on the density and type of vegetation, topography, weather, dwelling unit density, and whether or not there are local mitigation measures in place that help reduce the zone's fire rating such as an extensive network of fire hydrants, fire-rated construction, or fuel modification zones (The Planning Center, July 25, 2005).

According to the City's Municipal Code Chapter 19.15, the City identifies three foothill fire zones with different degrees of hazard based on slope, type of fuel present and natural barriers:

- Fire Zone A - Extreme Hazard that includes areas with slopes of 30 percent or greater
- Fire Zone B - High Hazard that includes area with slopes between 15 and 30 percent
- Fire Zone C - Moderate Hazard that includes slopes between 0 and 15 percent,
- Fire Zone C, Abutting Wildlands - includes those lots on the perimeter of a tract that are adjacent to wildlands.

The City of San Bernardino fire zones are located primarily along the foothills of the San Bernardino Mountains, north of Interstate 210, due the to steep terrain, highly flammable chaparral vegetation, and high winds that correspond with seasonal dry periods.

The Project area is not located in any of the fire foothill zones. The closest fire zone is the Little Mountain area, located approximately 2.5 miles northeast of the Project alignment. This area is designated as an Extreme Fire Hazard Area according to the City's General Plan.

The City's Municipal Code also defines "wildlands" as "*Any area of land that is essentially unimproved, in a natural state of hydrology, vegetation and animal life, and not under cultivation*." Segment 4 of the Project area could meet the City's definitions of "wildlands."

Impact Analysis

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Less Than Significant. The City of San Bernardino has an Emergency Operations Plan (EOP) that addresses the City's planned response to large-scale emergencies resulting from natural disasters, technological incidences, and national security emergencies. The EOP describes the overall responsibilities of the federal, State, county, and City of Chino for protecting life and property and ensuring the overall well-being of the population. At the local level the CVIFD is responsible for implementation of the EOP.

Currently, Only Segment 1 of State Street, between 16th Street and Hanover Street, currently has paved access. The remainder of the project is not open to the public or is vacant. Construction will occur in Segment 1 will follow a traffic control plan that will be developed prior to construction. This traffic control plan allows for emergency vehicles to pass.

The construction and operation of the proposed Project would not place any permanent or temporary physical barriers on any existing public streets, or on the new roadway. Additionally, once constructed, the new section of roadway will provide a better evacuation route from fires in the foothills north of Interstate 210. Therefore, the Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plans.

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?

Less Than Significant With Mitigation Incorporated. The Project area is not identified as being within a high fire area as designated by the City of San Bernardino. However, Segment 4 of the Project, the vacant segment near Baseline, is located in an area where low-lying coastal sage scrub and ruderal vegetation exists near homes, which is consistent with the City's Municipal Code definition of "wildlands." The adjacent Lytle Creek active channel is similar in vegetation type and density, and a network of bladed roads can act as a fire break in the event of a fire. And though there is a low risk of a fire, sparks from equipment during construction may ignite vegetation in the area of construction during extremely high winds. Therefore, **Mitigation Measure FIRE-1** is incorporated to ensure the potential risk is less than significant. The mitigation measure is located at the end of this section.

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?

Less Than Significant. Segment 4 of the roadway is designed to be built up approximately 12 feet from the intersection of Baseline, and feathered to match existing grade in Segment 3. The new slope on each side of the roadway will be compacted and contoured to 3:1 and will be hydroseeded with a mix of native, drought-tolerant, low vegetation. A 5-foot-wide concrete sidewalk will separate the roadway from the vegetation and will act as a buffer between vehicle sparks/exhaust and the new vegetation during operation of the new roadway. Therefore, there is a less than significant impact to fire risk, nor will the new roadway 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?

Less Than Significant. The new roadway is not within an area that is subject to downstream flooding or landslides and is not located along the foothills where post-fire instability or drainage changes could impact the Project. The Lytle Creek wash exists adjacent to the Project alignment on the west. However, FEMA Map number 06071C8677J indicates that the extent of the 100-year floodplain for Lytle Creek does not extend past its bank on the east side. Stormwater runoff will be addressed by the Project's SWPPP. The Project components also include curb and gutter and catch basins under the roadway to capture storm flows. These flows will be directed into the City's existing storm drain on the west side of the Project alignment in Segment 4. The Project location, design, and compliance with the Best Management Practices outlined in in the SWPPP ensures that drainage issues are adequately addressed on site and the potential for flooding would be less than significant.

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Mitigation Measures:

FIRE-1 During construction, all staging areas, welding areas, or areas slated for construction using spark-producing equipment will be cleared of dried vegetation or other material that could ignite. Spark arresting equipment shall be in good working order. The City of San Bernardino and/or its contractor shall require all vehicles and crews working at the project site to have access to functional fire extinguishers at all times. In addition, construction crews are required to have a spotter during welding activities to look out for potentially dangerous situations, including accidental sparks. The contractor also shall provide a safety plan for the implementation of additional protocols when the National Weather Service issues a Red Flag Warning. Such protocols should address smoking and fire rules, storage and parking areas, use of gasoline-powered tools, use of spark arresters on construction equipment, road closures, use of a fire guard, fire suppression tools, fire suppression equipment, and training requirements.

Impact Conclusion:

No significant adverse effects are anticipated with the inclusion of the above mitigation measure.

	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?		X		
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)?		X		
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

SUBSTANTIATION:

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?*

Less Than Significant With Mitigation Incorporated. Based on the native habitat components and known occurrence and persistence of sensitive species within or adjacent to the Project area, this project could result in impacts to these resources. However, this project does not have the potential to impact federally listed threatened or endangered species and its habitat. Mitigation measures are included in this document to address the potential impacts and reduce them to a less than significant impact level. With implementation of these measures, no significant adverse impacts to biological resources will result from project implementation.

Similarly, no cultural resources with significant values were found in the project footprint. However, a potential exists to accidentally expose subsurface cultural resources during construction. Contingency mitigation measures are included as in this document to address this potential impact and reduce it to a less than significant impact level. With implementation **Mitigation Measures CUL-1** and **CUL-2** of the cultural resources mitigation measures, and **Mitigation Measure GEO-1** (paleontological impacts), no significant adverse impacts to cultural resources or paleontological impacts will result from project implementation.

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)?

There are no projects that have been identified to occur within State Street area during the time of the proposed construction. Potential impacts have been identified in the categories of air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, and hydrology and water quality, noise, transportation and traffic, and wildfire. The evaluation contained in this document determined that potential impacts to the environment can be reduced to a less than significant level with implementation of the identified mitigation measures. Based on data provided in this document, including the type of project proposed and its location, it is concluded that implementation of the proposed project will not result in impacts that are either individually or cumulatively considerable or significant when viewed in relation to past, present or probable future projects.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

The proposed project will not result in any identifiable substantial adverse effects on humans either directly or indirectly. The goal of the proposed Project is to provide better circulation within the City of San Bernardino as envisioned by the City's General Plan. The issues for which mitigation has been provided to control potential harm to humans are air quality, geology, hazards and hazardous materials, and hydrology and water quality, noise, transportation and traffic, and wildfire. With implementation of the required mitigation no substantial adverse effect to humans will result from carrying out the proposed Project.

Therefore, based on the findings in this Initial Study, the City of San Bernardino, acting as the CEQA lead agency for this proposed project, will process a Mitigated Negative Declaration (MND) as the appropriate CEQA environmental determination for the proposed project. The District will issue a Notice of Intent to Adopt a Mitigated Negative Declaration and circulate the MND package for review for the required 30-day period. Following receipt of comments, the District will compile responses to any comments and prepare a final MND package for consideration by District. Based on the final MND package, the District will consider whether implementation of the proposed project as defined in this document can proceed as determined by the District at the completion of the review process.

If you or your agency comments on this proposed MND, you or your agency will be provided responses to comments and notified of the date of the District's final review and decision. A decision by the City to approve the MND would be based on all of the information available in the whole of the record before the District at the conclusion of the CEQA environmental review process for this proposed project. Completion of the CEQA review process would allow implementation of the proposed project in accordance with any approved mitigation measures and conditions of approval for the project.

6 SUMMARY OF MITIGATION MEASURES

The following mitigation measures were identified to reduce impacts to less than significant:

AIR QUALITY

AIR-1 The contractor shall adhere to applicable measures contained in Table 1 of Rule 403 including, but not limited to:

- All clearing, grading, earth-moving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are limited to 15 miles per hour or less.

AIR-2 The following measures shall be incorporated into Project plans and specifications as implementation of SCAQMD Rule 1113:

- Only "Low-Volatile Organic Compounds" paints (no more than 50 gram/liter of VOC) consistent with SCAQMD Rule 1113 shall be used.

BIOLOGY

BIO-1 Prior to construction, a 30-day pre-construction survey be conducted to confirm that BUOW are still absent.

BIO-2 Bird nesting season generally extends from February 1 through September 15 in southern California and specifically, April 15 through August 31 for migratory passerine birds. To avoid impacts to nesting birds (common and special status) during the nesting season, a qualified Avian Biologist will conduct pre-construction Nesting Bird Surveys (NBS) prior to project-related disturbance to nestable vegetation to identify any active nests. If no active nests are found, no further action will be required. If an active nest is found, the biologist will set appropriate no-work buffers around the nest which will be based upon the nesting species, its sensitivity to disturbance, nesting stage and expected types, intensity and duration of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved no-work buffer zone shall be clearly marked in the field, within which no disturbance activity shall commence until the qualified biologist has determined the young birds have successfully fledged and the nest is inactive.

CULTURAL RESOURCES

CUL-1 In the event that pre-contact 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 Mitigation Measure TCR-1, if any such find occurs 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-2 If significant 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-3 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 Public Resources Code Section 5097.98, and enforced for the duration of the project. These code provisions require notification of the County Coroner and the Native American Heritage Commission, who in turn must notify those persons believed to be most likely descended from the deceased Native American for appropriate disposition of the remains. Excavation or disturbance may continue in other areas of the project site that are not reasonably suspected to overlie adjacent remains or archaeological resources.

GEOLOGY AND SOILS

GEO-1 **Paleontological Resources**. Any substantial excavations (i.e. over 5 feet in depth) in the proposed Project area should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed Project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

HAZARDS AND HAZARDOUS MATERIALS

HAZ – 1 All asphalt requiring removal from the Project Site shall be disposed of in accordance with current regulatory standards.

HAZ – 2 A hazardous spill prevention plan shall be prepared by the Applicant and submitted to the City for approval to minimize the likelihood of a spill shall be prepared prior to construction. The plan shall state the actions that would be required if a spill occurs to prevent contamination of surface waters and provide for cleanup of the spill. The plan shall follow Federal, state, and local safety guidelines and standards to avoid increased exposure to these pollutants.

HAZ – 3 If a contaminated area is encountered during construction, construction shall cease in the vicinity of the contaminated area. The construction contractor shall notify all appropriate authorities, including the EPA and the City. If necessary, the contaminated site shall be remediated to minimize the potential for exposure of the public and to allow the Project to be safety constructed.

HYDROLOGY

HYD-1 **Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP)**. Prior to issuance of any Grading Permit, and as part of the future development's compliance with the NPDES requirements, a Notice of Intent shall be prepared and submitted to the Santa Ana Regional Water

Quality Control Board (RWQCB) providing notification and intent to comply with the State of California General Construction Permit. Also, a SWPPP shall be reviewed and approved by the Director of Public Works and the City Engineer for water quality construction activities on-site. A copy of the SWPPP shall be available and implemented at the construction site at all times. The SWPPP shall outline the source control and/or treatment control BMPs to avoid or mitigate runoff pollutants at the construction site to the "maximum extent practicable." All recommendations in the Plan shall be implemented during area demolition/preparation, grading, and construction. The Project shall comply with each of the recommendations detailed in the Plan, and other such measure(s) as the City deems necessary to mitigate potential storm water runoff impacts.

NOISE

NOI-1 During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.

NOI-2 The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction (i.e., to the center).

NOI-3 The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

TRANSPORTATION/TRAFFIC

TRA-1 Conduct a traffic analysis every 10 years, until Project build-out, at the key intersections that were the subject of the Project TIA to refine growth rates and actual traffic congestion. Implement modifications to the roadways and signals as necessary to maintain adequate levels of service.

WILDFIRE

FIRE-1 During construction, all staging areas, welding areas, or areas slated for construction using spark-producing equipment will be cleared of dried vegetation or other material that could ignite. Spark arresting equipment shall be in good working order. The City of San Bernardino and/or its contractor shall require all vehicles and crews working at the project site to have access to functional fire extinguishers at all times. In addition, construction crews are required to have a spotter during welding activities to look out for potentially dangerous situations, including accidental sparks. The contractor also shall provide a safety plan for the implementation of additional protocols when the National Weather Service issues a Red Flag Warning. Such protocols should address smoking and fire rules, storage and parking areas, use of gasoline-powered tools, use of spark arresters on construction equipment, road closures, use of a fire guard, fire suppression tools, fire suppression equipment, and training requirements.

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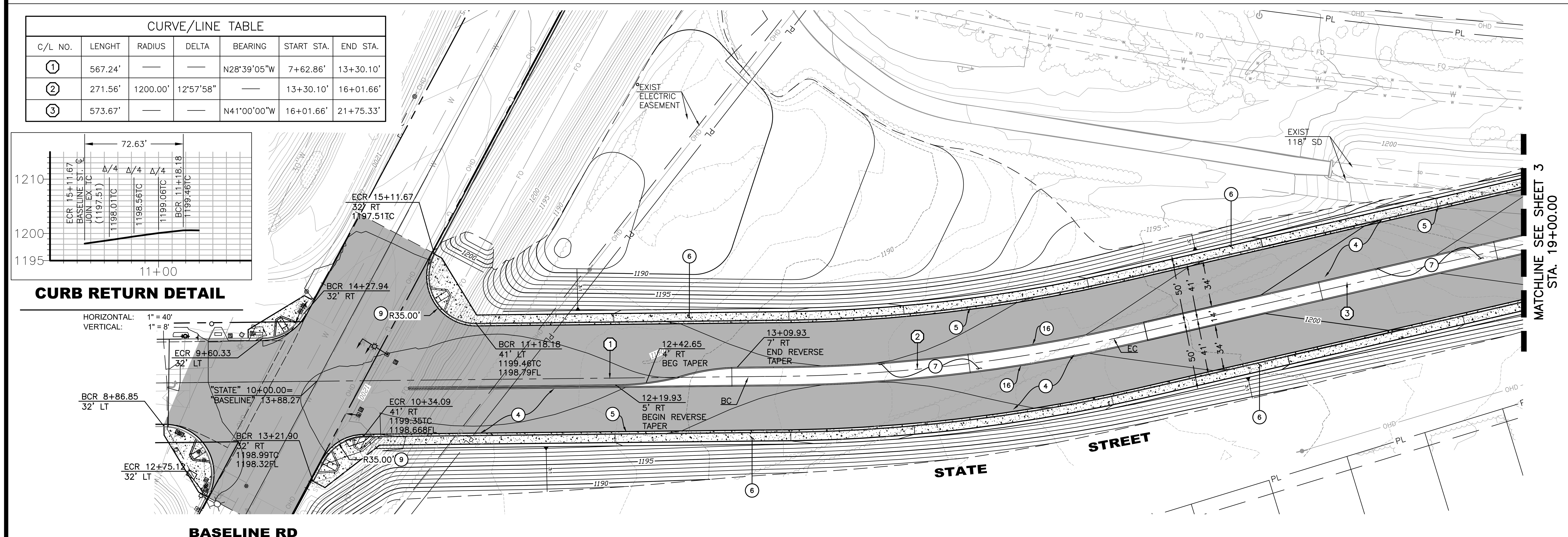
United States Geological Survey (USGS)

APPENDICES

Appendix A – Project Engineering Plans

CURVE/LINE TABLE

C/L NO.	LENGHT	RADIUS	DELTA	BEARING	START STA.	END STA.
1	567.24'	—	—	N28°39'05"W	7+62.86'	13+30.10'
2	271.56'	1200.00'	12°57'58"	—	13+30.10'	16+01.66'
3	573.67'	—	—	N41°00'00"W	16+01.66'	21+75.33'



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13. PROTECT IN PLACE EXISTING MANHOLE, ADJUST FRAME AND COVER PER STANDARD DWG NO. 304 IF APPLICABLE
14. PROTECT IN PLACE EXISTING WATER VALVE, ADJUST TO GRADE IF APPLICABLE
15. MILL 0.15' AND CONSTRUCT 0.15' HMA B-PG 64-10 OVERLAY
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CONSTRUCT AC IMPROVEMENTS

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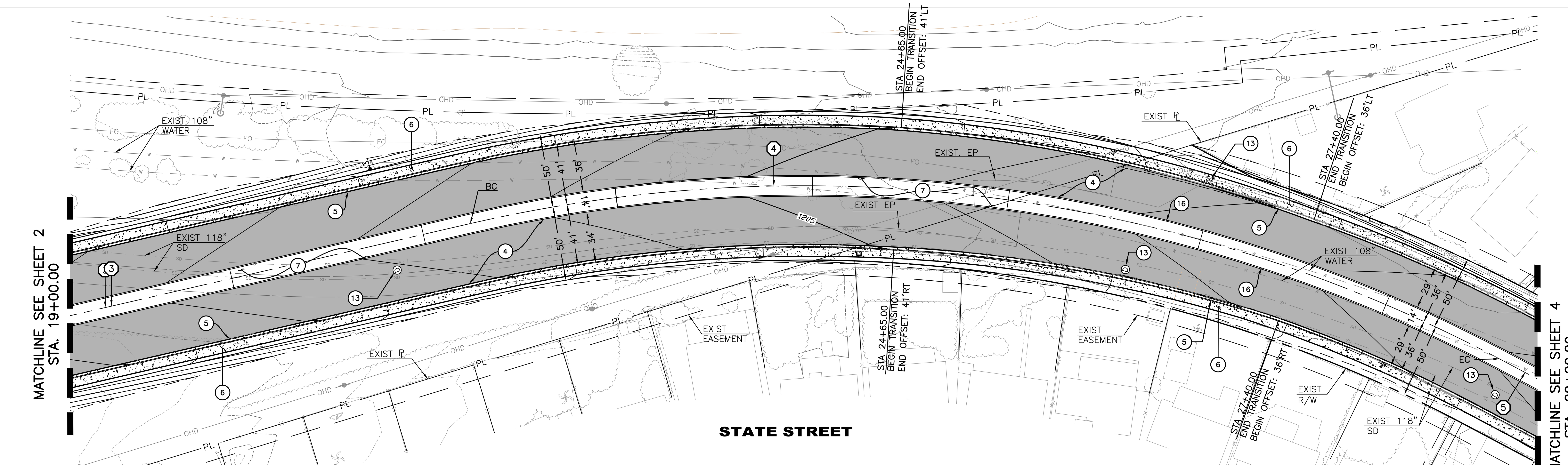

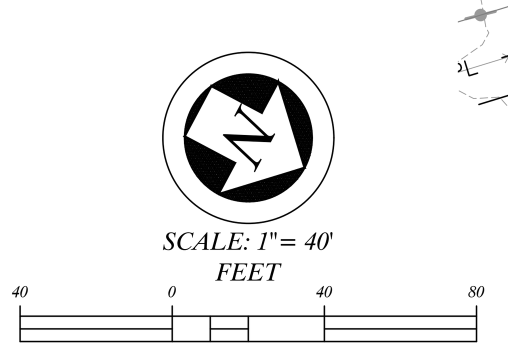

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CONSTRUCT PCC IMPROVEMENTS

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3	573.67'	——	——	N41°00'00"W	16+01.66'	21+75.33'
4	714.11'	1000.00'	40°54'55"	——	21+75.33'	28+89.44'
5	1313.75'	——	——	N0°03'30"W	28+89.44'	42+03.19'

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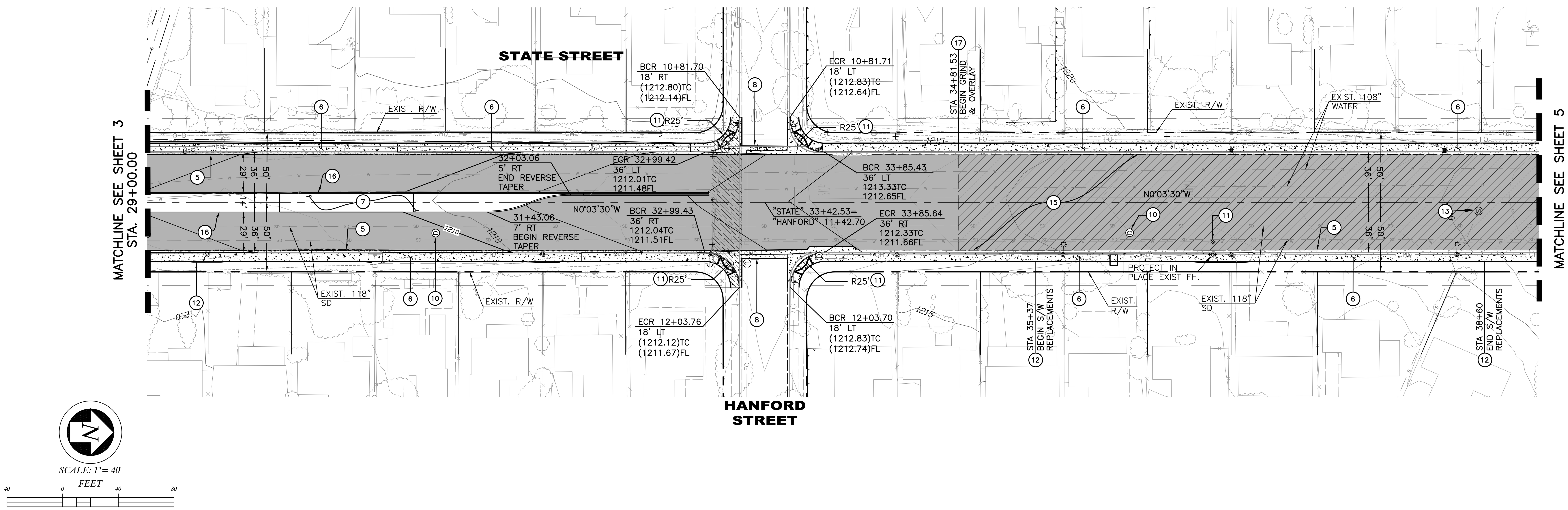

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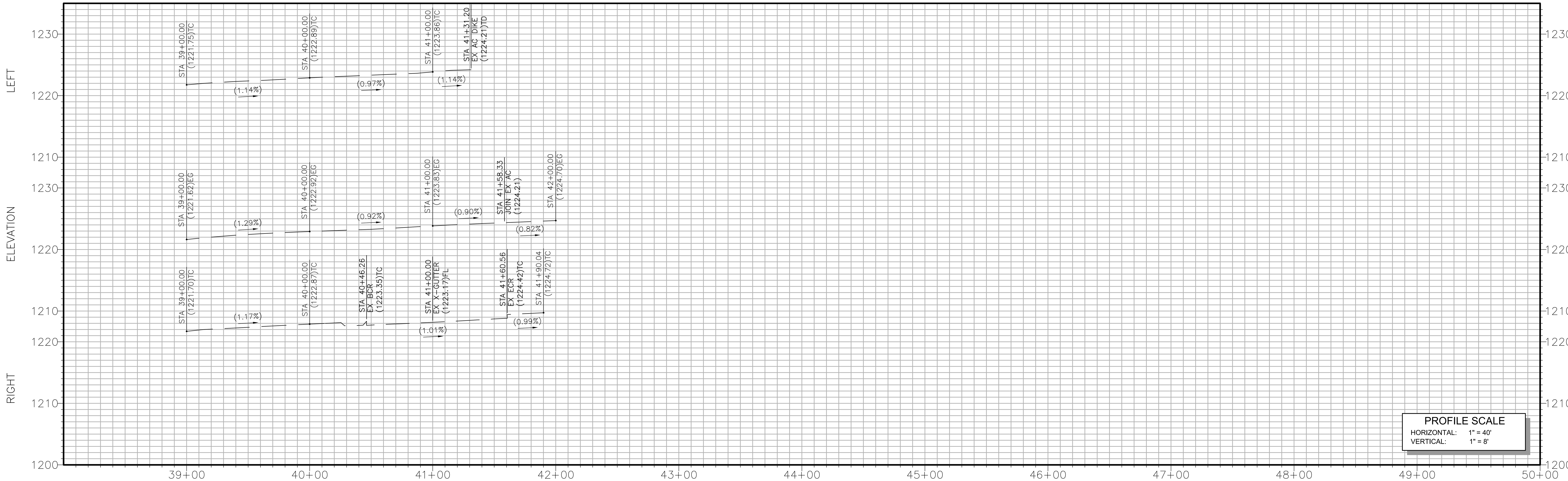

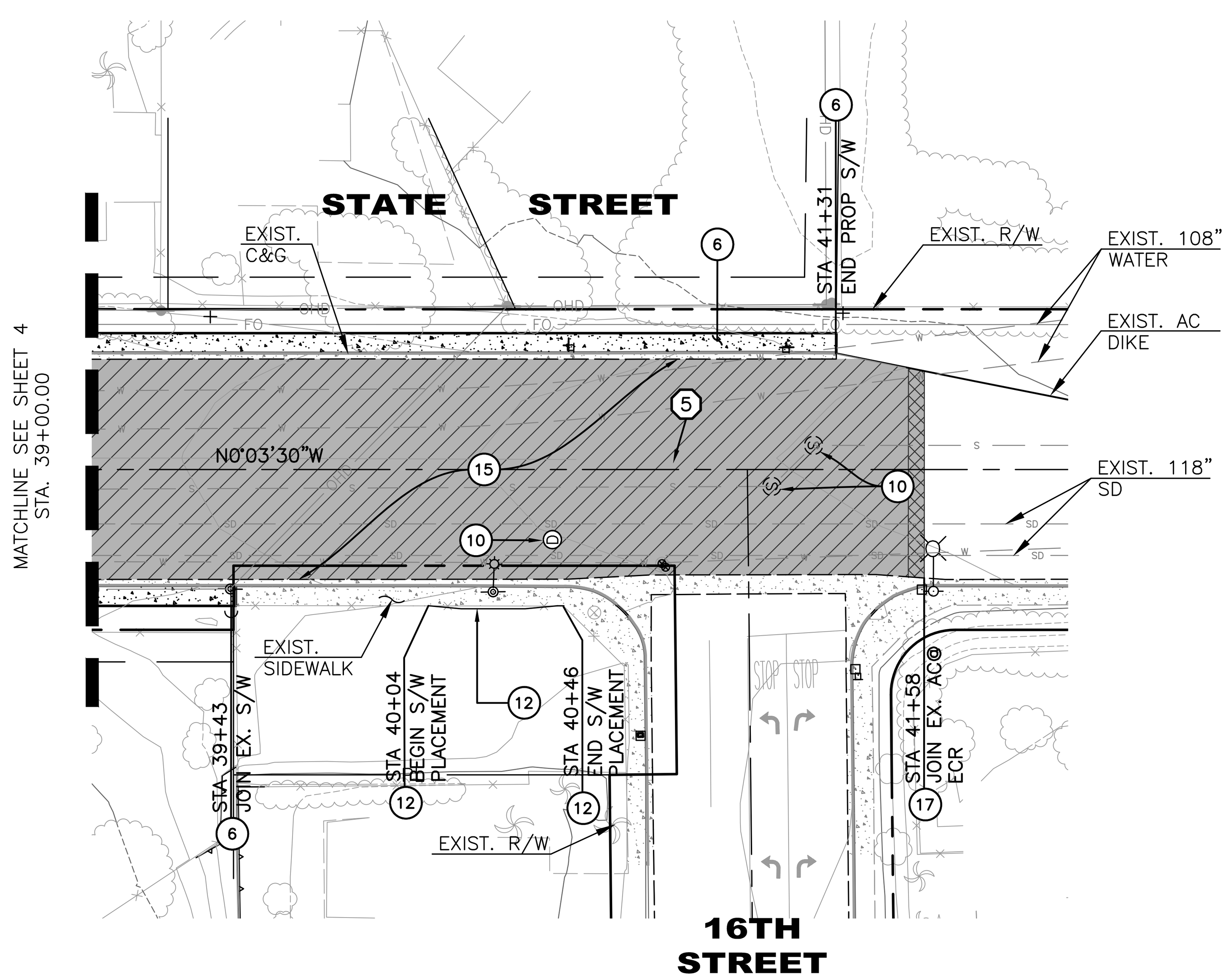

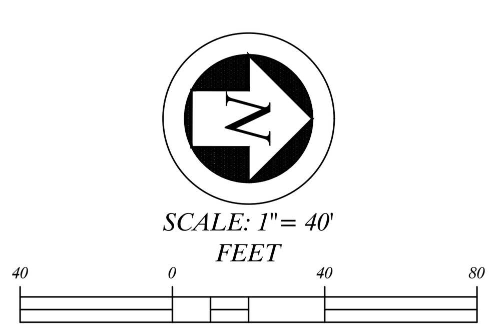

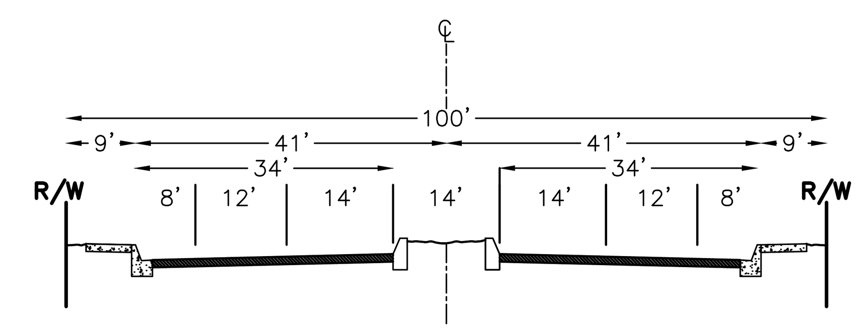

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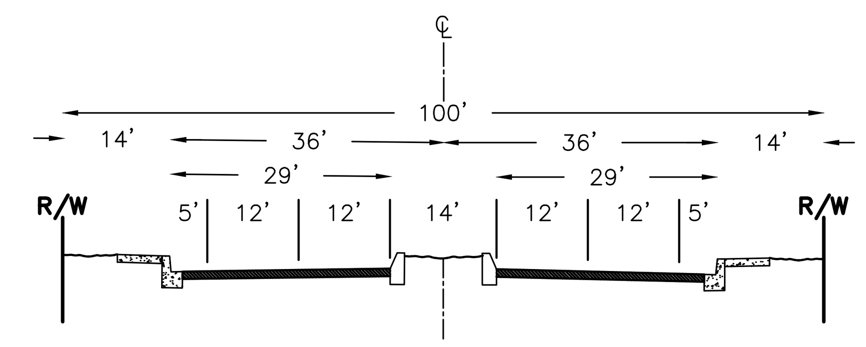

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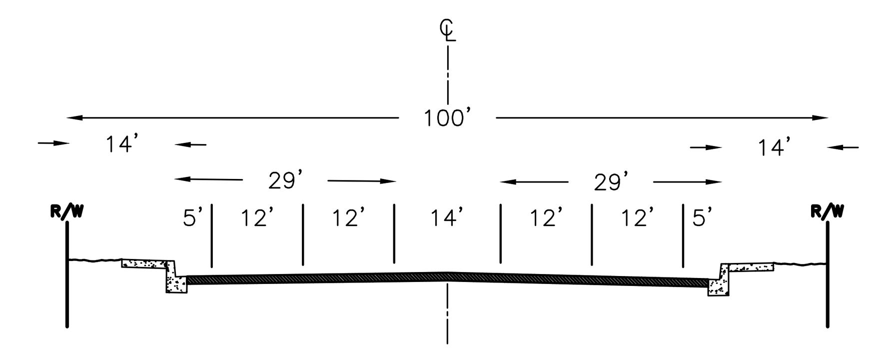

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Appendix B – Air Quality Analysis

State Street Extension

AIR QUALITY IMPACT ANALYSIS

CITY OF SAN BERNARDINO

PREPARED BY:

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JULY 12, 2019

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
$\mu g/m^3$	Microgram per Cubic Meter
AQ	Air Quality
AQIA	Air Quality Impact Analysis
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
BACM	Best Available Control Measures
BBAQMD	Bay Area Air Quality Management District
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CALGreen	California Green Building Standards Code
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CPS	Scenic Highway Commercial
CY	Cubic Yards
EIR	Environmental Impact Reports
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
LST	Localized Significance Threshold
LST METHODOLOGY	Final Localized Significance Threshold Methodology
MM	Mitigation Measures
NAAQS	National Ambient Air Quality Standards
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
O_3	Ozone
Pb	Lead
PDF	Project Design Features
PM_{10}	Particulate Matter 10 microns in diameter or less
$PM_{2.5}$	Particulate Matter 2.5 microns in diameter or less

PPM	Parts Per Million
Project	State Street Extension
RECLAIM	Regional Clean Air Incentives Market
ROG	Reactive Organic Gases
RTP/SCS	Regional Transportation Plan/ Sustainable Communities Strategy
SB	Senate Bill
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SF	Square Feet
SIPs	State Implementation Plans
SO_2	Sulfur Dioxide
SRA	Source Receptor Area
TAC	Toxic Air Contaminant
TOG	Total Organic Gases
UFP	Ultra Fine Particles
URBEMIS	Urban Emissions
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
VPH	Vehicles Per Hour

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *State Street Extension Air Quality Impact Analysis* are summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines (1). Table ES-1 shows the findings of significance for each potential air quality impact under CEQA before and after any required mitigation measures described below.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Regional Construction Emissions	3.4	*Less Than Significant*	*n/a*
Localized Construction Emissions	3.5	*Less Than Significant*	*n/a*
CO "Hot Spot" Analysis	3.6	*Less Than Significant*	*n/a*
Air Quality Management Plan	3.7	*Less Than Significant*	*n/a*
Sensitive Receptors	3.8	*Less Than Significant*	*n/a*
Odors	3.9	*Less Than Significant*	*n/a*
Cumulative Impacts	3.10	*Less Than Significant*	*n/a*

ES.2 STANDARD REGULATORY REQUIREMENTS/BEST AVAILABLE CONTROL MEASURES

Measures listed below (or equivalent language) shall appear on all Project grading plans, construction specifications and bid documents, and the County shall ensure such language is incorporated prior to issuance of any development permits. South Coast Air Quality Management District (SCAQMD) Rules that are currently applicable during construction activity for this Project include but are not limited to Rule 403 (Fugitive Dust) (2) and Rule 1113 (Architectural Coatings) (3). It should be noted that these Best Available Control Measures (BACMs) are not mitigation as they are standard regulatory requirements. As such, credit for Rule 403 and Rule 1113 have been taken

BACM AQ-1

The contractor shall adhere to applicable measures contained in Table 1 of Rule 403 including, but not limited to (2):

- All clearing, grading, earth-moving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three (3) times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are limited to 15 miles per hour or less.

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The following measures shall be incorporated into Project plans and specifications as implementation of SCAQMD Rule 1113 (3):

- Only "Low-Volatile Organic Compounds" paints (no more than 50 gram/liter of VOC) consistent with SCAQMD Rule 1113 shall be used.

ES.3 CONSTRUCTION-SOURCE MITIGATION MEASURES

It should be noted that mitigation is not needed to reduce estimated maximum daily construction regional or localized emissions.

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1 INTRODUCTION

This report presents the results of the air quality impact analysis (AQIA) prepared by Urban Crossroads, Inc., for the proposed State Street Extension (Project). The purpose of this AQIA is to evaluate the potential impacts to air quality associated with construction of the proposed Project and recommend measures to mitigate impacts considered potentially significant in comparison to thresholds established by the SCAQMD.

1.1 SITE LOCATION

The Project is located in the City of San Bernardino, on State Street between 16th Street and Baseline Street, and includes five proposed segments, as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The Project proposes to construct a new, approximately one-half mile segment of State Street between 16th Street and Baseline Street in approximately 2020 and includes five proposed segments.

EXHIBIT 1-A: LOCATION MAP

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2 AIR QUALITY SETTING

This section provides an overview of the existing air quality conditions in the Project area and region.

2.1 SOUTH COAST AIR BASIN

The Project site is located in the South Coast Air Basin (SCAB) within the jurisdiction of SCAQMD (4). The SCAQMD was created by the 1977 Lewis-Presley Air Quality Management Act, which merged four county air pollution control bodies into one regional district. Under the Act, the SCAQMD is responsible for bringing air quality in areas under its jurisdiction into conformity with federal and state air quality standards. As previously stated, the Project site is located within the SCAB, a 6,745-square mile subregion of the SCAQMD, which includes portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County.

The SCAB is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Los Angeles County portion of the Mojave Desert Air Basin is bounded by the San Gabriel Mountains to the south and west, the Los Angeles / Kern County border to the north, and the Los Angeles / San Bernardino County border to the east. The Riverside County portion of the Salton Sea Air Basin is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

2.2 REGIONAL CLIMATE

The regional climate has a substantial influence on air quality in the SCAB. In addition, the temperature, wind, humidity, precipitation, and amount of sunshine influence the air quality.

The annual average temperatures throughout the SCAB vary from the low to middle 60s (degrees Fahrenheit). Due to a decreased marine influence, the eastern portion of the SCAB shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the SCAB, with average minimum temperatures of 47°F in downtown Los Angeles and 36°F in San Bernardino. All portions of the SCAB have recorded maximum temperatures above 100°F.

Although the climate of the SCAB can be characterized as semi-arid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of SCAB climate. Humidity restricts visibility in the SCAB, and the conversion of sulfur dioxide to sulfates is heightened in air with high relative humidity. The marine layer provides an environment for that conversion process, especially during the spring and summer months. The annual average relative humidity within the SCAB is 71 percent along the coast and 59 percent inland. Since the ocean effect is dominant, periods of heavy early morning fog are frequent and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90 percent of the SCAB's rainfall occurs from November through April. The annual average rainfall varies from approximately nine inches in Riverside to fourteen inches in downtown Los Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thunderstorms near the coast and slightly heavier shower activity in the eastern portion of the SCAB with frequency being higher near the coast.

Due to its generally clear weather, about three-quarters of available sunshine is received in the SCAB. The remaining one-quarter is absorbed by clouds. The ultraviolet portion of this abundant radiation is a key factor in photochemical reactions. On the shortest day of the year there are approximately 10 hours of possible sunshine, and on the longest day of the year there are approximately 14½ hours of possible sunshine.

The importance of wind to air pollution is considerable. The direction and speed of the wind determines the horizontal dispersion and transport of the air pollutants. During the late autumn to early spring rainy season, the SCAB is subjected to wind flows associated with the traveling storms moving through the region from the northwest. This period also brings five to ten periods of strong, dry offshore winds, locally termed "Santa Anas" each year. During the dry season, which coincides with the months of maximum photochemical smog concentrations, the wind flow is bimodal, typified by a daytime onshore sea breeze and a nighttime offshore drainage wind. Summer wind flows are created by the pressure differences between the relatively cold ocean and the unevenly heated and cooled land surfaces that modify the general northwesterly wind circulation over southern California. Nighttime drainage begins with the radiational cooling of the mountain slopes. Heavy, cool air descends the slopes and flows through the mountain passes and canyons as it follows the lowering terrain toward the ocean. Another characteristic wind regime in the SCAB is the "Catalina Eddy," a low level cyclonic (counterclockwise) flow centered over Santa Catalina Island which results in an offshore flow to the southwest. On most spring and summer days, some indication of an eddy is apparent in coastal sections.

In the SCAB, there are two distinct temperature inversion structures that control vertical mixing of air pollution. During the summer, warm high-pressure descending (subsiding) air is undercut by a shallow layer of cool marine air. The boundary between these two layers of air is a persistent marine subsidence/inversion. This boundary prevents vertical mixing which effectively acts as an impervious lid to pollutants over the entire SCAB. The mixing height for the inversion structure is normally situated 1,000 to 1,500 feet above mean sea level.

A second inversion-type forms in conjunction with the drainage of cool air off the surrounding mountains at night followed by the seaward drift of this pool of cool air. The top of this layer forms a sharp boundary with the warmer air aloft and creates nocturnal radiation inversions. These inversions occur primarily in the winter, when nights are longer and onshore flow is weakest. They are typically only a few hundred feet above mean sea level. These inversions effectively trap pollutants, such as NO_X and CO from vehicles, as the pool of cool air drifts seaward. Winter is therefore a period of high levels of primary pollutants along the coastline.

2.3 WIND PATTERNS AND PROJECT LOCATION

The distinctive climate of the Project area and the SCAB is determined by its terrain and geographical location. The SCAB is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter.

Wind patterns across the south coastal region are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. Winds are characteristically light although the speed is somewhat greater during the dry summer months than during the rainy winter season.

2.4 CRITERIA POLLUTANTS

Criteria pollutants are pollutants that are regulated through the development of human health based and/or environmentally based criteria for setting permissible levels. Criteria pollutants, their typical sources, and health effects are identified below (5):

TABLE 2-1: CRITERIA POLLUTANTS

Criteria Pollutant	Description	Sources	Health Effects
Carbon Monoxide (CO)	CO is a colorless, odorless gas produced by the incomplete combustion of carbon-containing fuels, such as gasoline or wood. CO concentrations tend to be the highest during the winter morning, when little to no wind and surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, unlike ozone, motor vehicles operating at slow speeds are the primary source of CO in the SCAB. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections.	Any source that burns fuel such as automobiles, trucks, heavy construction equipment, farming equipment and residential heating.	Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs but exerts its effect on tissues by interfering with oxygen transport and competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (oxygen deficiency) as seen at high altitudes.

Criteria Pollutant	Description	Sources	Health Effects
Sulfur Dioxide (SO_2)	SO_2 is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When SO_2 oxidizes in the atmosphere, it forms sulfates (SO_4). Collectively, these pollutants are referred to as sulfur oxides (SO_X)	Coal or oil burning power plants and industries, refineries, diesel engines	A few minutes of exposure to low levels of SO_2 can result in airway constriction in some asthmatics, all of whom are sensitive to its effects. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, are observed after acute exposure to SO_2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO_2. Animal studies suggest that despite SO_2 being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO_2 levels. In these studies, efforts to separate the effects of SO_2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

Criteria Pollutant	Description	Sources	Health Effects
Nitrogen Oxides (Oxides of Nitrogen, or NO_X)	NO_X consist of nitric oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O) and are formed when nitrogen (N_2) combines with oxygen (O_2). Their lifespan in the atmosphere ranges from one to seven days for nitric oxide and nitrogen dioxide, to 170 years for nitrous oxide. Nitrogen oxides are typically created during combustion processes and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility. Of the seven types of nitrogen oxide compounds, NO_2 is the most abundant in the atmosphere. As ambient concentrations of NO_2 are related to traffic density, commuters in heavy traffic may be exposed to higher concentrations of NO_2 than those indicated by regional monitoring station.	Any source that burns fuel such as automobiles, trucks, heavy construction equipment, farming equipment and residential heating.	Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposure to NO_2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO_2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups. In animals, exposure to levels of NO_2 considerably higher than ambient concentrations result in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and NO_2.
Ozone (O_3)	O_3 is a highly reactive and unstable gas that is formed when volatile organic compounds (VOCs) and nitrogen oxides (NO_X), both byproducts of internal combustion engine exhaust, undergo slow photochemical reactions in the presence of	Formed when reactive organic gases (ROG) and nitrogen oxides react in the presence of sunlight. ROG sources	Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible sub-groups for ozone effects.

Criteria Pollutant	Description	Sources	Health Effects
	sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant.	include any source that burns fuels, (e.g., gasoline, natural gas, wood, oil) solvents, petroleum processing and storage and pesticides.	Short-term exposure (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. Elevated ozone levels are associated with increased school absences. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple outdoor sports and live in communities with high ozone levels. Ozone exposure under exercising conditions is known to increase the severity of the responses described above. Animal studies suggest that exposure to a combination of pollutants that includes ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.
Particulate Matter	PM_{10} (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols.	Sources of PM_{10} include road dust, windblown dust and construction. Also	A consistent correlation between elevated ambient fine particulate matter (PM_{10} and $PM_{2.5}$) levels and an

Criteria Pollutant	Description	Sources	Health Effects
	Particulate matter pollution is a major cause of reduce visibility (haze) which is caused by the scattering of light and consequently the significant reduction air clarity. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs where they may be deposited, resulting in adverse health effects. Additionally, it should be noted that PM_{10} is considered a criteria air pollutant. $PM_{2.5}$ (Particulate Matter less than 2.5 microns): A similar air pollutant to PM_{10} consisting of tiny solid or liquid particles which are 2.5 microns or smaller (which is often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from SO_2 release from power plants and industrial facilities and nitrates that are formed from NO_X release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions. $PM_{2.5}$ is a criteria air pollutant.	formed from other pollutants (acid rain, NO_X, SO_X, organics). Incomplete combustion of any fuel. $PM_{2.5}$ comes from fuel combustion in motor vehicles, equipment and industrial sources, residential and agricultural burning. Also formed from reaction of other pollutants (acid rain, NO_X, SO_X, organics).	increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in lifespan, and an increased mortality from lung cancer. Daily fluctuations in $PM_{2.5}$ concentration levels have also been related to hospital admissions for acute respiratory conditions in children, to school and kindergarten absences, to a decrease in respiratory lung volumes in normal children, and to increased medication use in children and adults with asthma. Recent studies show lung function growth in children is reduced with long term exposure to particulate matter. The elderly, people with pre-existing respiratory or cardiovascular disease, and children appear to be more susceptible to the effects of high levels of PM_{10} and $PM_{2.5}$.
Volatile Organic Compounds (VOC)	VOCs are hydrocarbon compounds (any compound containing various combinations of hydrogen and carbon atoms) that exist in the ambient air. VOCs contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. Compounds of carbon (also known as organic	Organic chemicals are widely used as ingredients in household products. Paints, varnishes and wax all contain organic solvents, as do many cleaning, disinfecting,	Breathing VOCs can irritate the eyes, nose and throat, can cause difficulty breathing and nausea, and can damage the central nervous system as well as other organs. Some VOCs can cause cancer. Not all VOCs have all these health

Criteria Pollutant	Description	Sources	Health Effects
	compounds) have different levels of reactivity; that is, they do not react at the same speed or do not form ozone to the same extent when exposed to photochemical processes. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. Exceptions to the VOC designation include carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. VOCs are a criteria pollutant since they are a precursor to O3, which is a criteria pollutant. The SCAQMD uses the terms VOC and ROG (see below) interchangeably.	cosmetic, degreasing and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored.	effects, though many have several.
Reactive Organic Gases (ROG)	Similar to VOC, Reactive Organic Gases (ROG) are also precursors in forming ozone and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons, which are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and nitrogen oxides react in the presence of sunlight. ROGs are a criteria pollutant since they are a precursor to O_3, which is a criteria pollutant. The SCAQMD uses the terms ROG and VOC (see previous) interchangeably.	Sources similar to VOCs.	Health effects similar to VOCs.
Lead (Pb)	Lead is a heavy metal that is highly persistent in the environment and is considered a criteria pollutant. In the past, the primary source of lead in the air was emissions from vehicles burning leaded gasoline. As a result of the removal of lead from gasoline, there have been no violations at any of the SCAQMD's regular air monitoring stations since 1982. The major sources of lead emissions are ore and metals processing,	Metal smelters, resource recovery, leaded gasoline, deterioration of lead paint.	Fetuses, infants, and children are more sensitive than others to the adverse effects of Pb exposure. Exposure to low levels of Pb can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased Pb levels are

Criteria Pollutant	Description	Sources	Health Effects
	particularly lead smelters, and piston-engine aircraft operating on leaded aviation gasoline. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers. It should be noted that the Project does not include operational activities such as metal processing or lead acid battery manufacturing. As such, the Project is not anticipated to generate a quantifiable amount of lead emissions.		associated with increased blood pressure. Pb poisoning can cause anemia, lethargy, seizures, and death; although it appears that there are no direct effects of Pb on the respiratory system. Pb can be stored in the bone from early age environmental exposure, and elevated blood Pb levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland) and osteoporosis (breakdown of bony tissue). Fetuses and breast-fed babies can be exposed to higher levels of Pb because of previous environmental Pb exposure of their mothers.
Odor	Odor means the perception experienced by a person when one or more chemical substances in the air come into contact with the human olfactory nerves (6).	Odors can come from many sources including animals, human activities, industry, natures, and vehicles.	Offensive odors can potentially affect human health in several ways. First, odorant compounds can irritate the eye, nose, and throat, which can reduce respiratory volume. Second, studies have shown that the VOCs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects such as stress.

2.5 EXISTING AIR QUALITY

Existing air quality is measured at established SCAQMD air quality monitoring stations. Monitored air quality is evaluated 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 2-2 (7).

The determination of whether a region's air quality is healthful or unhealthful is determined by comparing contaminant levels in ambient air samples to the state and federal standards presented in Table 2-2. The air quality in a region is considered to be in attainment by the state if the measured ambient air pollutant levels for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, PM_{10}, and $PM_{2.5}$ are not to be exceeded. All others are not to be equaled or exceeded. It should be noted that the three-year period is presented for informational purposes and is not the basis for how the State assigns attainment status. Attainment status for a pollutant means that the Air District meets the standards set by the U.S. EPA or the California EPA. Conversely, nonattainment means that an area has monitored air quality that does not meet the NAAQS or CAAQS standards. In order to improve air quality in nonattainment areas, a State Implementation Plan (SIP) is drafted. The SIP outlines the measures that the state will take to improve air quality. Once nonattainment areas meet the standards and additional redesignation requirements, the EPA will designate the area as a maintenance area (8).

TABLE 2-2: AMBIENT AIR QUALITY STANDARDS (1 OF 2)

Ambient Air Quality Standards

(Updated 5/4/16)

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 μg/m³)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 μg/m³)		0.070 ppm (137 μg/m³)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 μg/m³	Gravimetric or Beta Attenuation	150 μg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 μg/m³		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 μg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 μg/m³	Gravimetric or Beta Attenuation	12.0 μg/m³	15 μg/m³	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m³)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m³)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m³)		9 ppm (10 mg/m³)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m³)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 μg/m³)	Gas Phase Chemiluminescence	100 ppb (188 μg/m³)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 μg/m³)		0.053 ppm (100 μg/m³)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 μg/m³)	Ultraviolet Fluorescence	75 ppb (196 μg/m³)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 μg/m³)	
	24 Hour	0.04 ppm (105 μg/m³)		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 μg/m³	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 μg/m³ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 μg/m³		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 μg/m³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 μg/m³)	Gas Chromatography			

See footnotes on next page ...

TABLE 2-2: AMBIENT AIR QUALITY STANDARDS (2 OF 2)

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 CARB 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 CARB 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 CARB 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.

2.6 REGIONAL AIR QUALITY

Air pollution contributes to a wide variety of adverse health effects. The EPA has established national ambient air quality standards (NAAQS) for six of the most common air pollutants: carbon monoxide, lead, ozone, particulate matter, nitrogen dioxide, and sulfur dioxide which are known as criteria pollutants. The SCAQMD monitors levels of various criteria pollutants at 37 permanent monitoring stations and 5 single-pollutant source Lead (Pb) air monitoring sites throughout the air district (9). On February 20, 2019, ARB posted the 2018 amendments to the state and national area designations. See Table 2-3 for attainment designations for the SCAB (10). Appendix 2.1 provides geographic representation of the state and federal attainment status for applicable criteria pollutants within the SCAB.

TABLE 2-3: ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN THE SCAB

Criteria Pollutant	State Designation	Federal Designation
Ozone – 1-hour standard	Nonattainment	--
Ozone – 8-hour standard	Nonattainment	Nonattainment
PM_{10}	Nonattainment	Attainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Unclassifiable/Attainment
Nitrogen Dioxide	Attainment	Unclassifiable/Attainment
Sulfur Dioxide	Unclassifiable/Attainment	Unclassifiable/Attainment
Lead[1]	Attainment	Unclassifiable/Attainment

Note: See Appendix 2.1 for a detailed map of State/National Area Designations within the SCAB
"-" = The national 1-hour O_3 standard was revoked effective June 15, 2005

2.7 LOCAL AIR QUALITY

The Project site is located within the Source Receptor Area (SRA) 34 (11). Within SRA 34, the SCAQMD Central San Bernardino Valley monitoring station is located 3.55 miles south of the Project site and is the nearest long-term air quality monitoring site for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$.

The most recent three (3) years of data available is shown on Table 2-4 and identifies the number of days ambient air quality standards were exceeded for the study area, which is considered to be representative of the local air quality at the Project site. Data for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ for 2015 through 2017 was obtained from the SCAQMD Air Quality Data Tables (12). Additionally, data for SO_2 has been omitted as attainment is regularly met in the SCAB and few monitoring stations measure SO_2 concentrations.

[1] The Federal nonattainment designation for lead is only applicable towards the Los Angeles County portion of the SCAB.

TABLE 2-4: PROJECT AREA AIR QUALITY MONITORING SUMMARY 2015-2017

POLLUTANT	STANDARD	YEAR		
		2015	**2016**	**2017**
O_3				
Maximum Federal 1-Hour Concentration (ppm)		0.134	0.158	0.158
Maximum Federal 8-Hour Concentration (ppm)		0.117	0.118	0.136
Number of Days Exceeding Federal 1-Hour Standard	>0.07 ppm	6	10	14
Number of Days Exceeding State 1-Hour Standard	> 0.09 ppm	52	70	81
Number of Days Exceeding Federal 8-Hour Standard	> 0.070 ppm	78	106	112
Number of Days Exceeding State 8-Hour Standard	> 0.070 ppm	79	108	112
CO				
Maximum Federal 1-Hour Concentration	> 35 ppm	2.3	2.2	2.5
Maximum Federal 8-Hour Concentration	> 20 ppm	1.8	1.7	2.3
NO_2				
Maximum Federal 1-Hour Concentration	> 0.100 ppm	0.071	0.060	0.066
Annual Federal Standard Design Value		0.015	0.017	0.016
PM_{10}				
Maximum Federal 24-Hour Concentration (μg/m^3)	> 150 μg/m^3	78.0	91.0	86.0
Annual Federal Arithmetic Mean (μg/m^3)		30.7	33.1	30.9
Number of Days Exceeding Federal 24-Hour Standard	> 150 μg/m^3	0	0	0
Number of Days Exceeding State 24-Hour Standard	> 50 μg/m^3	17	33	35
$PM_{2.5}$				
Maximum Federal 24-Hour Concentration (μg/m^3)	> 35 μg/m^3	53.5	32.5	38.2
Annual Federal Arithmetic Mean (μg/m^3)	> 12 μg/m^3	10.7	10.8	11.4
Number of Days Exceeding Federal 24-Hour Standard	> 35 μg/m^3	2	0	1

Source: Data for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ was obtained from SCAQMD Air Quality Data Tables.

2.8 REGULATORY BACKGROUND

2.8.1 FEDERAL REGULATIONS

The U.S. EPA is responsible for setting and enforcing the NAAQS for O_3, CO, NO_X, SO_2, PM_{10}, and lead (13). 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 (14). 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.

The 1990 amendments to the CAA that identify specific emission reduction goals for areas not meeting the NAAQS require a demonstration of reasonable further progress toward attainment and incorporate additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA most directly applicable to the development of the Project site include Title I (Non-Attainment Provisions) and Title II (Mobile Source Provisions). Title I provisions were established with the goal of attaining the NAAQS for the following criteria pollutants O_3, NO_2, SO_2, PM_{10}, CO, $PM_{2.5}$, and lead. The NAAQS were amended in July 1997 to include an additional standard for O_3 and to adopt a NAAQS for $PM_{2.5}$. Table 3-1 (previously presented) provides the NAAQS within the SCAB.

Mobile source emissions are regulated in accordance with Title II provisions. These provisions require the use of cleaner burning gasoline and other cleaner burning fuels such as methanol and natural gas. Automobile manufacturers are also required to reduce tailpipe emissions of hydrocarbons and NO_X. NO_X is a collective term that includes all forms of nitrogen oxides (NO, NO_2, NO_3) which are emitted as byproducts of the combustion process.

2.8.2 CALIFORNIA REGULATIONS

California Air Resource Board (CARB). The CARB, which became part of the California EPA in 1991, is responsible for ensuring implementation of the California Clean Air Act (AB 2595), responding to the federal CAA, and for regulating emissions from consumer products and motor vehicles. The California CAA mandates achievement of the maximum degree of emissions reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CARB established the CAAQS for all pollutants for which the federal government has NAAQS and, in addition, establishes standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride. However, at this time, hydrogen sulfide and vinyl chloride are not measured at any monitoring stations in the SCAB because they are not considered to be a regional air quality problem. Generally, the CAAQS are more stringent than the NAAQS (15) (13).

Local air quality management districts, such as the SCAQMD, regulate air emissions from stationary sources such as commercial and industrial facilities. All air pollution control districts have been formally designated as attainment or non-attainment for each CAAQS.

Serious non-attainment areas are required to prepare air quality management plans that include specified emission reduction strategies in an effort to meet clean air goals. These plans are required to include:

- Application of Best Available Retrofit Control Technology to existing sources;
- Developing control programs for area sources (e.g., architectural coatings and solvents) and indirect sources (e.g. motor vehicle use generated by residential and commercial development);
- A District permitting system designed to allow no net increase in emissions from any new or modified permitted sources of emissions;

- Implementing reasonably available transportation control measures and assuring a substantial reduction in growth rate of vehicle trips and miles traveled;
- Significant use of low emissions vehicles by fleet operators;
- Sufficient control strategies to achieve a five percent or more annual reduction in emissions or 15 percent or more in a period of three years for ROGs, NO_X, CO and PM_{10}. However, air basins may use alternative emission reduction strategy that achieves a reduction of less than five percent per year under certain circumstances.

Title 24 Energy Efficiency Standards and California Green Building Standards. California Code of Regulations 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 GHG emissions. The 2019 version of Title 24 was adopted by the California Energy Commission (CEC) and will become effective on January 1, 2020. As a conservative measure, the analysis herein assumes compliance with the 2016 Title 24 Standards and no additional reduction for compliance with the 2019 standards have been taken.

The CEC indicates that the 2019 Title 24 standards may require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, update indoor and outdoor lighting for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7 percent less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will about 53 percent less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30 percent less energy due to lighting upgrades (16).

California Code of Regulations, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2011, and is administered by the California Building Standards Commission. CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2019 California Green Building Code Standards that will be effective January 1, 2020. Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. CALGreen recognizes that many jurisdictions have developed existing construction and demolition ordinances and defers to them as the ruling guidance provided, they establish a minimum 65 percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. The State Building Code provides the minimum standard that buildings must meet in order to be certified for occupancy, which is generally enforced by the local building official.

On May 10, 2019, the Building Standards Commission (BSC) published a *Summary: 2019 New Code and 2016 Supplemental Updates – Nonresidential Mandatory Measures* which provides a summary of the updates and changes in the 2019 CALGreen (17). It should be noted that at the time of this AQIA, the Building Standards Commission has not yet provided the published the updated CALGreen Guidebooks or Checklists. Based on personal communication with staff at the BSC, the published Guidebooks and Checklists will likely be made available just prior to 2020, however no firm timeline has been established at this time (18). Notwithstanding, the 2016 CALGreen standards are still applicable to the Project and require:

- Short-term bicycle parking. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For new buildings with 10 or more tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.1.2).
- Designated parking. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling (5.410.1).
- Construction waste. A minimum 65 percent diversion of construction and demolition waste from landfills, increasing voluntarily to 80 percent for new homes and commercial projects (5.408.1, A5.408.3.1 [nonresidential], A5.408.3.1 [residential]). All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled (5.408.3).
- Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:
    - The installation of water-conserving fixtures (5.303.3) or
    - Using nonpotable water systems (5.303.4).
- Water use savings. 20 percent mandatory reduction of indoor water use with voluntary goal standards for 30, 35 and 40 percent reductions (5.303.2, A5303.2.3 [nonresidential]).
- Water meters. Separate water meters for buildings in excess of 50,000 sf or buildings projected to consume more than 1,000 gallons per day (5.303.1).
- Irrigation efficiency. Moisture-sensing irrigation systems for larger landscaped areas (5.304.3).
- Materials pollution control. Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard (5.404).
- Building commissioning. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 sf to ensure that all are working at their maximum capacity according to their design efficiencies (5.410.2).

2.8.3 Air Quality Management Planning

Currently, the NAAQS and CAAQS are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards (19). AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy. A detailed discussion on the AQMP and Project consistency with the AQMP is provided in Section 3.7.

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3 PROJECT AIR QUALITY IMPACT

3.1 INTRODUCTION

The Project has been evaluated to determine if it will violate an air quality standard or contribute to an existing or projected air quality violation. Additionally, the Project has been evaluated to determine if it will result in a cumulatively considerable net increase of a criteria pollutant for which the SCAB is non-attainment under an applicable federal or state ambient air quality standard. The significance of these potential impacts is described in the following section.

3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related air quality impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to air quality if it would (1):

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. affecting a substantial number of people.

The SCAQMD has also developed regional significance thresholds for other regulated pollutants, as summarized at Table 3-1 (20). The SCAQMD's CEQA Air Quality Significance Thresholds (March 2015) indicate that any projects in the SCAB with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

TABLE 3-1: MAXIMUM DAILY REGIONAL EMISSIONS THRESHOLDS

Pollutant	Construction
Regional Thresholds	
NO_X	100 lbs/day
VOC	75 lbs/day
PM_{10}	150 lbs/day
$PM_{2.5}$	55 lbs/day
SO_X	150 lbs/day
CO	550 lbs/day
Lead	3 lbs/day

Source: Regional Thresholds presented in this table are based on the SCAQMD Air Quality Significance Thresholds, March 2015

3.3 CALIFORNIA EMISSIONS ESTIMATOR MODEL™ EMPLOYED TO ESTIMATE AQ EMISSIONS

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 California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (21). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine construction air quality emissions. Output from the model runs for construction activities are provided in Appendix 3.1.

3.4 CONSTRUCTION EMISSIONS

Construction activities associated with the Project will result in emissions of VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$. Construction related emissions are expected from the following construction activities:

- Demolition
- Earthwork
- Paving
- Traffic Installations

Construction is expected to commence in October 2021 and will last through October 2022. The Project is divided into five (5) segments. Rather than modeling each segment separately, all segments will be modeled together in order to identify a "worst-case" analysis scenario. The construction schedule presented in Table 3-2 is based on the 2022 opening year and a 12-month construction period. It should be noted that 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] A detailed summary of construction equipment is shown in Table 3-3. The site-specific construction fleet may vary due to specific project needs at the time of construction. The duration of construction activity and associated equipment both represent a reasonable approximation of the expected construction fleet as required per CEQA guidelines. Please refer to specific detailed modeling inputs/outputs contained in Appendix 3.1 of this analysis.

[2] As shown in the California Emissions Estimator Model (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 3-2: CONSTRUCTION DURATION

Phase Name	Start Date	End Date	Days
Demolition	10/11/2021	01/07/2022	65
Earthwork[3]	01/08/2022	04/08/2022	65
Paving	04/09/2022	07/08/2022	65
Traffic Installations [4]	07/09/2022	10/07/2022	65

Source: Construction activity based the 2022 opening year.

TABLE 3-3: CONSTRUCTION EQUIPMENT ASSUMPTIONS

Activity	Equipment	Number	Hours Per Day
Demolition	Concrete/Industrial Saws	1	8
	Excavators	3	8
	Rubber Tired Dozers	2	8
Earthwork	Excavators	1	8
	Graders	1	8
	Rubber Tired Dozers	2	8
	Scrapers	1	8
	Tractors/Loaders/Backhoes	3	8
Paving	Pavers	2	8
	Paving Equipment	2	8
	Rollers	2	8
Traffic Installations	Air Compressors	1	8

Source: Construction equipment based on the Project Description and CalEEMod defaults.

Dust is typically a major concern during demolition and earthwork activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Fugitive dust emissions rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). The CalEEMod model was utilized to calculate fugitive dust emissions resulting from this phase of activity.

[3] It should be noted that CalEEMod does not provide an extensive selection of construction activity options. As such, for CalEEMod purposes, earthwork activities were modeled as grading/excavation.
[4] For CalEEMod purposes, traffic installation activities were modeled as drainage/utilities/sub-grade activities.

Demolition

The Project will require demolition of existing improvements (pavement, curb, gutters). Based on information provided in the project description, the Project would result in approximately 5,003.33 tons of debris from demolition activities.

Earthwork Activities

Based on information provided by the Project applicant, the Project is expected require 20,000 cubic yards of imported soil. For purposes of analysis, the CalEEMod default hauling trip length of 20 miles will be utilized for analytical purposes. Dust is typically a major concern during rough grading activities.

Construction Worker Vehicle Trips

Construction emissions for construction worker vehicles traveling to and from the Project site, as well as vendor trips (construction materials delivered to the Project site) were estimated based on information from CalEEMod model defaults.

3.4.2 Regional Construction Emissions Summary

The SCAQMD Rules that are currently applicable during construction activity for this Project include Rule 403 (Fugitive Dust) (2) and Rule 1113 (Architectural Coatings) (3). As such, credit for Rule 403 and Rule 1113 have been taken in the air quality modeling herein.

Impacts without Mitigation

The estimated maximum daily construction emissions without mitigation are summarized on Table 3-4. Detailed construction model outputs are presented in Appendix 3.1. Under the assumed scenarios, emissions resulting from the Project construction would not exceed criteria pollutant thresholds established by the SCAQMD for emissions of any criteria pollutant.

TABLE 3-4: OVERALL CONSTRUCTION EMISSIONS SUMMARY (WITHOUT MITIGATION)

Year	Emissions (lbs/day)					
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2021	3.29	33.23	22.38	0.05	2.51	1.63
2022	3.94	47.25	27.45	0.09	8.42	4.55
Maximum Daily Emissions	**3.94**	**47.25**	**27.45**	**0.09**	**8.42**	**4.55**
SCAQMD Regional Threshold	75	100	550	150	150	55
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Source: The unmitigated CalEEMod regional construction-source emissions are presented in Appendix 3.1.

3.5 LOCALIZED SIGNIFICANCE - CONSTRUCTION ACTIVITY

BACKGROUND ON LOCALIZED SIGNIFICANCE THRESHOLD (LST) DEVELOPMENT

The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (LST Methodology) (22). The SCAQMD has established that impacts to air quality are significant if there is a potential to contribute or cause localized exceedances of the federal and/or state ambient air quality standards (NAAQS/CAAQS). Collectively, these are referred to as Localized Significance Thresholds (LSTs).

The significance of localized emissions impacts depends on whether ambient levels in the vicinity of any given project are above or below State standards. In the case of CO and NO_2, if ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a state or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to PM_{10} and $PM_{2.5}$; both of which are non-attainment pollutants.

The SCAQMD established LSTs in response to the SCAQMD Governing Board's Environmental Justice Initiative I-4[5]. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. The SCAQMD states that lead agencies can use the LSTs as another indicator of significance in its air quality impact analyses.

LSTs were developed in response to environmental justice and health concerns raised by the public regarding exposure of individuals to criteria pollutants in local communities. To address the issue of localized significance, the SCAQMD adopted LSTs that show whether a project would cause or contribute to localized air quality impacts and thereby cause or contribute to potential localized adverse health effects. The analysis makes use of methodology included in the *LST Methodology* (23).

APPLICABILITY OF LSTS FOR THE PROJECT

For this Project, the appropriate Source Receptor Area (SRA) for the LST analysis is the SCAQMD Central San Bernardino Valley monitoring station (SRA 34). LSTs apply to CO, NO_2, PM_{10}, and $PM_{2.5}$. The SCAQMD produced look-up tables for projects less than or equal to 5 acres in size.

In order to determine the appropriate methodology for determining localized impacts that could occur as a result of Project-related construction, the following process is undertaken:

- CalEEMod is utilized to determine the maximum daily on-site emissions that will occur during construction activity.

[5] The purpose of SCAQMD's Environmental Justice program is to ensure that everyone has the right to equal protection from air pollution and fair access to the decision-making process that works to improve the quality of air within their communities. Further, the SCAQMD defines Environmental Justice as "…equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution."

- The SCAQMD's Fact Sheet for Applying CalEEMod to Localized Significance Thresholds (24) is used to determine the maximum site acreage that is actively disturbed based on the construction equipment fleet and equipment hours as estimated in CalEEMod.
- If the total acreage disturbed is less than or equal to five acres per day, then the SCAQMD's screening look-up tables are utilized to determine if a project has the potential to result in a significant impact. The look-up tables establish a maximum daily emissions threshold in pounds per day that can be compared to CalEEMod outputs.
- If the total acreage disturbed is greater than five acres per day, then LST impacts are appropriately evaluated through dispersion modeling.

EMISSIONS CONSIDERED

SCAQMD's *LST Methodology* clearly states that "off-site mobile emissions from the Project should not be included in the emissions compared to LSTs (22)." Therefore, for purposes of the construction LST analysis, only emissions included in the CalEEMod "on-site" emissions outputs were considered.

MAXIMUM DAILY DISTURBED-ACREAGE

Table 3-5 is used to determine the maximum daily disturbed acreage for use in determining the applicability of the SCAQMD's LST look-up tables. Based on Table 3-5, the proposed Project could actively disturb approximately 1 acre per day for demolition activities and 2.5 acres per day for the earthwork activities. The acres disturbed is based on the equipment list and days in for demolition and earthwork according to the anticipated maximum number of acres a given piece of equipment can pass over in an 8-hour workday (as shown on Table 3-5). The equipment-specific grading rates are summarized in the CalEEMod user's guide, *Appendix A: Calculation Details for CalEEMod* (October 2017).

TABLE 3-5 : MAXIMUM DAILY DISTURBED-ACREAGE

Construction Activity	Equipment Type	Equipment Quantity	Acres graded per 8-hour day	Operating Hours per Day	Acres graded per day
Demolition	Rubber Tired Dozers	2.0	0.5	8	1.0
Total acres disturbed per day during Demolition					1.0
Earthwork	Graders	1.0	0.5	8	0.5
	Rubber Tired Dozers	2.0	0.5	8	1.0
	Scrapers	1.0	1	8	0.5
Total acres disturbed per day during Earthwork					2.5

Source: Maximum daily disturbed acreage based on equipment list presented in Appendix 3.1.

SENSITIVE RECEPTORS

As previously stated, LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. Receptor locations are off-site locations where individuals may be exposed to emissions from Project activities. This AQIA analyzes localized construction emissions impacts at the nearest sensitive receptors. Some people are especially sensitive to air pollution and are given special consideration when evaluating air quality impacts from projects. These groups of people include children, the elderly, individuals with pre-existing respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather to exercise are defined as "sensitive receptors"; they are also known to be locations where an individual can remain for 24 hours.

Project-related Sensitive Receptors

Sensitive receptors in the Project study area include existing residential homes as described below and as shown on Exhibit 3-A. The SCAQMD recommends that the nearest sensitive receptor be considered when determining the Project's potential to cause an individual and cumulatively significant impact.

R1: Location R1 represents the existing residential homes located approximately 73 feet northeast of Segment 1 of the Project on the north side of 16th Street.

R2: Location R2 represents the existing outdoor living areas (backyards) of residential homes west of Segment 1 of the Project site on the west side of State Street at an approximate distance of 29 feet.

R3: Location R3 represents the existing outdoor living areas (backyards) of residential homes east of Segment 1 of the Project site on the east side of State Street at an approximate distance of 22 feet.

R4: Location R4 represents the existing outdoor living areas (backyards) of residential homes west of Segment 1 of the Project site on the west side of State Street at an approximate distance of 23 feet.

R5: Location R5 represents the existing outdoor living areas (backyards) of residential homes east of Segment 1 of the Project site on the east side of State Street at an approximate distance of 17 feet.

R6: Location R6 represents the existing outdoor living areas (backyards) of residential homes west of Segment 2 of the Project site at an approximate distance of 26 feet.

R7: Location R7 represents the existing outdoor living areas (backyards) of residential homes east of Segment 2 of the Project site at an approximate distance of 17 feet.

R8: Location R8 represents the existing outdoor living areas (backyards) of residential homes east of Segment 3 of the Project site at an approximate distance of 35 feet.

R9: Location R9 represents the existing outdoor living areas (backyards) of residential homes east of Segment 4 of the Project site at an approximate distance of 98 feet.

R10: Location R10 represents the existing outdoor living areas (backyards) of residential homes east of Segment 4 and north of Segment 5 of the Project site at an approximate distance of 172 feet.

R11: Location R11 represents the existing outdoor living areas (backyards) of residential homes east of Segment 5 of the Project site on Baseline Street at an approximate distance of 420 feet.

EXHIBIT 3-A: SENSITIVE RECEPTOR LOCATIONS

R12: Location R12 represents the existing outdoor sports fields of Arroyo Valley High School, southeast of Segment 5 of the Project site at an approximate distance of 267 feet.

The nearest residential receptors to the Project site are located approximately 17 feet/5 meters from the Project site (represented by R5 and R7). It should be noted that the LST Methodology also explicitly states that "*It is possible that a project may have receptors closer than 25 meters. Projects with boundaries located closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters* (22)." Consistent with the SCAQMD's LST Methodology, a 25-meter receptor distance is utilized in this analysis and provide for a conservative i.e. "health protective" standard of care.

LOCALIZED THRESHOLDS FOR CONSTRUCTION ACTIVITY

The SCAQMD's screening look-up tables are utilized in determining impacts. It should be noted that since the look-up tables identifies thresholds at only 1 acre, 2 acres, and 5 acres, linear regression has been utilized, consistent with SCAQMD guidance, in order to interpolate the threshold values for the other disturbed acreage and distances not identified in the look-up tables.

TABLE 3-6: MAXIMUM DAILY LOCALIZED EMISSIONS THRESHOLDS

Pollutant	Construction
Localized Thresholds	
NO_X	118 lbs/day (Demolition)
	270 lbs/day (Earthwork)
CO	674 lbs/day (Demolition)
	1,700 lbs/day (Earthwork)
PM_{10}	4 lbs/day (Demolition)
	12 lbs/day (Earthwork)
$PM_{2.5}$	3 lbs/day (Demolition)
	8 lbs/day (Earthwork)

Source: Localized Thresholds presented in this table are based on the SCAQMD's *LST Methodology*, July 2008

LOCALIZED CONSTRUCTION-SOURCE EMISSIONS

Impacts without Mitigation

Table 3-7 identifies the localized impacts at the nearest receptor location in the vicinity of the Project. Without mitigation, localized construction emissions would not exceed the applicable SCAQMD LSTs for emissions of any criteria pollutant. Outputs from the model runs for unmitigated construction LSTs are provided in Appendix 3.1.

TABLE 3-7: LOCALIZED SIGNIFICANCE SUMMARY OF CONSTRUCTION (WITHOUT MITIGATION)

On-Site Demolition Emissions	Emissions (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions	**31.44**	**21.57**	**2.19**	**1.54**
SCAQMD Localized Threshold	118	667	4	3
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**
On-Site Earthwork Emissions	**Emissions (lbs/day)**			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions	**38.59**	**25.23**	**7.45**	**4.27**
SCAQMD Localized Threshold	187	1,101	8	5
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod localized construction-source emissions are presented in Appendix 3.1.

3.6 CO "HOT SPOT" ANALYSIS

As discussed below, the Project would not result in potentially adverse CO concentrations or "hot spots." Further, detailed modeling of Project-specific carbon monoxide (CO) "hot spots" is not needed to reach this conclusion. An adverse CO concentration, known as a "hot spot", would occur if an exceedance of the state one-hour standard of 20 ppm or the eight-hour standard of 9 ppm were to occur. At the time of the 1993 Handbook, the SCAB was designated nonattainment under the California AAQS and National AAQS for CO (25).

It has long been recognized that CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. In response, vehicle emissions standards have become increasingly stringent in the last twenty years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SCAB is now designated as attainment, as previously noted in Table 2-3. Also, CO concentrations in the Project vicinity have steadily declined. To establish a more accurate record of baseline CO concentrations affecting the SCAB, a CO "hot spot" analysis was conducted in 2003 for four busy intersections in Los Angeles at the peak morning and afternoon time periods. This "hot spot" analysis did not predict any violation of CO standards, as shown on Table 3-8.

TABLE 3-8: CO MODEL RESULTS

Intersection Location	Carbon Monoxide Concentrations (ppm)		
	Morning 1-hour	Afternoon 1-hour	8-hour
Wilshire-Veteran	4.6	3.5	3.7
Sunset-Highland	4	4.5	3.5
La Cienega-Century	3.7	3.1	5.2
Long Beach-Imperial	3	3.1	8.4

Source: 2003 AQMP, Appendix V: Modeling and Attainment Demonstrations
Notes: Federal 1-hour standard is 35 ppm and the deferral 8-hour standard is 9.0 ppm.

Based on the SCAQMD's 2003 AQMP and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan), peak carbon monoxide concentrations in the SCAB were a result of unusual meteorological and topographical conditions and not a result of traffic volumes and congestion at a particular intersection. As evidence of this, for example, 8.4 ppm CO concentration measured at the Long Beach Blvd. and Imperial Hwy. intersection (highest CO generating intersection within the "hot spot" analysis), only 0.7 ppm was attributable to the traffic volumes and congestion at this intersection; the remaining 7.7 ppm were due to the ambient air measurements at the time the 2003 AQMP was prepared (25). Therefore, even if the traffic volumes for the proposed Project were double or even triple of the traffic volumes generated at the Long Beach Blvd. and Imperial Hwy. intersection, coupled with the on-going improvements in ambient air quality, the Project would not be capable of resulting in a CO "hot spot" at any study area intersections.

Similar considerations are also employed by other Air Districts when evaluating potential CO concentration impacts. More specifically, the Bay Area Air Quality Management District (BAAQMD) concludes that under existing and future vehicle emission rates, a given project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour—or 24,000 vehicles per hour where vertical and/or horizontal air does not mix—in order to generate a significant CO impact (26).

Traffic volumes generating the CO concentrations for the "hot spot" analysis, shown on Table 3-9. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which has a daily traffic volume of approximately 100,000 vehicles per day. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm; this indicates that, should the daily traffic volume increase four times to 400,000 vehicles per day, CO concentrations (4.6 ppm x 4= 18.4 ppm) would still not likely exceed the most stringent 1-hour CO standard (20.0 ppm).[6] At buildout of the Project, the highest daily traffic volumes generated at the roadways within the vicinity of the Project are expected to generate less than the highest daily traffic volumes generated at the busiest intersection in the CO "hot spot" analysis. As such, the Project would not likely exceed the most stringent 1-hour CO standard.

6 Based on the ratio of the CO standard (20.0 ppm) and the modeled value (4.6 ppm).

TABLE 3-9: TRAFFIC VOLUMES

Intersection Location	Peak Traffic Volumes (vph)				
	Eastbound (AM/PM)	Westbound (AM/PM)	Southbound (AM/PM)	Northbound (AM/PM)	Total (AM/PM)
Wilshire-Veteran	4,954/2,069	1,830/3,317	721/1,400	560/933	8,062/7,719
Sunset-Highland	1,417/1,764	1,342/1,540	2,304/1,832	1,551/2,238	6,614/5,374
La Cienega-Century	2,540/2,243	1,890/2,728	1,384/2,029	821/1,674	6,634/8,674
Long Beach-Imperial	1,217/2,020	1,760/1,400	479/944	756/1,150	4,212/5,514

Source: 2003 AQMP

3.7 AIR QUALITY MANAGEMENT PLANNING

The Project site is located within the SCAB, which is characterized by relatively poor air quality. The SCAQMD has jurisdiction over an approximately 10,743 square-mile area consisting of the four-county Basin and the Los Angeles County and Riverside County portions of what use to be referred to as the Southeast Desert Air Basin. In these areas, the SCAQMD is principally responsible for air pollution control, and works directly with the SCAG, county transportation commissions, local governments, as well as state and federal agencies to reduce emissions from stationary, mobile, and indirect sources to meet state and federal ambient air quality standards.

Currently, these state and federal air quality standards are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of AQMPs to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

In March 2017, the AQMD released the Final 2016 AQMP. The 2016 AQMP continues to evaluate current integrated strategies and control measures to meet the NAAQS, as well as, explore new and innovative methods to reach its goals. Some of these approaches include utilizing incentive programs, recognizing existing co-benefit programs from other sectors, and developing a strategy with fair-share reductions at the federal, state, and local levels (27). Similar to the 2012 AQMP, the 2016 AQMP incorporates scientific and technological information and planning assumptions, including the 2016 RTP/SCS, a planning document that supports the integration of land use and transportation to help the region meet the federal Clean Air Act requirements (19). The Project's consistency with the AQMP will be determined using the 2016 AQMP as discussed below.

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's CEQA Air Quality Handbook (1993) (28). These indicators are discussed below:

Consistency Criterion No. 1: The proposed Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

The violations that Consistency Criterion No. 1 refers to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if regional or localized significance thresholds were exceeded.

Construction Impacts – Consistency Criterion 1

The violations that Consistency Criterion No. 1 refers to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if localized or regional significance thresholds were exceeded. The Project would not exceed the applicable LST thresholds or regional significance thresholds for construction activity after implementation of applicable mitigation measures. Therefore, the Project would not conflict with the AQMP according to this criterion.

On the basis of the preceding discussion, the Project would not conflict with the AQMP according to this criterion.

Consistency Criterion No. 2: The Project will not exceed the assumptions in the AQMP based on the years of Project build-out phase.

The 2016 AQMP demonstrates that the applicable ambient air quality standards can be achieved within the timeframes required under federal law. Growth projections from local general plans adopted by cities in the district are provided to the SCAG, which develops regional growth forecasts, which are then used to develop future air quality forecasts for the AQMP. Development consistent with the growth projections in City of San Bernardino General Plan is considered to be consistent with the AQMP.

Construction Impacts

Peak day emissions generated by construction activities are largely independent of land use assignments, but rather are a function of development scope and maximum area of disturbance. Irrespective of the site's land use designation, development of the site to its maximum potential would likely occur, with disturbance of the entire site occurring during construction activities. Development consistent with the growth projections in the General Plan is considered to be consistent with the AQMP.

On the basis of the preceding discussion, the Project is determined to be consistent with the second criterion.

AQMP Consistency Conclusion

The Project would not result in or cause NAAQS or CAAQS violations. The Project's does not propose a land use development but rather the widening of a road segment. The Project is therefore considered to be consistent with the AQMP.

3.8 POTENTIAL IMPACTS TO SENSITIVE RECEPTORS

The potential impact of Project-generated air pollutant emissions at sensitive receptors has also been considered. Sensitive receptors can include uses such as long-term health care facilities, rehabilitation centers, and retirement homes. Residences, schools, playgrounds, childcare centers, and athletic facilities can also be considered as sensitive receptors.

Results of the LST analysis indicate that, the Project would not exceed the SCAQMD localized significance thresholds during construction. Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations during Project construction.

Results of the LST analysis indicate that the Project would not exceed the SCAQMD localized significance thresholds during construction activity. Further Project traffic would not create or result in a CO "hotspot." Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations as the result of Project construction.

3.9 ODORS

The potential for the Project to generate objectionable odors has also been considered. 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 Project does not contain land uses typically associated with emitting objectionable odors. Potential odor sources associated with the proposed Project may result from construction equipment exhaust and the application of asphalt and architectural coatings during construction activities and the temporary storage of typical solid waste (refuse) associated with the proposed Project's uses. Standard construction requirements would minimize odor impacts from construction. The construction odor emissions would be temporary, short-term, and intermittent in nature and would cease upon completion of the respective phase of construction and is thus considered less than significant. It is expected that Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with the City's solid waste regulations. The proposed Project would also be required to comply with SCAQMD Rule 402 to prevent occurrences of public nuisances. Therefore, odors associated with the proposed Project construction would be less than significant and no mitigation is required (29).

3.10 CUMULATIVE IMPACTS

Federal standards designated the Project area as an extreme non-attainment area for ozone, attainment for PM_{10}, and non-attainment for $PM_{2.5}$, and lead. State standards designated the Project area as nonattainment for ozone, PM_{10}, $PM_{2.5}$ and attainment for lead.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (30). In this report the AQMD clearly states (Page D-3):

"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.

Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."

Therefore, this analysis assumes that individual projects that do not generate construction emissions that exceed the SCAQMD's recommended daily thresholds for project-specific impacts would also not cause a cumulatively considerable increase in emissions for those pollutants for which the Basin is in nonattainment, and, therefore, would not be considered to have a significant, adverse air quality impact. Alternatively, individual project-related construction emissions that exceed SCAQMD thresholds for project-specific impacts would be considered cumulatively considerable.

Construction Impacts

The Project-specific evaluation of emissions presented in the preceding analysis demonstrates that, after implementation of applicable mitigation measures, Project construction-source air pollutant emissions would not result in exceedances of regional thresholds. Therefore, Project construction-source emissions would be considered less than significant on a project-specific and cumulative basis.

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5 CERTIFICATION

The contents of this air study report represent an accurate depiction of the environmental impacts associated with the proposed State Street Extension Project. The information contained in this air quality impact assessment report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
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Air Dispersion Modeling – Lakes Environmental • June, 2006

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APPENDIX 2.1:

STATE/FEDERAL ATTAINMENT STATUS OF CRITERIA POLLUTANTS

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APPENDIX 3.1:

CALEEMOD CONSTRUCTION (UNMITIGATED) EMISSIONS MODEL OUTPUTS

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Appendix C – Biological Resources Assessment

47 1st Street, Suite 1
Redlands, CA 92373-4601
(909) 915-5900

June 26, 2019

Steven Latino, PE, MBA
Director of Engineering
ERSC - Engineering Resources Southern California
1861 W. Redlands Blvd, Bldg 7B
Redlands, CA 92373

RE: BIOLOGICAL RESOURCES ASSESSMENT & JURISDICTIONAL DELINEATION
PHASE 1 OF THE STATE STREET EXTENSION - BASELINE STREET TO 16TH STREET
SAN BERNARDINO, CA

Dear Mr. Latino:

Jericho Systems, Inc. (Jericho) is pleased to provide ERSC with this 2019 biological resources assessment and jurisdictional delineation for proposed State Street Extension project (Project). The Project proposes to construct a new, approximately one-half mile, 4-lane roadway between 16th Street and Baseline Street, in the City of San Bernardino.

In November 2016, Jericho conducted a San Bernardino kangaroo rat (*Dipodomys merriami parvus*; [SBKR]) protocol level presence/absence survey as part of a previous analysis performed for the same Project. The results of that survey were negative for SBKR.

The purpose of this current BRA was to re-assess the potential effects of the proposed Project to designated critical habitats and/or any species currently listed (other than SBKR, for which the survey was focused on the area within critical habitat) or formally proposed for listing as endangered or threatened under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA) or species designated as sensitive by the California Department of Fish and Wildlife (CDFW) and/or the California Native Plant Society (CNPS). Special emphasis is placed burrowing owl (*Athene cuniculara*; BUOW), a California Species of Special Concern (SSC) which have been well documented by regulatory databases and other reports to occur in the local area. The current survey included areas not surveyed in the November 2016 effort.

Jericho also assessed the jurisdictional water resources. The purpose of the jurisdictional delineation was to assess the extent of impacts, if any, to State and /or federal jurisdictional waters that are subject to Sections 404 and 401 of the federal Clean Water Act (CWA) regulated by the U.S. Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) respectively; and/or Section 1602 of the California Fish and Game Code (FCG) administered by the CDFW.

PROJECT UNDERSTANDING

The City of San Bernardino is proposing to construct Phase 1 of State Street between Baseline Street and 15th Street to provide four lanes of traffic with a raised center median. The project will include, but is not limited to, curb and gutter, sidewalks, access ramps, traffic signal modification, signing and striping and street lights. Two short sections of State Street exist near Baseline Street and near 15th Street; however, most of the alignment is vacant land.

The City of San Bernardino General Plan, adopted on November 1, 2005, identifies State Street as a north-south major arterial thoroughfare within the City of San Bernardino boundaries. Currently, there is a gap in the State Street corridor between Hanford Street and East Foothill Boulevard. The City of San Bernardino is proposing to construct a new, approximately one-half mile segment of State Street between 16th Street and Baseline Street in approximately 2020. This activity is part of a phased plan over the next 10 years to extend State Street from its present terminus at 16th Street to approximately 1.5 miles southerly to intersect with 5th Street. The Phase 1 segment between 16th Street and Baseline Street encompasses improving State Street from 16th Street to Baseline Street, with four lanes of travel, sidewalks, and curbs and gutters. All of the work would occur within the existing two-lane State Street and its existing right-of-way between 16th Street and the terminus of Hanford Street, and within new rights-of-way to be acquired between the terminus of Hanford Street and W. Baseline Street.

PROJECT LOCATION

The proposed Project is located in the City of San Bernardino, along State Street, beginning at approximately the intersection of 16th Street, and along a designed alignment to Baseline Street. The Project alignment traverses two USGS 7.5' quadrangles: the southwest one-quarter of *San Bernardino North* and the northwest one-quarter of *San Bernardino South*. Residential development generally exists along both sides of the northern half of the alignment. The Assessor's Parcel Numbers associated with the Project are APN 0269-181-02, 0269-181-03, 0269-181-04, and 0269-181-17.

For study purposes, the Project alignment was divided into five segments that were similar in nature:

The segments of the Project are generally as follows:

- **Segment 1 – Existing State Street, between the intersection of 16th Street and Hanford Street.** This approximately 0.14 mile (about 700 feet) long section currently contains an approximately two-lane paved roadway, with curb and gutter, but no sidewalks.

- **Segment 2 – Existing State Street between Hanford Street and State Street terminus, approximately 700-feet south of Hanford Street**. This approximately 0.15-mile (approximately 760 feet) segment is an existing, paved two-lane road, with no curb and gutter and no sidewalks. The pavement is in poor condition and is closed to through traffic between the intersection with Hanford Street and the terminus approximately 0.15-mile south of the intersection with Hanford Street.

- **Segment 3 – New roadway from terminus of Segment 2 to approximately 0.13 mile southwesterly** (a physical reference point being between the terminus of Lilian Court located approximately 250 feet to the east) (**Error! Reference source not found.**). This approximate 0.14-mile long (approximately 715 feet) segment will generally follow an alignment between the San Bernardino Flood Control Channel and the backyards of residential property along Colorado Avenue. This segment lies entirely within Assessor's Parcel Number (APN) 0269-181-04,

- **Segment 4 – New roadway from Section 3 to Baseline Street.** This approximately 0.14-mile (approximately 800 feet) segment will bisect the approximate 9.7-acre vacant parcel, APN 0269-181-04.

- **Segment 5 –Baseline Street Intersection.** This segment consists of the existing intersection of W. Baseline Street and State Street (**Error! Reference source not found.**).

METHODS

As stated above, the objective of this document is to determine whether the Project area supports special status or otherwise sensitive species and/ or their habitat, and to address the potential effects associated with the Proposed project on those resources. The species and habitats addressed in this document are based on database information and field investigation.

Sensitive Biological Resources

Prior to conducting the field study, species and habitat information was gathered from the reports related to the specific project and relevant databases for the *San Bernardino North* and *San Bernardino South* USGS quadrangles to determine which species and/or habitats would be expected to occur on site. These sources include:

- U.S. Fish and Wildlife (USFWS) threatened and endangered species occurrence GIS overlay;
- USFWS Information for Planning and Consultation System (IPaC);
- California Natural Diversity Database (CNDDB) *Rarefind 5*);
- CNDDB Biogeographic Information and Observation System (BIOS);
- California Native Plant Society Electronic Inventory (CNPSEI) database;
- Calflora Database;
- USDA Natural Resources Conservation Service (NRCS) Web Soil Survey;
- USFWS National Wetland Inventory;
- Environmental Protection Agency (EPA) Water Program “My Waters” data layers
- 45-Day Presence/Absence Survey for San Bernardino kangaroo rat (*Dipodomys merriami parvus* prepared by Jericho Systems, Inc, date November 19, 2016.

According to the U.S. EPA Regional map, the Project site is located in the Inland Valleys Ecoregion. An Ecoregion is a regional area that has similar ecosystems in terms of type, quality, and quantity of environmental resources. The Inland Valleys Ecoregion consists of alluvial fans and basin floors immediately south of the San Gabriel and San Bernardino Mountains of Southern California and includes the San Jacinto and Perris Valleys toward the south. This ecoregion includes some floodplains along the Santa Ana River. The soil moisture regime is xeric which is characterized by long periods of drought in the summer. Historically, vegetation in this Ecoregion included Riversidean coastal sage scrub, valley grasslands, and riparian woodlands. Currently, much of this Ecoregion, including the project site and surrounding vicinity is heavily urbanized.

Hydrologically, the project site is located within the Bunker Hill Sub-Area (HSA 801.52) which is within the larger Upper Santa Anna River Watershed (HUC 180702030508). Soils in this area consist of Soboba stony loamy sand and Tujunga gravelly loamy sand from 0-9 percent slopes.

On March 21, 2019, Jericho Biologist Christian Nordal conducted a field survey of the Project area with focus on potential habitat for sensitive biological and hydrological resources and migratory birds. Mr.

Nordal is a qualified biologist with advanced degrees in Biology and several years of experience surveying for the sensitive species known to in California. Mr. Nordal conducted the survey by walking transects spaced approximately 30 feet apart, which provided 100 percent visual coverage of the ground. Weather conditions were cloudy with periodic rainfall; however, most of the project site is existing road/concrete, and the remaining habitat was clearly visible even in the overcast. Survey hours of spanned from 1:00 p.m. to 3:00 p.m. with temperatures ranging from 46 degrees Fahrenheit (° F) to 57° F and winds ranging from 7-10 mph. The survey encompassed the Project site boundaries plus a 150-foot survey buffer where accessible and appropriate.

Wildlife species were detected during field surveys by sight, calls, tracks, scat, or other signs. In addition to species observed, expected wildlife usage of the site was determined according to known habitat preferences of regional wildlife species and knowledge of their relative distributions in the area. Mr. Nordal assessed the Project area for habitat type structure, species composition/association, condition and human disturbances. The main focus of the surveys was to identify potential habitat for special status wildlife including jurisdictional waters and to evaluate the potential for sensitive species to occur within the Project area.

In regard to jurisdictional waters, Mr. Nordal looked for indicators of active surface flow and corresponding physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris. Suspected jurisdictional areas were checked for the presence of definable channels, soils, and hydrology. Evaluation of potential federal jurisdiction followed the regulations set forth in 33CFR part 328 and the USACE guidance documents and evaluation of potential State jurisdiction followed guidance in the Fish and Game Code and A Review of Stream Processes and Forms in Dryland Watersheds (CDFW, 2010).

On April 2, 2019, Jericho ecologist Shay Lawrey performed a follow up site assessment to evaluate the potential to support for sensitive small mammals to occur on site, specifically the federally endangered SBKR and State species of special concern LAPM. Ms. Lawrey has advanced degrees in biology, is permitted to trap and handle SBKR and has two decades of experience with surveying for sensitive small mammals.

RESULTS

The site contains residential and public structures (including roads), a vacant parcel and existing paved/concrete surfaces. The two segments of the Project site that have the potential to support biological resources are Segments 3 and 4. Segments 1 and 2 are paved and located in an urban area surrounded by residential uses.

According to the database queries, 74 sensitive species (29 vertebrates, 2 invertebrates, and 30 plant species) and 3 sensitive habitats have been documented in the *San Bernardino North* and *San Bernardino South* USGS quadrangles. Table 1 in attachment 1 represents a compiled list of sensitive species documented within these quads and takes into account each species range, habitat requirements and the potential for their occurrence on the site, which is based on required habitat elements and range relative to the current site conditions as well as the field investigation of the Project area and surveyor’s knowledge of the species and local ecology.

Critical Habitat

The Project area is located within the designated Critical Habitat for San Bernardino Merriam’s Kangaroo Rat (SBKR).

The soils within Segments 3 and 4 Soboba stony loamy sand and Tujunga gravelly loamy sand. Weed abatement, homeless activity and off-road vehicle use (ORV) use have resulted in compaction of the soils.

The vegetation bordering Segments 1 and 2 is ornamental and the vegetation within Segments 3 and 4 is mostly ruderal consisting of ripgut brome (*Bromus diandrus*) and slender oat (*Avena barbata*). There is small approximate 25 square-foot patch of degraded sage scrub north of Baseline Road consisting of California sagebrush (*Artemesia californica*), mulefat (*Baccharis salicifolia*), California buckwheat (*Eriogonum fasciculatum*), scalebroom (*Lepidospartum squamatum*), woolly Indian paintbrush (*Castilleja foliolosa*), California brittlebush (*Encelia californica*), common fiddleneck (*Amsinckia menziesii*), and coastal heron's bill (*Erodium cicutarium*).

<u>San Bernardino Kangaroo Rat (SBKR)</u>

The SBKR is one of several kangaroo rat species in its range. The Dulzura kangaroo rat (*Dipodomys simulans*), the Pacific kangaroo rat (*D. agilis*) and the Stephens kangaroo rat (*D. stephensi*) can occur in areas occupied by the SBKR, but these other species have a wider habitat range. The habitat of the SBKR is described as being confined to primary and secondary alluvial fan scrub habitats, with sandy soils deposited by fluvial (water) rather than aeolian (wind) processes. Burrows are dug in loose soil, usually near or beneath shrubs. SBKR, are confined to inland valley scrub communities, and more particularly, to scrub communities occurring along rivers, streams and drainage. Most of these drainages have been historically altered as a result of flood control efforts and the resulting increased use of river resources, including mining, off-road vehicle uses and road and housing development. This increased use of river resources has resulted in a reduction in both the amount and quality of habitat available for the SBKR. The past habitat losses and potential future losses prompted the emergency listing of the SBKR as an endangered species.

No aspect of the Project site contains the habitat elements typically associated with SBKR. Further, the small mammal burrows on site were not the appropriate size, shape or aspect for SBKR. The 2016 trapping of Segment 4 determined SBKR to be absent.

<u>Los Angeles Pocket Mouse (LAPM)</u>

The LAPM (*Perognathus longimembris brevinasus*) is one of two pocket mice found in this area of San Bernardino County. Both the LAPM and the San Diego pocket mouse occupy similar habitats, but the San Diego pocket mouse has a wider range extending south into San Diego County. The habitat of the LAPM is described as being confined to lower elevation grasslands and coast sage scrub habitats, in areas with soils composed of fine sands. The present known distribution of this species extends from Rancho Cucamonga east to Morongo and south to the San Diego County border. LAPM forages in open ground and underneath shrubs. Pocket mice in general dig burrows in loose soil, although this has not been completely documented for this subspecies. The LAPM is listed as a Critical Species of Concern by the CDFW.

Segment 4 of the Project site contains habitat marginally suitable habitat for LAPM. Previous small mammal trapping of Segment 4 performed in 2016 targeting SBKR also determined LAPM to be absent.

Burrowing owl (BUOW)

Burrowing Owl (*Athene cunicularia*; [BUOW]) are known to occur locally within suitable habitat areas. BUOW is a ground-dwelling owl typically found in arid prairies, fields, and open areas where vegetation is sparse and low to the ground. The BUOW depends on the presence of mammal burrows, i.e. ground squirrel burrows to provide shelter from predators, inclement weather and to provide a nesting place. They are also known to make use of human-created structures, such as cement culverts and pipes, for burrows. They feed primarily on insects but will also take small rodents, birds, and reptiles. They are active during the day and night, generally observed in the early morning hours or at twilight. The breeding season for BUOW is February 1 through August 31. The BUOW is not listed under the State or Federal Endangered Species Act but is considered both a State and federal SSC. The BUOW is a protected by the international treaty under the Migratory Bird Treaty Act of 1918 and by State law under the California Fish and Game Code (CDFG Code #3513 & #3503.5).

No evidence of BUOW was found in the survey area. No BUOW pellets, feathers or whitewash were found near existing burrows on site. No BUOW individuals were observed. Therefore, BUOW are considered absent from the site at the time of surveys.

Nesting Birds

The project site and immediate surrounding areas do contain habitat suitable for nesting birds in general, including the shrubs on site. Nesting birds are protected under the MBTA which provides protection for nesting birds that are both residents and migrants whether or not they are considered sensitive by resource agencies. The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed under 50 CFR 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The direct injury or death of a migratory bird, due to construction activities or other construction-related disturbance that causes nest abandonment, nestling abandonment, or forced fledging would be considered take under federal law. The USFWS, in coordination with the CDFW administers the MBTA. CDFW's authoritative nexus to MBTA is provided in FGC Sections 3503.5 which protects all birds of prey and their nests and FGC Section 3800 which protects all non-game birds that occur naturally in the State.

Jurisdiction Waters

An underground reinforced concrete box (RCB) storm drain bisects Segment 3 and outlets above ground into Lytle Creek outside of the project area to the west. The RCB is not subject to the Clean Water Act or California Fish and Game Code regulations. Its outlet into Lytle Creek is however subject to these regulations. No aspect of the project proposes alterations to the Storm Drain outlet and no further discussion is made.

No hydric vegetation, hydric soils, and/or wetland hydrology are present in any segment of the Project site.

CONCLUSIONS

The proposed Project will not affect State or federally listed endangered, threatened species because there is no habitat to support these species within, adjacent to, or in the broader vicinity of the Project area.

In addition, the proposed Project will not adversely affect the SBKR Critical Habitat in the Project area because no Primary Constituent Elements (PCEs) outlined in the critical habitat designation for SBKR occur on site. A PCE is a physical or biological feature essential to the conservation of a species for which its designated or proposed critical habitat is based on, such as space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the species historic geographic and ecological distribution.

The specific PCEs required for the SBKR are derived from the biological needs of the SBKR are alluvial fans, washes, and associated floodplain areas containing friable non-compacted soils consisting of sand, loamy sand, sandy loam, and loam, adjacent upland areas containing alluvial sage scrub habitat with approximately 50 percent shrub cover. Although the Project site is adjacent to Lytle Creek wash the soils on site are compacted due to weed abatement, homeless Segment 3 and 4 are and unauthorized ORV use. The small amount of vegetation on site is mostly non-native and ruderal with a very small patch of buckwheat. This vegetation on site is not associated with SBKR occupation.

Habitat conditions within Segment 3 and 4 are not suitable for SBKR. The 25 square foot patch of remnant coastal sage scrub habitat on site is surrounded by non-native ruderal vegetation. Further the Project site is surrounded by residential uses with feral predator animals such as dogs and cats. Previous trapping efforts in the Project area were negative for this species and no further studies are recommended.

As for LAPM the habitat quality is marginally suitable at best. Previous trapping confirmed the absence of this species, and no further studies are recommended.

The habitat is marginally suitable for BUOW, but no BUOW individuals or sign of their past or current occupations was observed. This species was absent during the time of survey. To reduce the potential impacts to BUOW, the following is recommended.

- Prior to construction, a 30-day pre-construction survey be conducted to confirm that BUOW are still absent.

Vegetation bordering and within the Project alignment has the potential to support nesting birds and migratory birds protected under the MBTA. Therefore, pre-construction surveys are warranted and recommended should project implementation occur during the bird nesting season. To reduce the potential impacts to nesting birds, the following is recommended:

- Bird nesting season generally extends from February 1 through September 15 in southern California and specifically, April 15 through August 31 for migratory passerine birds. To avoid impacts to nesting birds (common and special status) during the nesting season, a qualified Avian Biologist will conduct pre-construction Nesting Bird Surveys (NBS) prior to project-related disturbance to nestable vegetation to identify any active nests. If no active nests are found, no further action will be required. If an active nest is found, the biologist will set appropriate no-work buffers around the nest which will be based upon the nesting species, its sensitivity to disturbance, nesting stage and expected types, intensity and duration of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved no-work buffer zone shall be clearly marked in the field, within which no disturbance activity shall commence until the qualified biologist has determined the young birds have successfully fledged and the nest is inactive.

Should you have any questions or require further information, please contact me at (909) 915-5900 or shay@jericho-systems.com should you have any questions or require further information.

Sincerely,

Shay Lawrey, President

Attachments:

A. Photos
B. Project Exhibits
C. Species Occurrence Potential

Photo 1: South-facing shot of the project site at the end of State Street

Photo 2: North-facing shot of the project site at the end of State Street

Photo 3: Northeast-facing shot of the project site from Baseline Road

Photo 4: Existing scrub habitat on site

Photo 5: Degraded sage scrub on site

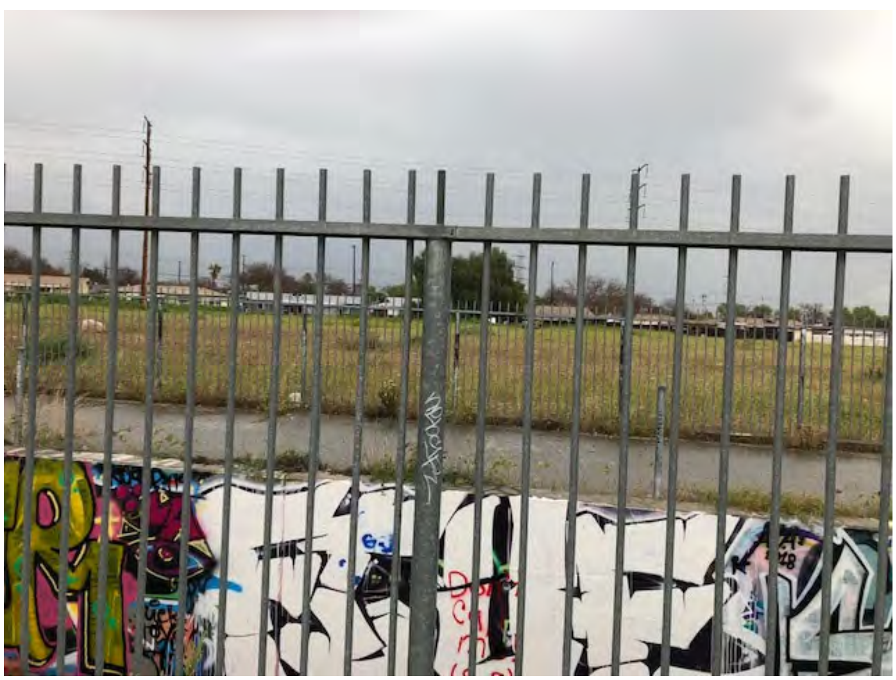
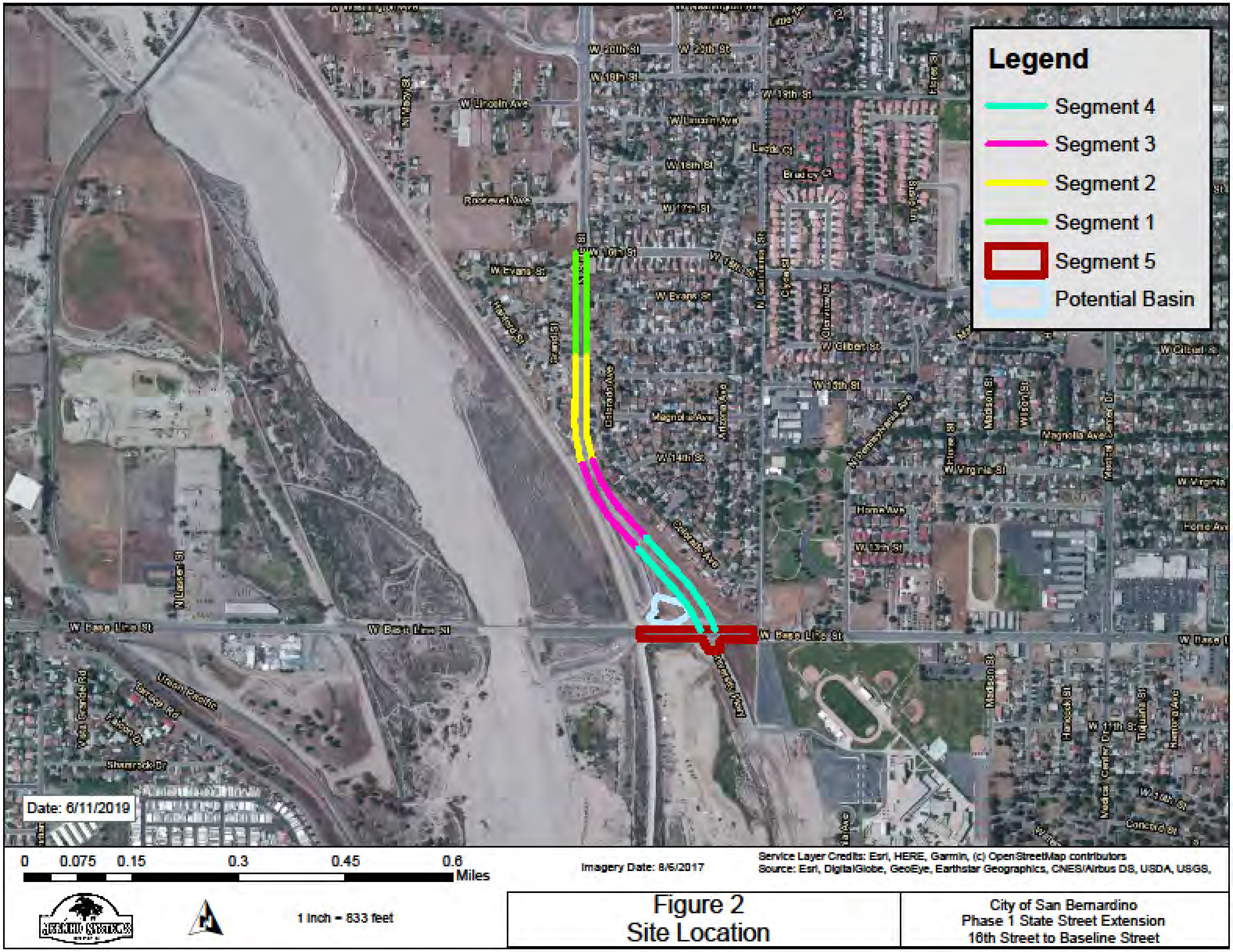


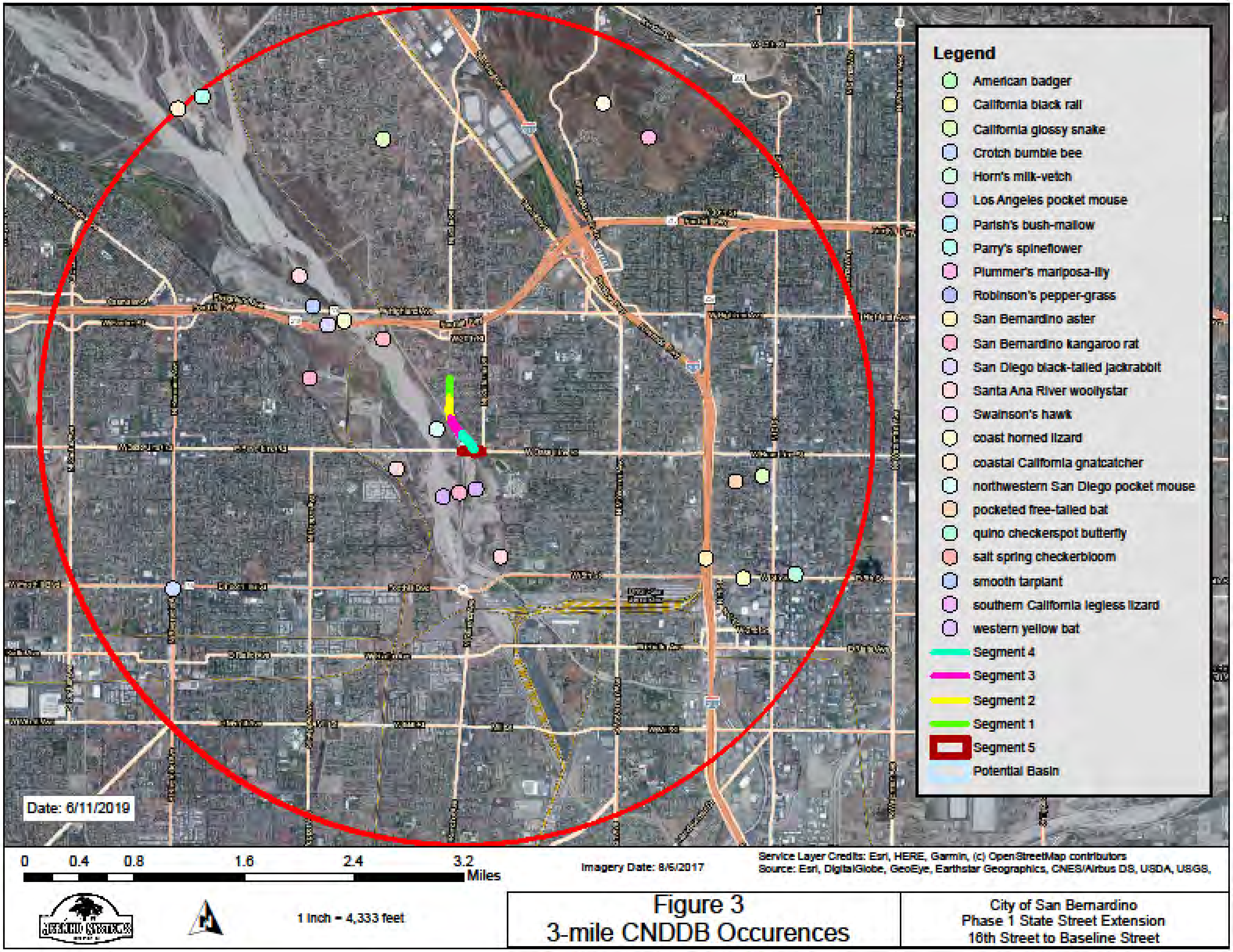
Photo 6: Invasive grasses within project boundary (across from concrete stormdrain)

Steve Latino
BRA-JD – Phase I State Street Extension
May 9, 2019
Attachment B Exhibits

Steve Latino
BRA-JD – Phase I State Street Extension
May 9, 2019
Attachment B Exhibits



Steve Latino
BRA-JD – Phase I State Street Extension
May 9, 2019
Attachment B Exhibits



Steve Latino
BRA-JD – Phase I State Street Extension
May 9, 2019
Attachment B Exhibits

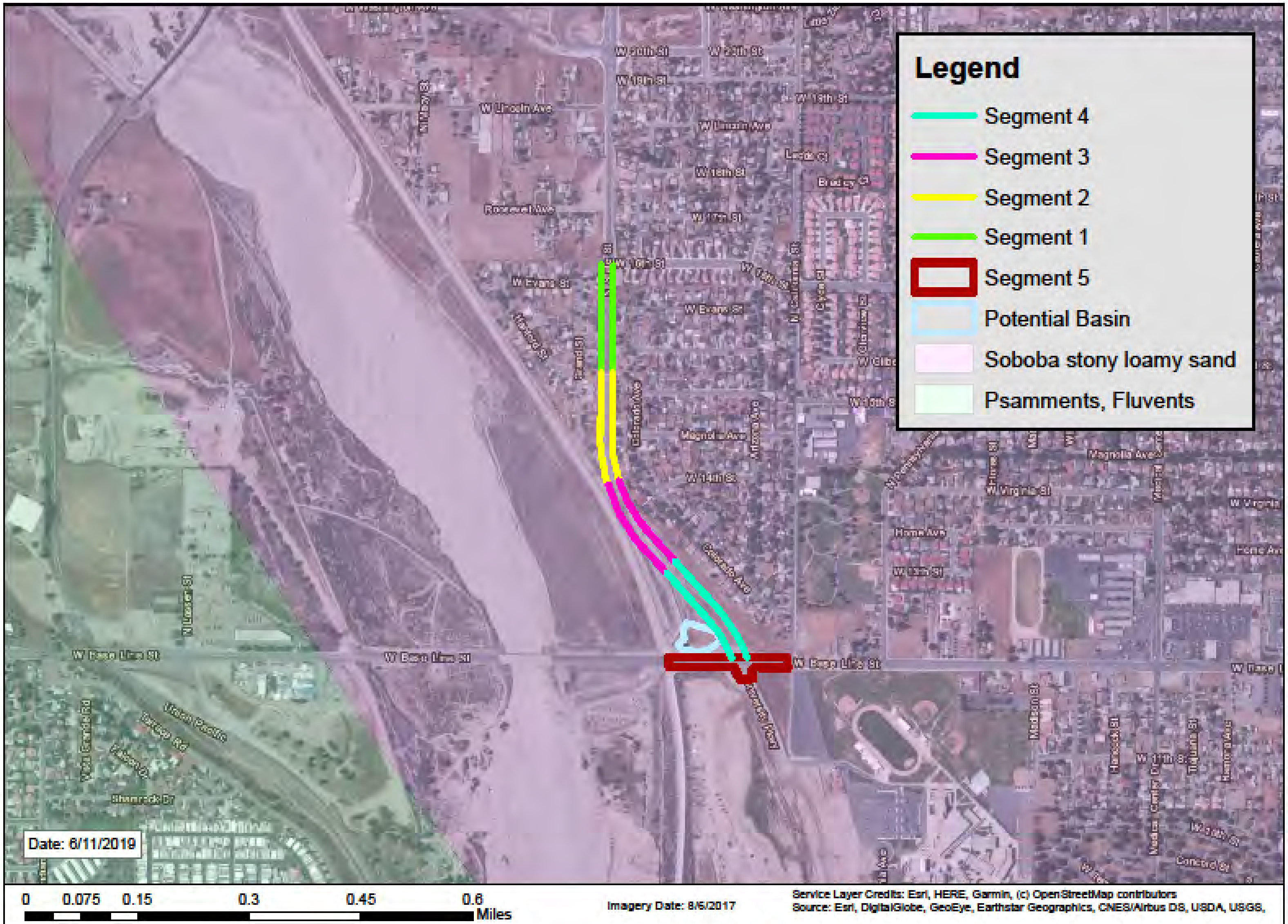


Figure 4
Soils

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street

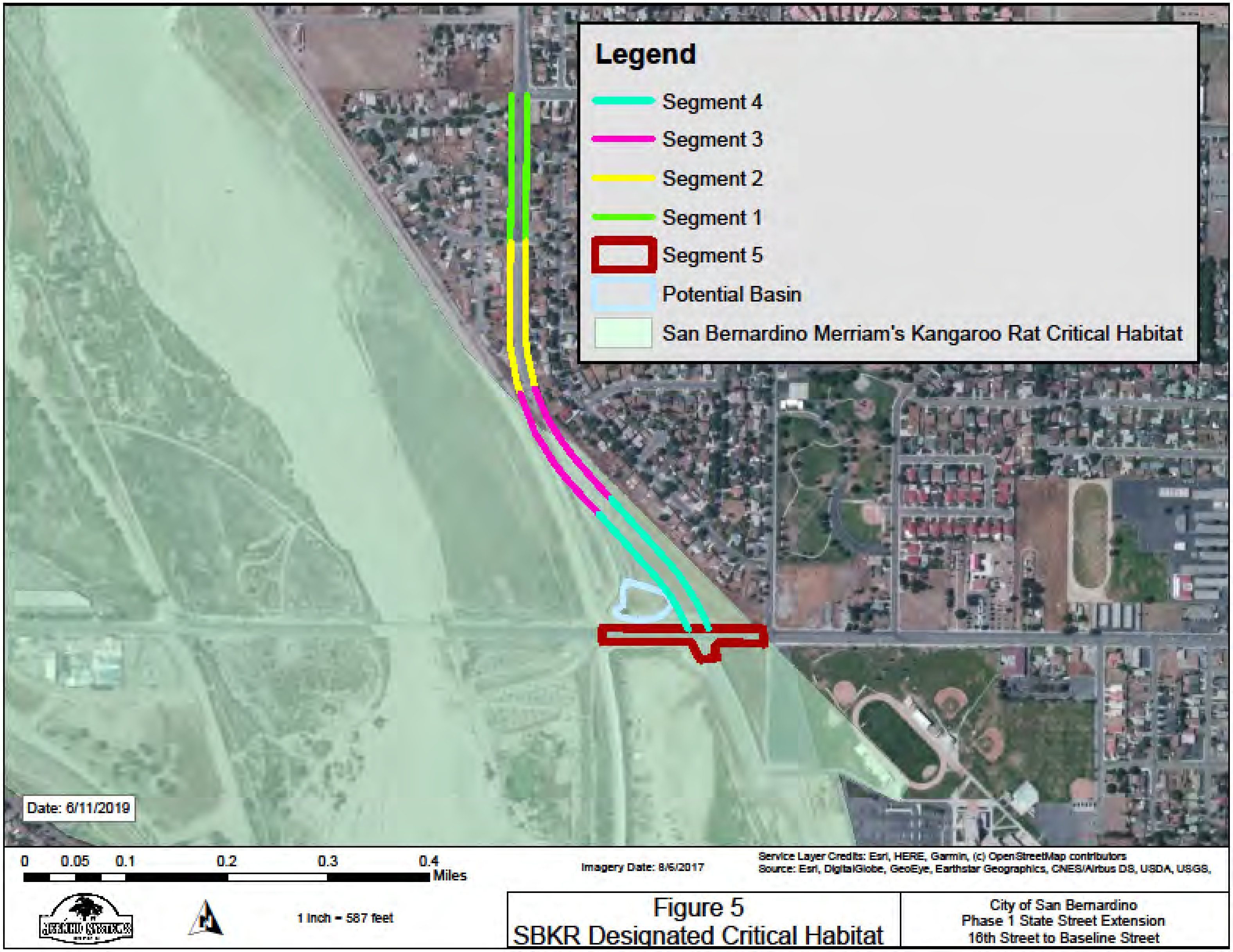


Figure 5
SBKR Designated Critical Habitat

City of San Bernardino
Phase 1 State Street Extension
16th Street to Baseline Street

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Agelaius tricolor	tricolored blackbird	None/Candidate Endangered	G2G3, S1S2, SSC	Wetlands with cattails, bulrushes, and willows; agricultural fields	Habitat on site is primarily invasive grasses along a flat, graded allotment. Potential to occur is low.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	none/none	G5T3, S2, WL	Grassy or rocky slopes with sparse vegetation, always in brushy areas; coastal scrub, chaparral, pine-oak woods	Habitat on site is primarily invasive grasses along a flat, graded allotment. Potential to occur is low.
Ambrosia pumila	San Diego Ambrosia	Endangered/ none	G1, S1, 1B.1	Upper terraces of rivers and drainages as well as openings in grasslands, sage scrub, and disturbed sites	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Anniella stebbinsi	southern California legless lizard	none/none	G3, S3, SSC	Coastal sand dunes, sandy washes, alluvial fans	Habitat on site is absent of sand or alluvial fans. Potential to occur is low.
Arenaria paludicola	marsh sandwort	none/none	G1, S1, 1B.1	Marshes, swamps, and freshwaters that are wet year-round	Habitat on site is absent of year-round freshwater sources. Potential to occur is low.
Artemisiospiza belli belli	Bell's sage sparrow	none/none	G5T2T3, S3, WL	Sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Arizona elegans occidentalis	California glossy snake	none/none	G5T2, S2, SSC	Arid scrub, rocky washes, grasslands, chaparral	Habitat on site is absent of burrows. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Arizona elegans occidentalis	Stephens' Kangaroo Rat	Endangered/ Threatened	G1, S1	Arid/semi-arid open habitats (less than 50% cover)	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Aspidoscelis hyperythra	orange-throated whiptail	none/none	G5, S2S3, WL	Semi-arid brushy areas with loose soils and rocks, including washes, streamsides, rocky hillsides, and coastal chaparral	Habitat on site contains trace amounts of brush. Potential to occur is low.
Aspidoscelis tigris stejnegeri	coastal whiptail	none/none	G5T5, S3, SSC	Hot and dry open areas with sparse foliage.	Habitat on site contains trace amounts of brush. Potential to occur is medium-low.
Astragalus hornii var. hornii	Horn's milk-vetch	none/none	G4G5T1T2, S1, 1B.1	Lake margins, alkaline, meadows and seeps, playas	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Athene cunicularia	burrowing owl	none/none	G4, S3, SSC	Open areas with little vegetation and existing burrows	Habitat on site is primarily invasive grasses. No burrows were detected during survey. Potential to occur is low.
Berberis nevinii	Nevin's barberry	Endangered/ Endangered	G1, S1, 1B.1	chaparral, desert transition, or foothill woodlands in sandy, gravelly soils and washes.	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Bombus crotchii	Crotch bumble bee	none/none	G3G4, S1S2	Sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Brodiaea filifolia	thread-leaved brodiaea	Threatened/ Endangered	G2, S2, 1B.1	Clay within vernal pools, chaparral openings, cismontane woodlands, coastal scrub, playas, valley and foothill grassland	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Buteo swainsoni	Swainson's hawk	none/ Threatened	G5, S3	Prairies, fields, open ground for foraging	Habitat on site is primarily invasive grasses in an urban setting. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Calochortus palmeri var. palmeri	Palmer's mariposa lily	none/none	G3T2, S2, 1B.2	Chaparral, lower montane coniferous forest, meadows and sleeps (mesic microhabitat)	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Carex comosa	bristly sedge	none/none	G5S2, 2B.1	Freshwater wetlands, wetland-riparian, lake-margins/edges	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Castilleja lasiorhyncha	San Bernardino Mountains owl's-clover	none/none	G2, S2, 1B.2	Chaparral, meadows and seeps, pebble (pavement) plain, Riparian woodland, upper montane coniferous forest	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Catostomus santaanae	Santa Ana Sucker	Threatened/ none		Small-medium sized streams that flow year-round and vary in depth from several cm to over 1 m deep; cool water (<22C) with gravel, rubble, and boulder substrates	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Centromadia pungens ssp. laevis	smooth tarplant	none/none	G3G4T2, S2	Chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grassland, alkaline soils	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	none/none	G5T3T5, S3S4, SSC	chaparral, grasslands, scrub forests and deserts; rarely found in cities. Requires low growing vegetation or rocky outcroppings and sandy soil for burrows.	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Charina umbratica	southern rubber boa	none/ Threatened	G2G3, S2S3	Oak-conifer and mixed-conifer forests at elevations between 5,000-8,200 ft where rocks, lots, or debris provides shelter.	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Chloropyron maritimum ssp. Maritimum	salt marsh bird's-beak	Endangered/ Endangered	G4?T1, S1, 1B.2	Salt marshes, salt flats	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Chorizanthe parryi var. parryi	Parry's spineflower	none/none	G3T2, S2, 1B.1	Chaparral, cismontane woodland, coastal scrub, valley foothill grassland	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Threatened/ Endangered	G5T2T3, S1	Riparian woodland, small trees in high density	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Coleonyx variegatus abbotti	San Diego banded gecko	none/none	G5T3T4, S1S2, SSC	Rocky areas in coastal sage and chaparral	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Crotalus ruber	red-diamond rattlesnake	none/none	G4, S3, SSC	Arid scrub, coastal chaparral, rocky desert flats	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Cuscuta obtusioflora var. glandulosa	Peruvian doddler	none/none	G5T4?, SH, 2B.2	Marshes and swamps	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Dipodomys merriami parvus	San Bernardino kangaroo rat	Endangered/ none	G5T1, S1, SSC	Alluvial fan chaparral and sage scrub with sandy loam substrates.	Habitat on site is primarily invasive grasses. Protocol survey conducted in 2016 within critical habitat yielded no trapped mammals. Potential to occur is low.
Dipodomys stephensi	Stephen's kangaroo rat	Endangered/ Threatened	G2, S2	Desert scrub with lass than 50% protective cover; soft, well-drained substrates (sandy soil)	Habitat on site is primarily invasive grasses. Protocol survey conducted in 2016 within critical habitat yielded no trapped mammals. Potential to occur is low.
Dodecahema leptoceras	slender-horned spineflower	Endangered/ Endangered	G1, S1, 1B.1	Chaparral, cismontane woodland, coastal scrub (alluvial fan)	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Empidonax traillii extimus	Southwestern Willow Flycatcher	Endangered/ Endangered	G1, S1	Riparian	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Eremophila alpestris actia	California horned lark	none/none	G5T4Q, S4, WL	Prairies, fields, open ground without trees or shrub.	Habitat on site is primarily invasive grasses. Potential to occur is medium.

Scientific Name	**Common Name**	**Federal/State Ranking**	**Other Rankings**	**Habitat**	**Potential to Occur**
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Endangered/ Endangered	G4T1, S1, 1B.1	Chaparral, coastal scrub (alluvial fan)	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Eumops perotis californicus	western mastiff bat	none/none	G5, S3S4, SSC	Found in a variety of habitats; requires significant rock features for suitable roosting habitat	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Falco columbarius	merlin	none/none	G5, S3S4, WL	Open conifer woodland, prairie groves, open country, suburban yards	Habitat on site is primarily invasive grasses within an urban setting. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Fimbristylis thermalis	hot springs fimbristylis	none/none	G4, S1S2, 2B.2	Meadows and seeps (alkaline, near hot springs)	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Galium californicum ssp. primum	Alvin Meadow bedstraw	none/none	G5T2, S2, 1B.2	Chaparral, yellow pine	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Glaucomys oregonensis californicus	San Bernardino flying squirrel	none/none	G5T1T2, S1S2, SSC	Coniferous/deciduous forest	Habitat on site is primarily invasive grasses within an urban setting. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Gila orcuttii	arroyo chub	none/none	G2, S2, SSC	Sandy and muddy bottoms of flowing pools and runs of headwater creeks and small/medium rivers	Habitat on site is primarily invasive grasses within an urban setting. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Gymnogyps californianus	California Condor	Endangered/ Endangered		Scrub chaparral to forested mountain regions up to 6,000 ft elevation; forages in open grassland	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	none/none	G5TH, SH, 1A	Wetlands, freshwater marsh, salt-marsh	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Horkelia cuneata var. puberula	mesa horkelia	none/none	G4T1, S1, 1B.1	Sandy or gravelly soils in chaparral, coastal scrub, or cismontane woodland	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Imperata brevifolia	California satintail	none/none	G4, S3, 2B.1	Chaparral, Coastal scrub, Mojavean desert scrub, meadows and seeps (often alkali), Riparian scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Lasiurus xanthinus	western yellow bat	none/none	G5, S3, SSC	Palm oases, particularly require palm skirts for roosting	Habitat on site is primarily invasive grasses within an urban setting. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Laterallus jamaicensis coturniculus	California black rail	none/ Threatened	G3G4T1, S1, FP	Salt marshes, freshwater marshes, and wet meadows	Habitat on site is primarily invasive grasses within an urban setting. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	none/none	G5T3, S3, 4.3	chaparral, coastal sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	none/none	G5T3T4, S3S4, SSC	Desert shrub, early chaparral	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	**Common Name**	**Federal/State Ranking**	**Other Rankings**	**Habitat**	**Potential to Occur**
Lycium parishii	Parish's desert-thorn	none/none	G3?, S1, 2B.3	Coastal scrub, Sonoran desert scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Malacothamnus parishii	Parish's bush-mallow	none/none	GXQ, SX, 1A	Chaparral, sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Monardella pringlei	Pringle's monardella	none/none	GX, SX, 1A	Coastal sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Nasturtium gambelii	Gambel's Watercress	Endangered/ Threatened	G1, S1, 1B.1	Wetlands	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Neotoma lepida intermedia	San Diego desert woodrat	none/none	G5T3T4, S3S4, SSC	Sage scrub, juniper scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Nyctinomops femorosaccus	pocketed free-tailed bat	none/none	G4, S3, SSC	Caves, tennels, mines, rock crevices; sometimes found in roof tiles	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Oncorhynchus mykiss irideus	steelhead- southern California DPS	Endangered/ none	G5T1Q, S1	Cold water streams with shade	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Onychomys torridus ramona	southern grasshopper mouse	none/none	G5T1T2, S1S2, SSC	Shortgrass prairies, desert	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Perognathus longimembris brevinasus	Los Angeles pocket mouse	none/none	G5T1T2, S1S2, SSC	Lower eleveation grassland, alluvial sage scrub, coastal sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Phrynosoma blainvillii	coast horned lizard	none/none	G3G4, S3S4, SSC	Open areas of sandy soil and low vegetation in valleys, foothills, and semiarid mountains	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	**Common Name**	**Federal/State Ranking**	**Other Rankings**	**Habitat**	**Potential to Occur**
Polioptila californica californica	coastal California gnatcatcher	none/none	G4G5T2Q, S2, SSC	Sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Rana muscosa	southern mountain yellow-legged frog	none/none	G1, S1, WL	Rocky streams	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Ribes divaricatum var. parishii	Parish's gooseberry	none/none	G5TX, SX, 1A	Coastal sage scrub, riparian-wetland	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
	Riversidian Alluvial Fan Sage Scrub	none/none	G1, S1.1		
Rhaphiomidas terminatus abdominalis	Delhi Sands Flower-loving Fly	Endangered/ none	G1T1, S1	Sand dunes with fine, sandy soils stabilized by sparse native vegetation	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Schoenus nigricans	black bog-rush	none/none	G4, S2, 2B.2	Marshes and swamps (often alkaline)	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Senecio aphanactis	chaparral ragwort	none/none	G3, S2, 2B.2	Foothill woodland, coastal sage scrub	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Sidalcea neomexicana	salt spring checkerbloom	none/none	G4, S2, 2B.2	Creosote bush scrub, sage scrub, chaparral, yellow pine forest, wetland-riparian	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
	Southern Cottonwood Willow Riparian Forest	none/none	G3, S3.2		
	Southern Riparian Scrub	none/none	G3, S3.2		
Spea hammondii	western spadefoot	none/none	G3, S3, SSC	Hot, dry areas with seasonal water for reproduction	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Sphenopholis obstusata	Prairie wedge grass	none/none	G5, S2, 2B.2	Prairies, marshes, dunes, disturbed areas	Habitat on site is primarily invasive grasses. Potential to occur is medium.
Streptanthus campestris	southern jewelflower	none/none	G3, S3, 1B.3	Chaparral, lower montane coniferous forest, Pinyon and juniper woodland	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Scientific Name	Common Name	Federal/State Ranking	Other Rankings	Habitat	Potential to Occur
Symphyotrichum defoliatum	San Bernardino aster	none/none	G2, S2, 1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland vernally mesic)	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Taxidea taxus	American badger	none/none	G5, S3, SSC	Prairies, grasslands, open areas	Habitat on site is primarily invasive grasses; no burrows were detected. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Thamnophis hammondii	two-striped gartersnake	none/none	G4, S3S4, SSC	Primarily aquatic	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.
Vireo bellii pusillus	least Bell's vireo	none/none	G5T2, S2	Riparian	Habitat on site is primarily invasive grasses. The small patch of native scrub was surveyed no species of concern were found. Potential to occur is low.

Appendix D – Cultural Resources Assessment

PHASE I HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY

STATE STREET EXTENSION PROJECT, PHASE I

Baseline Street to 16th Street, City of San Bernardino
San Bernardino County, California

For Submittal to:

City of San Bernardino
290 North D Street
San Bernardino, CA 92418

Prepared for:

Jericho Systems, Inc.
47 North First Street
Redlands, CA 92373-4601

Prepared by:

CRM TECH
1016 East Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

July 11, 2019
CRM TECH Contract No. 3432
City of San Bernardino Project No. SS04-009

Title: Phase I Historical/Archaeological Resources Survey: State Street Extension Project, Phase I, Baseline Street to 16th Street, City of San Bernardino, San Bernardino County, California

Author(s): Bai "Tom" Tang, Principal Investigator
Terri Jacquemain, Historian/Report Writer
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Date: July 11, 2019

For Submittal to: City of San Bernardino
290 North D Street
San Bernardino, CA 92418
(909) 384-5057

Prepared for: Shay Lawrey and Julie Gilbert
Jericho Systems, Inc.
47 North First Street
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(909) 307-5633

USGS Quadrangle: San Bernardino North and San Bernardino South, Calif., 7.5' quadrangles (within the Rancho Muscupiabe land grant; T1N R4W, San Bernardino Baseline and Meridian)

Project Size: Approximately 10.2 acres

Keywords: Site 36-006863 (CA-SBR-6863H; historic-period refuse scatter); Site 36-010315 (CA-SBR-10315H; 132kV Hoover Dam Transmission Line); Site 36-010316 (CA-SBR-10316H; Southern Sierra Power Company Control-San Bernardino Transmission Line); Site 36-015497 (CPHI-SBr-012; San Bernardino Baseline/Baseline Street); no substantial adverse change to any "historical resources" under CEQA

EXECUTIVE SUMMARY

Between January and July 2019, at the request of Jericho Systems, Inc., CRM TECH performed a cultural resources study for the State Street Extension Project, Phase I, in the City of San Bernardino, San Bernardino County, California. The subject property of the study consists mainly of the State Street right-of-way between Baseline Street and 16th Street. An additional area at the future intersection of State Street and Baseline Street, under consideration for a stormwater basin and a construction buffer, was also included in the study. The project area encompasses a total of 10.2 acres of vacant land located generally along the east side of the Lytle Creek Wash, in a portion of the Rancho Muscupiabe land grant lying within T1S R4W, San Bernardino Baseline and Meridian.

The study is a part of the environmental review process for the project, which entails the construction of four traffic lanes divided by a raised meridian along with associated improvements such as curbs, gutters, sidewalks, ADA ramps, signage, striping, and traffic signal modification. The City of San Bernardino, as the lead agency for the project, required the study pursuant to the California Environmental Quality Act (CEQA). The purpose of the study is to provide the City with the necessary information and analysis to determine whether the proposed project would cause substantial adverse changes to any "historical resources," as defined by CEQA, that may exist in the project area.

In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, contacted Native American representatives, pursued historical background research, and carried out an intensive-level field survey of the entire project area. As a result of these research procedures, four previously recorded sites of historical origin were identified as lying partially within the project area:

Site No.	Description
36-006863	Historic-period refuse scatter
36-010315	132kV Hoover Dam Transmission Line
36-010316	Southern Sierra Power Company Control-San Bernardino Transmission Line
36-015497	San Bernardino Baseline/Baseline Street

Among these, the portion of Site 36-006863 in the project area was evaluated during this study and was determined not to meet the definition of a "historical resource." The other three sites bear various existing national and/or state historical designations and therefore qualify as "historical resources," but the proposed project will not cause a substantial adverse change to their significance or integrity. No other potential "historical resources" were encountered throughout the course of this study. However, the Native American Heritage Commission identified unspecified Native American cultural resource(s) in the general vicinity of the project location that require further consultations between the City of San Bernardino and the appropriate Native American groups pursuant to Assembly Bill (AB) 52.

Based on these findings, CRM TECH recommends to the City of San Bernardino a tentative conclusion of *No Impact* on cultural resources, pending the completion of AB 52 consultations. No additional cultural resources investigation is recommended for the project unless construction plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered inadvertently during any earth-moving operations associated with the project, all work within 50 feet of the discovery should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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INTRODUCTION

Between January and July 2019, at the request of Jericho Systems, Inc., CRM TECH performed a cultural resources study for the State Street Extension Project, Phase I, in the City of San Bernardino, San Bernardino County, California (Fig. 1). The subject property of the study consists mainly of the State Street right-of-way between Baseline Street and 16th Street. An additional area at the future intersection of State Street and Baseline Street, under consideration for a stormwater basin and a construction buffer, was also included in the study. The project area encompasses a total of 10.2 acres of vacant land located generally along the east side of the Lytle Creek Wash, in a portion of the Rancho Muscupiabe land grant lying within T1S R4W, San Bernardino Baseline and Meridian (Figs. 2, 3).

The study is a part of the environmental review process for the project, which entails the construction of four traffic lanes divided by a raised meridian along with associated improvements such as curbs, gutters, sidewalks, ADA ramps, signage, striping, and traffic signal modification. The City of San Bernardino, as the lead agency for the project, required the study pursuant to 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 whether the proposed project would cause substantial adverse changes to any "historical resources," as defined by CEQA, that may exist in the project area.

In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, contacted Native American representatives, pursued historical background research, and carried out an intensive-level field survey of the entire project area. The following report is a complete account of the methods, results, and conclusion of the study. Personnel who participated in the study are named in the appropriate sections below, and their qualifications are provided in Appendix 1.

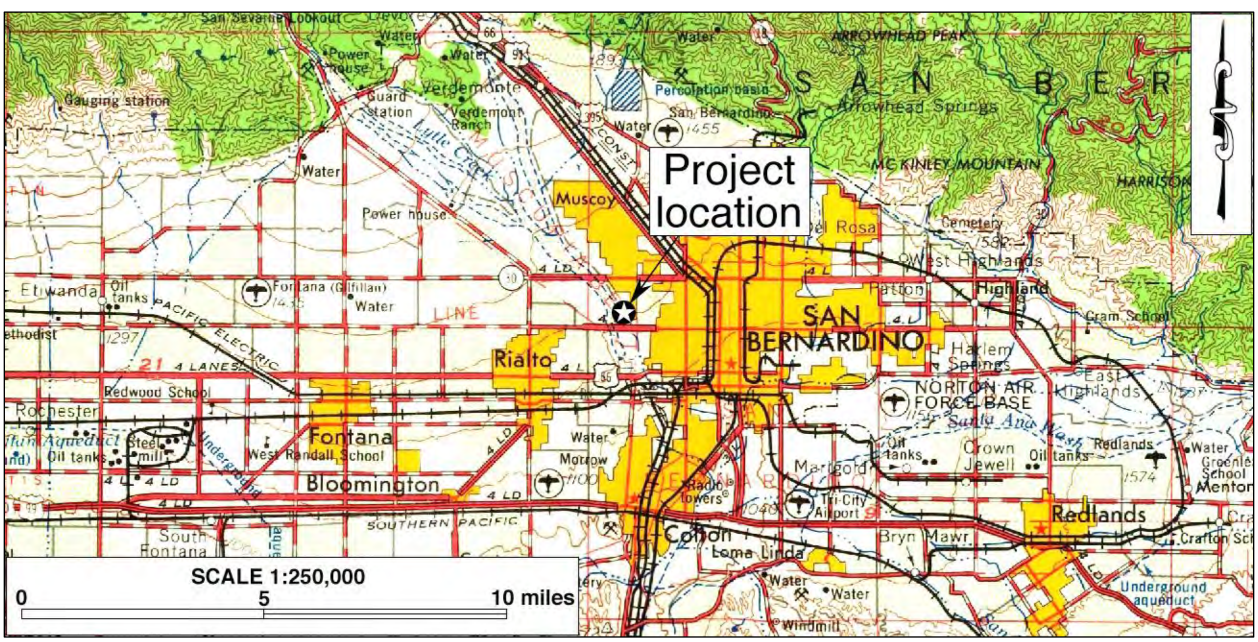


Figure 1. Project vicinity. (Based on USGS San Bernardino, Calif., 1:250,000 quadrangle [USGS 1969])

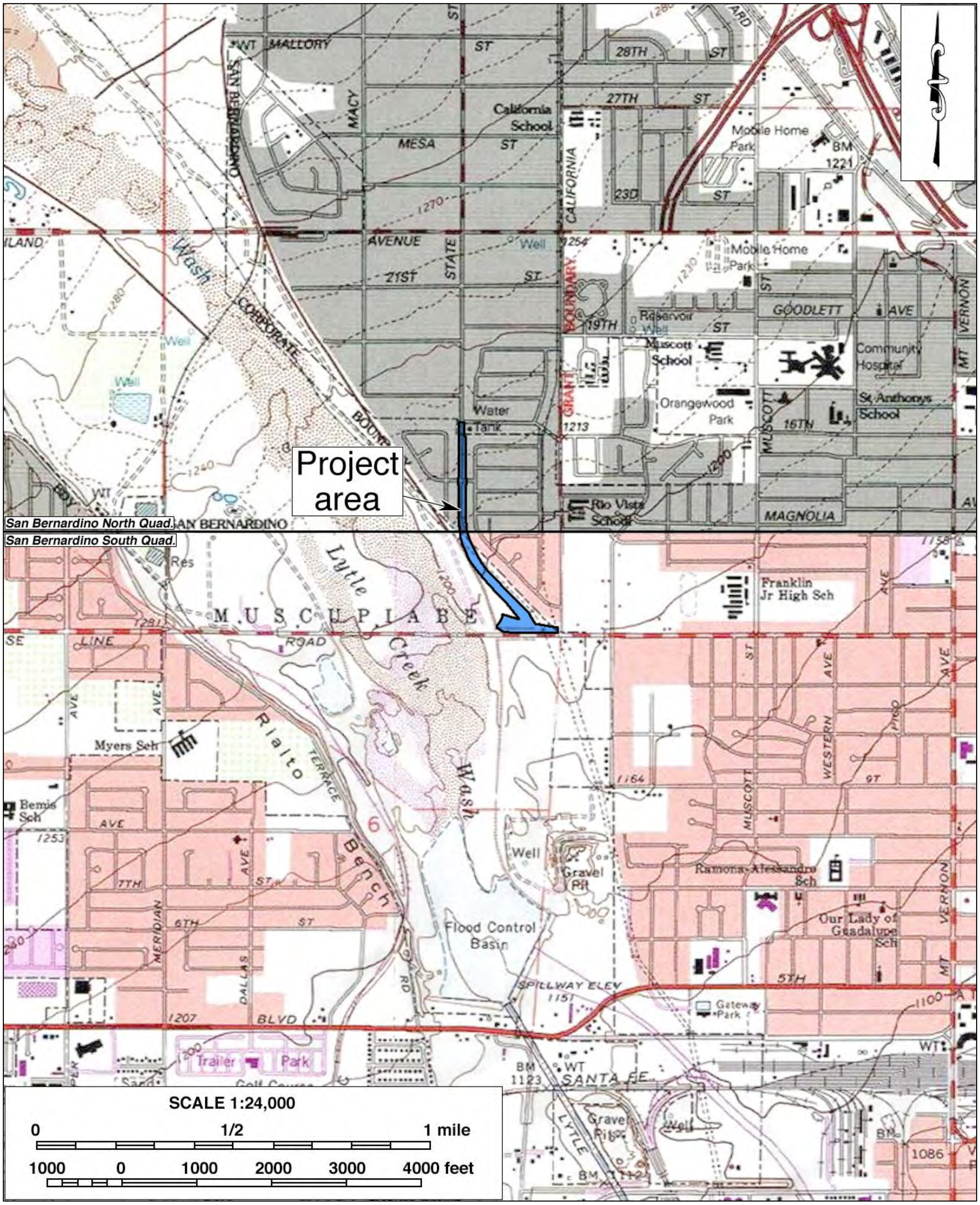


Figure 2. Project area. (Based on USGS San Bernardino North and San Bernardino South, Calif., 1:24,000 quadrangles [USGS 1980; 1996])

Figure 3. Aerial view of the project area.

SETTING

CURRENT NATURAL SETTING

The City of San Bernardino is situated in the eastern portion of the San Bernardino Valley, a broad inland valley extending from the southern base of the San Bernardino and San Gabriel Mountains on the north to the Santa Ana Mountains and the Jurupa Mountains on the south. The natural environment of the region is characterized by a temperate Mediterranean climate, with the average maximum temperature in July reaching the high 90s (Fahrenheit) and the average minimum temperature in January hovering around 30º. Rainfall is typically less than 20 inches annually, most of which occurred between November and March.

Lying on the western edge of the City of San Bernardino and near the adjacent City of Rialto, the project vicinity is largely urban in character. The northern portion of the project area traverses through a residential neighborhood and consists primarily of the existing alignment of State Street, including a closed and abandoned segment extending south from the Hanford Street intersection (Figs. 3, 4). The southern portion runs across undeveloped open land between the neighborhood on the east and the Lytle Creek Wash and a stormwater channel on the west (Figs. 3, 5).

The terrain in the project area is relatively level, with elevations ranging approximately between 1,185 feet and 1,225 feet above mean sea level, inclining gradually to the northwest. Soils in the vicinity are alluvial in nature and are composed of brown, fine- to coarse-grained sands mixed with rocks and a few small boulders, with gravel covering some areas near the wash and adjacent to Baseline Street. Vegetation in the area includes California sagebrush, foxtail, castor bean, and buckwheat. The ground surface within the project boundaries has been extensively disturbed in the past by construction activities associated with existing roads, nearby residences, and flood control features. Episodic dumping has left deposits of tires, broken concrete, and other trash, resulting in a neglected appearance.

Figure 4. Northern portion of the project area. (Photograph taken on February 20, 2019; view to the north)

Figure 5. Southern portion of the project area. (Photograph taken February 20, 2019; view to the northwest)

CULTURAL SETTING

Prehistoric 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 Cajon Pass area of San Bernardino County, 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 Empire 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 different cultural horizons vary regionally, the general framework of the prehistory 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 leave 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. In the making of 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 San Bernardino area is a part of the homeland of the Serrano people, which is centered in the San Bernardino Mountains. Together with that of the Vanyume people, linguistically a subgroup, the traditional territory of the Serrano also includes part of the San Gabriel Mountains, much of the San Bernardino Valley, 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 and cultivated 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 negligible 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 land holdings 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). The adjacent Muscupiabe land grant, which encompassed the project location, was awarded the next year to Michael C. White, a naturalized Englishman, but was abandoned a few months later (*ibid.*:35-36).

After the American annexation of Alta California in 1848, the Lugos sold the entire Rancho San Bernardino 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 (Schuiling 1984:45). 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 (*ibid.*: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. The city reincorporated in 1886 and embarked on a period of steady growth. Together with the neighboring communities in the Inland Empire region, San Bernardino was one of the leading producers in the citrus industry for much of the ensuing century.

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 well to the west of the original townsite and was a much later addition to the city's urban core. Historically dominated by agriculture, the area began to take on its present-day suburban residential character only during the post-World War II boom (see further discussion below).

RESEARCH METHODS

HISTORICAL/ARCHAEOLOGICAL RESOURCES RECORDS SEARCH

On January 24, 2019, CRM TECH archaeologist Ben Kerridge completed the records search at the South Central Coastal Information Center (SCCIC) of the California Historical Resource Information System, located on the campus of California State University, Fullerton. During the records search, Kerridge examined maps and records on file at the SCCIC for previously identified cultural resources and existing cultural resources reports within a one-mile radius of the project area. Previously identified cultural resources include properties designated as California Historical Landmarks, Points of Historical Interest, or San Bernardino County landmarks, and those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resources Inventory.

NATIVE AMERICAN PARTICIPATION

On January 21, 2019, CRM TECH submitted a written request to the Native American Heritage Commission (NAHC) for a records search in the commission's Sacred Lands File. Following the NAHC's recommendations and previously established consultation protocol, on February 1 CRM TECH further contacted a total of nine tribal representatives in the region in writing for additional information on potential Native American cultural resources in the project vicinity. A complete record of correspondence between CRM TECH and the Native American representatives is attached to this report in Appendix 2.

HISTORICAL BACKGROUND RESEARCH

Historical background research for this study was conducted by CRM TECH historian Terri Jacquemain. Sources consulted during the research included published literature in local and regional history, U.S. General Land Office (GLO) land survey plat maps dated 1873-1878, U.S. Geological Survey (USGS) topographic maps dated 1901-1996, and aerial photographs taken in 1938-2018. The historic maps are collected at the Science Library of the University of California, Riverside, and the California Desert District of the U.S. Bureau of Land Management, located in Moreno Valley. The aerial photographs are available at the Nationwide Environmental Title Research (NETR) Online website and through the Google Earth software.

FIELD SURVEY

On February 20, 2019, CRM TECH project archaeologist Salvadore Z. Boites carried out the intensive-level field survey of the project area. The linear portion of the survey was completed by walking a single transect placed along either side of the alignment, parallel to the project centerline, and spaced approximately 15 meters (approximately 50 feet) from each other. The rest of the project area was surveyed along a series of parallel north-south transects, also at 15-meter intervals. In this way, the ground surface of the entire project area was systematically and carefully examined for any evidence of human activities dating to the prehistoric or historic period (i.e., 50 years or older). Visibility of the native ground surface ranged mostly from fair to good (40-80%) except where pavement or pockets of dense vegetation growth are present.

RESULTS AND FINDINGS

PREVIOUS CULTURAL RESOURCES STUDIES IN THE VICINITY

According to SCCIC records, various portions of the project area were included in as many as 10 previous studies completed between 1978 and 2015, but the project area as a whole had not been surveyed systematically prior to this study (Fig. 6). Outside the project area but within a one-mile radius, SCCIC records show at least 37 other previous cultural resources studies on various tracts of land and linear features. Collectively, these past studies covered approximately 85% of the land within the scope of the records search and resulted in the identification of 18 historical/ archaeological sites.

Among the 18 sites, two were of prehistoric—i.e., Native American—nature. The closer of the two, 36-001457, was original found in 1939 and was later described as a large habitation site that had been partially destroyed. Still, more than 20,000 artifacts were recorded at the site in 1987, including projectile points, pottery sherds, beads, milling stones, flaked-stone tools and debitage, and shells. The location of the site is more than a half-mile to the southwest of the project area, across the Lytle Creek Wash. The other prehistoric site, 36-032705, represents the reburial location of likely prehistoric human remains nearly a mile to the northwest of the project area.

The other 16 previously identified sites dated to the historic period and included residential buildings, farm complexes, structural remains, refuse scatters, and various infrastructure features such as roads, ditches, and power transmission lines. Four of these sites were recorded as lying partially within the project boundaries, as listed below (see App. 3 for further information):

Site No.	Description
36-006863	Historic-period refuse scatter
36-010315	132kV Hoover Dam Transmission Line
36-010316	Southern Sierra Power Company Control-San Bernardino Transmission Line
36-015497	San Bernardino Baseline/Baseline Street

Among these four sites, 36-010315 and 36-010316 were previously found to be eligible for the National Register of Historic Places, and 36-015497 has been designated a California Point of Historical Interest (CPHI-SBr-012; see further discussion below). None of the other sites was located within or adjacent to the project area, and thus none of them requires further consideration during this study.

NATIVE AMERICAN INPUT

In response to CRM TECH's inquiry, the NAHC stated in a letter on January 23, 2019, that the Sacred Lands File indicated the presence of unspecified Native American cultural resource(s) in the general vicinity of the project area. For the specific location and nature of such resource(s), the NAHC referred further inquiry to tribes in the surrounding region and provided a list of potential contacts (see App. 2). Upon receiving the NAHC's reply, on February 1 CRM TECH contacted all nine tribal organizations on the referral list in writing (see App. 2). For some of the tribes, the

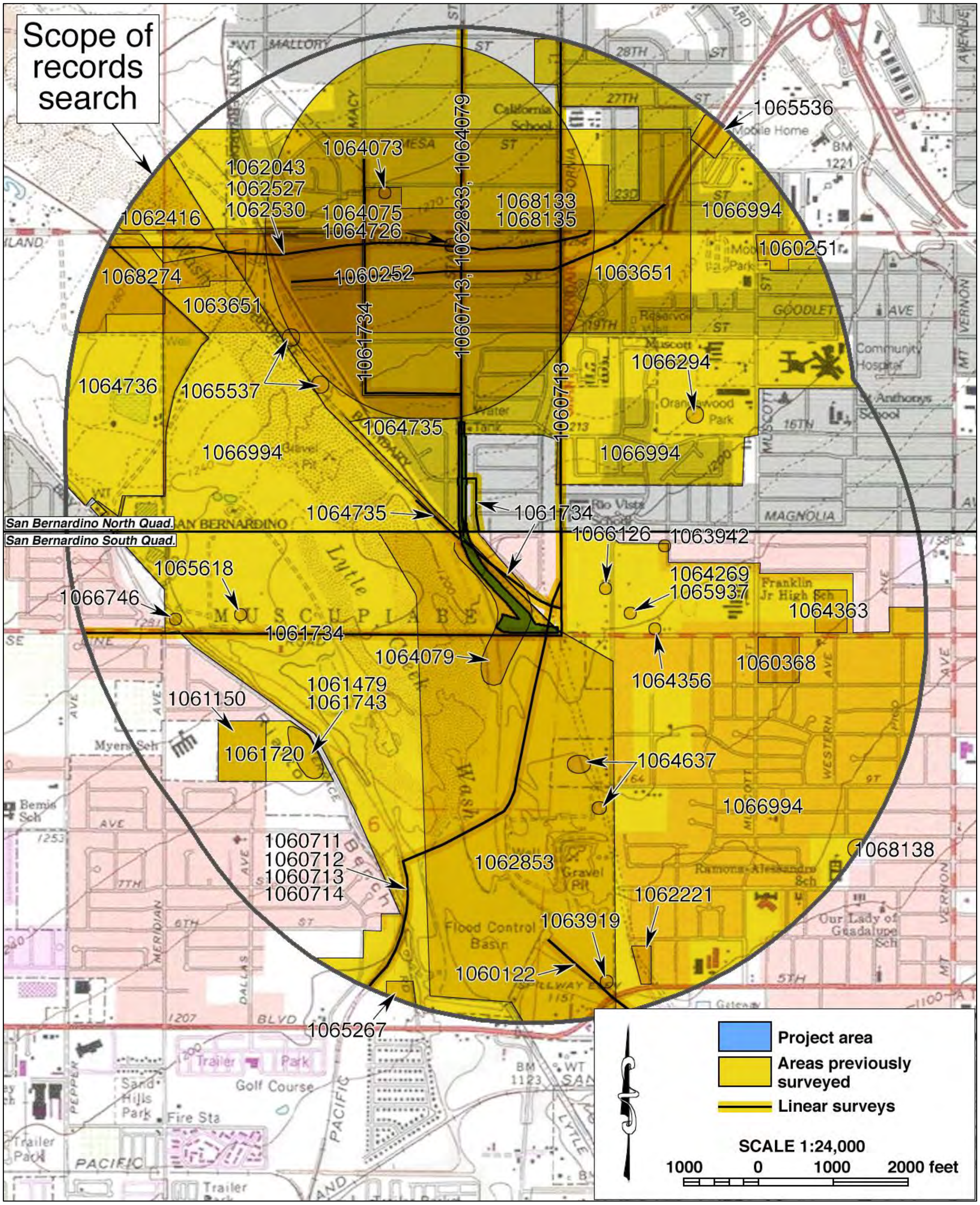


Figure 6. Previous cultural resources studies within the scope of the records search, listed by SCCIC file number. Locations of historical/archaeological sites are not shown as a protective measure.

designated spokespersons on cultural resources issues were contacted in lieu of the individuals on the referral list, as recommended in the past by the tribal government staff. The nine tribal representatives contacted during this study are listed below:

- Andrew Salas, Chairperson, Gabrieleno Band of Mission Indians-Kizh Nation;
- Sandonne Goad, Chairperson, Gabrielino Tongva Nation;
- Anthony Morales, Chairperson, Gabrieleño/Tongva San Gabriel Band of Mission Indians;
- Robert Dorame, Chairperson, Gabrielino Tongva Indians of California Tribal Council;
- Charles Alvarez, Chairperson, Gabrielino Tongva Tribe;
- Travis Armstrong, Tribal Historic Preservation Officer, Morongo Band of Mission Indians;
- Donna Yocum, Chairperson, San Fernando Band of Mission Indians;
- Jessica Mauck, Cultural Resources Analyst, San Manuel Band of Mission Indians;
- Mark Cochrane, Chairperson, Serrano Nation of Mission Indians.

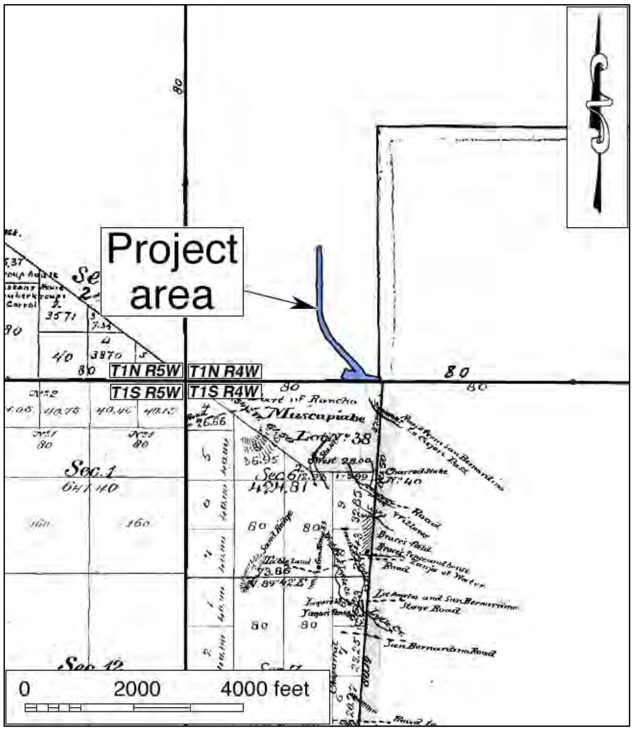
As of this time, three of the nine tribes have responded in writing (see App. 2). Jessica Mauck of the San Manuel Band asked for clarification of the project location by telephone on February 4 to help identify the NAHC finding and better assess the potential for Native American cultural resources to be encountered in or near the project area. She suspected that the finding could represent Site 36-032705, the reburial site mentioned above. Later that day, Ms. Mauck stated by e-mail that the NAHC finding could also refer to the former Serrano village of *Apuritaimbit* and/or Site 36-001457, which was known to contain highly significant materials. As both of these were located on the west side of the Lytle Creek Wash, Ms. Mauck further stated that the tribe was not aware of any Native American cultural resources on the east side of the creek, where the project area lies.

Brandy Salas, Admin Specialist of the Gabrieleno Band of Mission Indians-Kizh Nation, indicated that her tribe would like to pursue government-to-government consultation with the City of San Bernardino since ground disturbance would take place during the project. Travis Armstrong stated that the Morongo Band had no additional information to provide and would likely defer to the San Manuel Band for further consultation regarding this project.

HISTORICAL OVERVIEW

Historical sources consulted for this study show evidence of human activities in the project vicinity throughout the past 150 years, but the project area itself appears to be relatively low in sensitivity for cultural resources from the historic period. In the 1850s-1870s, a few houses, cultivated fields, and several roads were observed in the surrounding area, including a "Road from San Bernardino to Cajon Pass," which apparently ran in close proximity to the project area (Fig. 7). By the 1890s, the surrounding area demonstrated a settlement pattern that was typical for rural southern California at the time, featuring scattered buildings along crisscrossing roads (Fig. 8). None of the buildings, however, was located within or adjacent to the project boundaries (Fig. 8).

Around the turn of the century, the old road to Cajon Pass was the only man-made feature present in the project area, although the forerunner of Baseline Street was also extant partially along its present-day alignment at the southern end of the project area (Fig. 8). Crossing the northern end of the project area in a northwest-southeast direction, the old road to Cajon Pass had evidently fallen into disuse by the 1930s, after the completion of U.S. Route 66 (now Cajon Boulevard) further to the



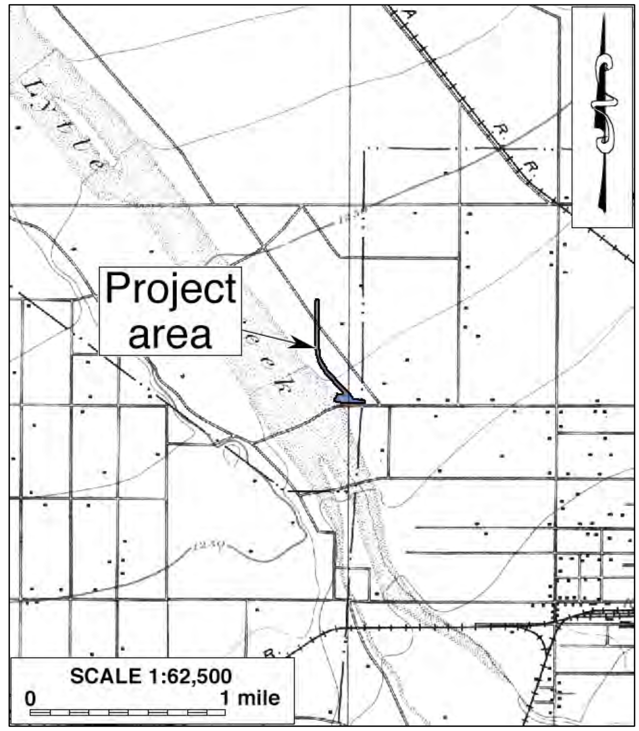


Figure 7. The project area and vicinity in 1852-1877. (Source: USGS 1873-1878)

Figure 8. The project area and vicinity in 1893-1894. (Source: USGS 1901)

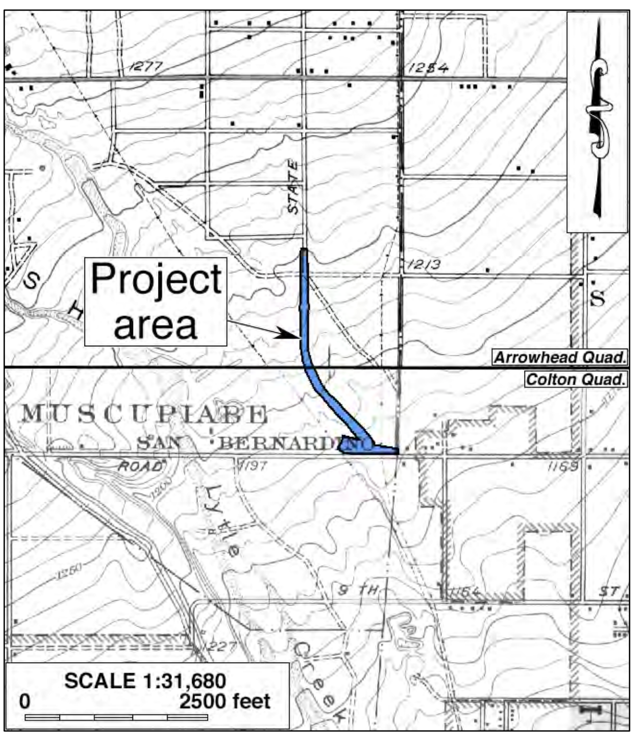


Figure 9. The project area and vicinity in 1936-1938. (Source: USGS 1941; 1943)

northeast (Fig. 9). The northernmost segment of State Street in the project area was in place by that time, and over the next ten years a levee was built along the east side of the Lytle Creek Wash, probably in response to a flooding event in March 1938 (NETR Online 1938; 1948; SBCFCD 2005). The rest of the project area, meanwhile, largely retained its natural state prior to 1948 (NETR Online 1948).

During the post-World War II boom, the landscape in the vicinity was completely transformed by the development of the residential neighborhood on both sides of the project route between the mid-1950s and the mid-1960s (Fig. 10; NETR Online 1959-1966). As a part of this development, State Street was extended further to the south, including the segment south of the Hanford Street intersection, which was later closed to the public sometime between 1968 and 1980 (NETR Online 1959-1980). The flood-control channel near the

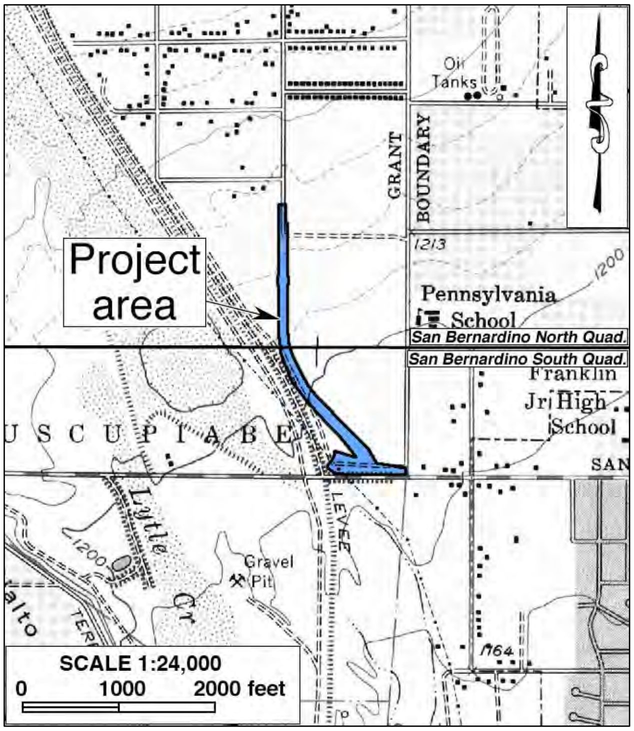


Figure 10. The project area and vicinity in 1952-1954. (Source: USGS 1954a; 1954b)

southern portion of the project area was constructed in 2004-2005, but no other notable changes in land use have been observed around the project location (NETR Online 1968-2012; Google Earth 1994-2018).

POTENTIAL HISTORICAL RESOURCES IN THE PROJECT AREA

During the field survey, all four of the previously recorded sites, 36-006863, 36-010315, 36-010316, and 36-015497, were observed at their reported locations in the project area. The two power lines, 36-010315 and 36-010316, nearly meet at the northwestern corner of Baseline Street and California Street and then split, with 36-010315 continuing northwest and crossing diagonally through the project area and 36-010316 heading north, away from the project location.

The project area was evidently a part of the Lytle Creek flood plain prior to the channelization of the creek in the 1930s-1940s, and the ground surface has been further disturbed by past development activities since the 1950s. As a result, the area is unlikely to contain any intact, potentially significant archaeological remains from the prehistoric period or the early historic period in subsurface deposits.

No remnants of the 1800s "Road from San Bernardino to Cajon Pass" or any associated artifacts were observed in the project area during the field survey. State Street is known to be partially present in the project area at least by 1938, and the rest of the road was built in the 1950s. However, the road is of standard design and construction and does not demonstrate any distinctively historical characters. As a typical component of the late-historic-period transportation infrastructure, the existing segment of State Street exhibit the potential to qualify as a "historical resource," and therefore requires no further consideration during this study.

No other buildings, structures, objects, sites, features, or artifacts more than 50 years of age were encountered within the project area. Scattered modern refuse was observed across the project area, but none of items is of any historical/archaeological interest. Based on these findings, the four previously identified sites represent the only potential "historical resources" in the project area, and each of them is discussed in further detail below.

Site 36-006863 (CA-SBR-6863H)

Site 36-006863 is a historic-period refuse scatter consisting of two loci, one of which is inside the project boundaries along the north side of Baseline Street, in the area under consideration for the stormwater basin, and the other was recorded across Baseline Street to the south (Texier et al. 1990). Spread over an approximately 175x85-meter (575x 278-foot) area, the artifact noted at the locus in the project area in 1990 included 13 hand-tooled bottles, 250+ fragments of sun-colored amethyst glass, 100+ aqua glass fragments, 50+ whiteware sherds, 25+ stoneware sherds, and an assortment of other types of glass (*ibid*.). Some of the artifacts bore embossing such as "P.C.G.W.," "Bludwine Bottli…," "Soda Works," "Whittmore," "Boston," or maker's marks such as "Grindley H…" and "ENG…" Two license plates and a shell button were also found (*ibid*.).

Beyond noting the deposit as being "historic" in age, however, no date range was assigned to Site 36-006863 (Texier et al. 1990). During the field survey, glass shards and a few other items consistent with the previously noted contents of 36-006863 were observed at and near the site location described in 1990, but only about 10 items, including cobalt glass and white ceramic fragment (Fig. 11), were found over an approximately 25x15-foot area, significantly lower in artifact count and a much smaller in surface area than recorded for this locus some 29 years ago.

Figure 11. Typical historic-period artifacts found at Site 36-006863. *Left*: cobalt glass fragment; *right*: ceramic sherd.

Site 36-010315 (CA-SBR-10315H)

Site 36-010315 represents the 132kV Hoover Dam Transmission Line, which was built in 1930-1931 between the Boulder (now Hoover) Dam and San Bernardino. Initially employed to carry electric power to the dam construction site, the transmission flow was reversed once the dam and the associated hydro power plant were completed (Williams 2015:2). The entire line was recorded in 1989 and was subsequently found eligible for listing National Register of Historic Places in 1993 (Brock 1989; Becker 2014:2). A segment of the transmission line across the California-Nevada state line was recorded into the Historic American Engineering Record in 2010 (HAER No. NV-45), and a site record update detailing its physical components was compiled in 2015, describing the line as being "constructed on lattice steel towers" (Williams 2015:2).

The portion of Site 36-010315 in the project area belongs to the Arrowhead-Calelectric-Devil Canyon-Shadin segment of the 225-mile-long transmission line. It crosses the project area near the southeastern end, where the construction buffer was delineated to the northwestern corner of Baseline Street and California Street, and again roughly 800 feet south of the intersection of State Street and

Hanford Street. Features of the site observed in and near the project area include a single concrete pole and a series of wooden poles (Fig. 5). The age of these poles is unknown, but they are evidently modern replacements for the multi-legged lattice steel towers that once carried the powerline (Williams 2015:2).

Site 36-010316 (CA-SBR-10316H)

Site 36-010316 represents the Southern Sierra Power Company's Control-San Bernardino Transmission Line, also known as the Tower Line, which was originally built in 1911-1913 between Bishop and San Bernardino (Taniguchi 2007:3; Austerman and Harper 2008:1). The entire 238-mile-long transmission line has been found eligible for listing National Register of Historic Places (Honey 2013). In 2008, however, it was reported that sometime after 2005 the original towers along a 22-mile stretch, including the portion in the project area, had been replaced with modern steel lattice towers (Sheets and Linder 2004; Ahmet 2008; Honey 2013:1).

As mentioned above, the recorded alignment of Site 36-010316 also crosses the southeastern end of the project area, at the northwestern corner of Baseline Street and California Street. During the field survey, no steel towers associated with this transmission line were observed within the project boundaries. The only components of the site identified in the project area was a single concrete pole of unknown age but completely modern appearance.

Site 36-015497 (CPHI-SBr-012)

Site 36-015497, the San Bernardino Baseline, has been part of the basis for all land surveys and titles in southern California since it was established by U.S. Deputy Surveyor Henry Washington in 1853. The San Bernardino Baseline and Meridian extend east-west and north-south, respectively, from the summit of Mount San Bernardino, where a monument was erected (Haenszel 1979:31). Because of its far-reaching influence in regional history, the San Bernardino Baseline has been officially designated a California Point of Historical Interest (OHP 1973).

The physical embodiment of the San Bernardino Baseline in the project vicinity is Baseline Street, which lies along the southern project boundary. Beyond the San Bernardino city limits, Baseline Street extends across many other communities in the Inland Empire as Baseline Road, Baseline Avenue, or simply Base Line. The road also traces its roots to the early 1850s, when the Mormon settlers forged a new road roughly along the San Bernardino Baseline from present-day Highland to Claremont as part of a more direct route between San Bernardino and Los Angeles (Haenszel 1979:31).

The precise route of the 1850s road, however, did not follow the San Bernardino Baseline exactly, as seen in the early historic maps (Figs. 7, 8). The fully straighten current alignment of Baseline Street near the project location dates to sometime between the 1890s and the 1930s (Figs. 8, 9). Today, Baseline Street continues to serve as a major east-west thoroughfare across the City of San Bernardino. At the project location, it is a four-lane road of modern appearance, resulting from repeated upgrading and constant maintenance over the years, and demonstrates no distinctively historical characters.

MANAGEMENT CONSIDERATIONS

APPLICABLE STATUTORY/REGULATORY FRAMEWORK

The purpose of this study is to identify any cultural resources within or adjacent to the project area, and to assist the City of San Bernardino in determining whether such resources meet the official definition of "historical resources," as provided in the California Public Resources Code, in particular CEQA. 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)). Regarding the proper criteria for the evaluation of historical significance, CEQA guidelines mandate 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))

DISCUSSION

In summary of the research results presented above, four previously recorded sites of historical origin were identified as lying partially within the project boundaries. The significant of these four sites under CEQA provisions and the potential for the proposed project to affect their significance and integrity are discussed in the sections below.

Site 36-006863 (CA-SBR-6863H)

As noted above, one of the two loci comprising Site 36-006863 was recorded in the current project area. During this study, glass shards and a few other historic-period refuse items consistent with the previously recorded contents of the site were noted at that location. Surficial deposits of refuse like 36-006863, virtually ubiquitous in settled or frequently travelled areas, constitute the most common type of cultural remains from the historic period. This site, on land where episodic trash dumping appears to have been ongoing over time, bears no identifiable association with any person or event of recognized historic significance, nor does it demonstrate any potential for important archaeological data. Therefore, Site 36-006863 does not meet the criteria for listing in the California Register of Historical Resources and does not qualify as a "historical resource."

Sites 36-010315 (CA-SBR-10315H) and 36-010316 (CA-SBR-10316H)

Sites 36-010315 and 36-010316 both represent major regional power transmission lines built in the early 20th century, and both were previously determined to be eligible for listing in the National Register of Historic Places. As such, they are automatically eligible for the California Register of Historical Resources, according to guidelines set forth by the Office of Historic Preservation, and thus meet the definition of "historical resources."

Nevertheless, the research results from this study further establish that all physical components of the two sites in the project area, primarily the concrete and wooden poles, are clearly modern replacements that are entirely different from the original steel towers in design, materials, workmanship, and feeling. These components do not contribute materially to the overall significance and integrity of the sites.

Any impact that the proposed project may have on the features of the sites within the project boundaries, including either direct, physical impact or indirect, visual impact, would not compromise the qualities and characteristics from which the sites obtain their eligibility to the National Register or the California Register, nor would it further diminish the historic integrity of the sites. Therefore, the project as currently proposed has no potential to cause substantial adverse changes in the significance of these "historical resources."

Site 36-015497 (CPHI-SBr-012)

The San Bernardino Baseline, embodied by Baseline Street in the project vicinity, is an officially designated California Point of Historical Interest. As such, it meets the definition of a "historical resource" under CEQA provisions. The historic value of the site, however, is symbolic in nature. It is derived primarily from the conceptual line across the landscape instead of the existing roadway, a major local thoroughfare of entirely modern character that does not contribute to the historic value. Since Site 36-015497 exists in the project area largely on paper, CRM TECH concludes that the proposed project has no potential to affect the significance or integrity of this "historical resource."

CONCLUSION AND RECOMMENDATIONS

CEQA establishes that a project that may cause a substantial adverse change in the significance of a "historical resource" or a "tribal cultural resource" is a project that may have a significant effect on the environment (PRC §21084.1-2). "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."

In summary, as a result of this study, four previously recorded sites were identified as lying partially within the project boundaries, including a historic-period refuse scatter, two early power transmission lines, and the San Bernardino Baseline. Among these, the portion of Site 36-006863 in the project area was evaluated during this study and was determined not to constitute a "historical resource" under CEQA provisions. The other three sites, 36-010315, 36-010316, and 36-015497, bear various existing national and/or state historical designations and therefore qualify as "historical resources," but the proposed project will not cause a substantial adverse change to their significance or integrity.

No other potential "historical resources" were encountered throughout the course of this study. However, the Native American Heritage Commission identified unspecified Native American cultural resource(s) in the general vicinity of the project location that require further consultations between the City of San Bernardino and the appropriate Native American groups pursuant to Assembly Bill (AB) 52. Based on these findings, CRM TECH presents the following recommendations to the City of San Bernardino:

- The proposed project will not cause a substantial adverse change to any known "historical resources."
- A tentative conclusion of *No Impact* on cultural resources appears to be appropriate for this project, pending the completion of AB 52 consultations to ensure the proper identification of potential "tribal cultural resources."
- No additional 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 any buried cultural materials are encountered during earth-moving operations associated with the project, all work within 50 feet of the discovery should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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APPENDIX 1:
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR/HISTORIAN
Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, UC 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, UC Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, UC Riverside.
1988-1993	Research Assistant, American Social History, UC 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*

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.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
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	Archaeological Technician, Field Director, and Project Director 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

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

Memberships

* Register of Professional Archaeologists; Society for American Archaeology; Society for California Archaeology; Pacific Coast Archaeological Society; Coachella Valley Archaeological Society.

PROJECT HISTORIAN/REPORT WRITER
Terri Jacquemain, M.A.

Education

2004 M.A., Public History and Historic Resource Management, University of California, Riverside.
- M.A. thesis: Managing Cultural Outreach, Public Affairs and Tribal Policies of the Cabazon Band of Mission Indians, Indio, California; internship served as interim Public Information Officer, Cabazon Band of Mission Indians, June-October, 2002.

2002 B.S., Anthropology, University of California, Riverside.
2001 Archaeological Field School, University of California, Riverside.
1991 A.A., Riverside Community College, Norco Campus.

Professional Experience

2003- Historian/Architectural Historian/Report Writer, CRM TECH, Riverside/Colton, California.
- Author/co-author of legally defensible cultural resources reports for CEQA and NHPA Section 106;
- Historic context development, historical/archival research, oral historical interviews, consultation with local communities and historical organizations;
- Historic building surveys and recordation, research in architectural history; architectural description

2002-2003 Teaching Assistant, Religious Studies Department, University of California, Riverside.
2002 Interim Public Information Officer, Cabazon Band of Mission Indians.
2000 Administrative Assistant, Native American Student Programs, University of California, Riverside.
1997-2000 Reporter, *Inland Valley Daily Bulletin*, Ontario, California.
1991-1997 Reporter, *The Press-Enterprise*, Riverside, California.

Membership

California Preservation Foundation.

PROJECT ARCHAEOLOGIST
Ben Kerridge, M.A.

Education

2014	Archaeological Field School, Institute for Field Research, Kephallenia, Greece.
2010	M.A., Anthropology, California State University, Fullerton.
2009	Project Management Training, Project Management Institute/CH2M HILL.
2004	B.A., Anthropology, California State University, Fullerton.

Professional Experience

2015- Project Archaeologist/Report Writer, CRM TECH, Colton, California.

2009-2014 Publications Delivery Manager, CH2M HILL, Santa Ana, California.

- Led teams of editors, document processors, and graphic designers in production of technical documents in support of construction, remediation, and mitigation/monitoring projects of varying sizes around the world.
- Provided field and research support to cultural resources management teams on various projects.

2010- Naturalist, Newport Bay Conservancy, Newport Beach, California.

2009-2010 Senior Commentator, GameReplays.org

2006-2009 Technical Publishing Specialist, CH2M HILL, Santa Ana, California.

2002-2007 Host and Head Writer, *The Rational Voice* Radio Program, Titan Radio, California State University, Fullerton.

2002-2006 English Composition/College Preparation Tutor, Various Locations, California.

PROJECT ARCHAEOLOGIST
Salvadore Z. Boites, M.A.

Education

2013	M.A., Applied Anthropology, California State University, Long Beach.
2003	B.A., Anthropology/Sociology, University of California, Riverside.

Professional Experience

2003-	Project Archaeologist, CRM TECH, Riverside/Colton, California.
2010-2011	Adjunct Instructor, Anthropology etc., Everest College, Anaheim, California.
2001-2002	Teaching Assistant, Moreno Elementary School, Moreno Valley, California.
1999-2003	Research Assistant, Anthropology Department, University of California, Riverside.

APPENDIX 2

CORRESPONDENCE WITH NATIVE AMERICAN REPRESENTATIVES*

* A total of nine local Native American representatives were contacted; a sample letter is included in this report.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916)373-3710
(916)373-5471 (Fax)
nahc@nahc.ca.gov

Project: State Street Extension from Baseline Street to 16th Street (CRM TECH No. 3432)

County: San Bernardino

USGS Quadrangle Name: San Bernardino North and San Bernardino South, Calif.

Township 1 North **Range** 4 West SB **BM; Section(s)** N/A (Muscupiabe land grant)

Company/Firm/Agency: CRM TECH

Contact Person: Nina Gallardo

Street Address: 1016 E. Cooley Drive, Suite A/B

City: Colton, CA **Zip:** 92324

Phone: (909) 824-6400 **Fax:** (909) 824-6405

Email: ngallardo@crmtech.us

Project Description: The primary component of the project is to extend State Street from 16th Street to Baseline Street (approximately 3080 linear feet of a new four-lane alignment) in the City of San Bernardino, San Bernardino County, California.

January 21, 2019

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

January 23, 2019

Nina Gallardo
CRM Tech

VIA Email to: ngallardo@crmtech.us

RE: Street Extension from Baseline Street to 16th Street 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 tribes 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 the NAHC. 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: steven.quinn@nahc.ca.gov.

Sincerely,

Steven Quinn

Steven Quinn
Associate Governmental Program Analyst

Attachment

Native American Heritage Commission
Native American Contact List
San Bernardino County
1/23/2019

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Chairperson
P.O. Box 490 — Gabrielino
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com

Gabrielino-Tongva Tribe
Charles Alvarez,
23454 Vanowen Street — Gabrielino
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Rroad — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Rroad — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

San Fernando Band of Mission Indians
Donna Yocum, Chairperson
P.O. Box 221838 — Kitanemuk
Newhall, CA, 91322 — Serrano
Phone: (503) 539 - 0933 — Tataviam
Fax: (503) 574-3308
ddyocum@comcast.net

San Manuel Band of Mission Indians
Lynn Valbuena, Chairwoman
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
jcoin@sanmanuel-nsn.gov

San Manuel Band of Mission Indians
Lee Clauss, Director of Cultural Resources
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Fax: (909) 864-3370
lclauss@sanmanuel-nsn.gov

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 Street Extension from Baseline Street to 16th Street Project, San Bernardino County.

Native American Heritage Commission
Native American Contact List
San Bernardino County
1/23/2019

Serrano Nation of Mission Indians
Goldie Walker, Chairperson
P.O. Box 343
Patton, CA, 92369
Phone: (909) 528 - 9027

Serrano

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 Street Extension from Baseline Street to 16th Street Project, San Bernardino County.

February 1, 2019

Anthony Morales, Chairperson
Gabrieleño/Tongva San Gabriel Band of Mission Indians
P. O. Box 693
San Gabriel, CA 91778

RE: State Street Extension from Baseline Street to 16th Street
3,080 Linear Feet of Street Alignment in the City of San Bernardino
San Bernardino County, California
CRM TECH Contract #3432

Dear Mr. Morales:

I am writing to bring your attention to an ongoing CEQA-compliance study for the proposed project referenced above. The project entails the extension of State Street from 16th Street to Baseline Street (approximately 3,080 linear feet of a new four-lane alignment) in the City of San Bernardino. The accompanying map, based on the USGS San Bernardino North and San Bernardino South, Calif., 7.5' quadrangles, depicts the location of the project area within the Muscupiabe land grant, T1N R4W, SBBM.

According to records on file at the South Central Coastal Information Center (SCCIC), there are four known historical/archaeological sites within or directly adjacent to the boundaries of the proposed project. The previously recorded sites dated to the historic period and included two power transmission alignments, Baseline Road, and a historic-period refuse scatter.

In a letter dated January 23, 2019, the Native American Heritage Commission reports that the sacred lands record search identified unspecified Native American cultural resource(s) in the project vicinity and recommends that local Native American groups be contacted for further information (see attached). Therefore, as part of the cultural resources study for this project, I am writing to request your input on potential Native American cultural resources in or near the project area.

Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value in or near the project area, or any other information to consider during the cultural resources investigations. Any information or concerns may be forwarded to CRM TECH by telephone, e-mail, facsimile, or standard mail. Requests for documentation or information we cannot provide will be forwarded to our client and/or the lead agency, namely the City of San Bernardino.

We would also like to clarify that, as the cultural resources consultant for the project, CRM TECH is not involved in the AB 52-compliance process or in government-to-government consultations. The purpose of this letter is to seek any information that you may have to help us determine if there are cultural resources in or near the project area that we should be aware of and to help us assess the sensitivity of the project area. Thank you for your time and effort in addressing this important matter.

Respectfully,

Nina Gallardo
Project Archaeologist/Native American liaison
CRM TECH
Email: ngallardo@crmtech.us
Encl.: NAHC response letter and project location map

From: Tribal Historic Preservation Office <thpo@morongo-nsn.gov>
Sent: Monday, February 4, 2019 11:56 AM
To: ngallardo@crmtech.us
Subject: Baseline Street to 16th Street Project

Hello,

Thank you for your letter regarding the project. We have no additional information to provide at this time and will likely defer to San Manuel once formal government-to-government consultation is initiated by the lead agency for this project.

Thank you for reaching out to our office.

Sincerely,

Travis Armstrong
Tribal Historic Preservation Officer
Morongo Band of Mission Indians
951-755-5259
Email: thpo@morongo-nsn.gov

From: Administration Gabrieleno <admin@gabrielenoindians.org>
Sent: Monday, February 4, 2019 12:25 PM
To: Nina Gallardo <ngallardo@crmtech.us>
Subject: Re: NA Scoping Letter for the Proposed Phase 1 of State Street Extension from Baseline Street to 16th Street, in the City of San Bernardino, San Bernardino County (CRM TECH #3432)

Hello Nina

Thank you for your letter dated February 1, 2019. If there will be any ground disturbance taking place regarding the above project our Tribal government would like to consult with your lead agency.

Thank you

Sincerely,

Brandy Salas
Admin Specialist
Gabrieleno Band of Mission Indians - Kizh Nation
PO Box 393
Covina, CA 91723
Office: 844-390-0787
website: www.gabrielenoindians.org

From: Jessica Mauck <JMauck@sanmanuel-nsn.gov>
Sent: Monday, February 4, 2019 3:28 PM
To: ngallardo@crmtech.us
Subject: RE: NA Scoping Letter for the Proposed Phase 1 of the State Street Extension from Baseline Street to 16th Street, in the City of San Bernardino, San Bernardino County (CRM TECH #3432)

Hi Nina,

Thank you for speaking with me over the phone regarding the positive SLF result from the NAHC. Sometimes this kind of conversation can be sensitive enough to SMBMI that we simply do not write out, but considering that CRM Tech has the site record that was created for the SLF, this information will appear in the report and so can be discussed in writing. That being said, I did provide additional information over the phone regarding the nature of the find, as well as the history of the project area within which the SLF resides, simply to give you an understanding regarding the sensitivity – however, that information is not relevant for the current project and so I will not provide it in writing for use in the report. However, our conversation did lead to some interesting discoveries within our department, and so there is some information I was unable to relay over the phone.

We believe the SLF finding is likely associated with the Serrano village of *Apuritaimbit*. We currently have the location for this site to the northwest of the project area. Per Tribe's data, this village was located on the west side of Lytle Creek and the space in between this location and the village of *Junubabit* (215/10 junction) to the south was used for travel between villages. However, we have been unable to spend much time figuring out (outside of some CEQA projects) where exactly *Apuritaimbit* is. This project gave me a chance to glance at the data, and while there are some habitation sites just north of the 210 (and the reason we believe the SLF to be associated with the village), there is also a large archaeological site to the south known as the Rialto Bench Site (CA-SBR-1457) that is extremely complex with highly significant material (collections are, as far as we know, sitting with the SB County museum). As Serrano villages were very large – once described by Bean et al. as almost 4000 acres (85: 1981) – we think that this site is actually evidence of the village as well. We also think it is notable that the history of this area describes a village to the west of Lytle Creek, and all pre-contact archaeological signatures that we have on record for the space around these sites and the SLF are all on the west side – we do not see pre-contact archaeological sites on the east side of the Creek until you reach the area around Junubabit. This is significant for this project in particular as it resides on the east side of the Creek, and this information will help assist SMBMI during consultation.

I hope you find the above information useful, and I thank you again for taking the time for a quick phone call this afternoon. I will do my best to track down more information in preparation for consultation, but please let me know if you have any questions in the meantime.

Thank you,

Jessica Mauck
Cultural Resources Analyst
O: (909) 864-8933 x3249, M: (909) 725-9054
26569 Community Center Drive, Highland California 92346

APPENDIX 3

CULTURAL RESOURCES WITHIN THE PROJECT AREA

P36-006863

1074

ARCHAEOLOGICAL SITE RECORD

PAGE: 1 OF 5 PERMANENT TRINOMIAL: CA-SBR-6863H
DATE OF ORIGINAL RECORD: N/A TEMPORARY NUMBER: SBS-C #6
DATE OF THIS FORM: 12/13/90 AGENCY DESIGNATION:
1. COUNTY: San Bernardino
2. USGS QUAD: San Bern. So. 7.5' 1967 REVISED: 1980
3. UTM COORDINATES: ZONE 11 469340 m Easting; 3775500 m Northing(X)
4. TOWNSHIP 1S/1N RANGE 4W, not sectioned
BASE MER. SBM
5. MAP COORDINATES: 15 mm S 164 mm E
6. ELEVATION: 1180 ft.

7. LOCATION: From Interstate 215 proceed west on Baseline Road for approximately 1.6 miles to California Street. Site is located approximately 130 meters west of California Street extending from north to south across Baseline Road.

8. PREHISTORIC HISTORIC X PROTOHISTORIC

9. SITE DESCRIPTION: Site consists of two distinct deposits of historical trash located on either side of Baseline Road on the upper terrace of Lytle Creek Wash. Locus A is a moderately dense deposit consisting of glass, ceramics and metal within a well defined area. (X)

10. AREA: 175 m (length) x 85 m (width); 11,683 m^2
Method: Pace

11. DEPTH: unknown METHOD: N/A

12. FEATURES: None.

13. ARTIFACTS: Locus A: 13 hand tooled bottles (5 crown cap), 10 automatic or semi-automatic bottles. 250+ fragments of sun-colored amethyst glass including hand tooled necks, jars, screw top jars, pressed glass, and tumbler fragments. One bottle base marked (X)

14. NON-ARTIFACTUAL CONSTITUENTS: Three pieces of shell and several fragments of bone noted at Locus A.

15. DATE OF ORIGINAL RECORD: N/A DATE OF THIS FORM: 12/13/90

16. RECORDED BY: Bruno Texier, June Schmidt, Jeanne Binning, and Robin Siebach.

17. AFFILIATION: Greenwood and Associates, 725 Jacon Way,
Pacific Palisades, CA 90272
(213) 454-3091

P36-006863

ARCHAEOLOGICAL SITE RECORD

 PERMANENT TRINOMIAL: SBR-6863H
DATE OF ORIGINAL RECORD: N/A TEMPORARY NUMBER: SBS-C #6
DATE OF THIS FORM: 12/13/90 AGENCY DESIGNATION:

18. **HUMAN REMAINS:** None observed.

19. **SITE INTEGRITY:** Locus A has been disked and many artifacts broken. Locus B has suffered numerous recent dumping episodes and some erosional damage.

20. **NEAREST WATER:** Lytle Creek Wash, approximately 100 meters west.

21. **VEGETATION COMMUNITY (SITE VICINITY):** Sagebrush scrub.

22. **VEGETATION COMMUNITY (ON SITE):** Same.

REFERENCES FOR ABOVE: N/A

23. **SITE SOIL:** Fine to coarse brown sand.

24. **SURROUNDING SOIL:** Same as 23

25. **GEOLOGY:** Granite cobbles and gravels.

26. **LANDFORM:** Alluvial terrace.

27. **SLOPE:** 0 28. **EXPOSURE:** Open

29. **LANDOWNERS(S), (TENANTS), ADDRESS:** Unknown.

30. **REMARKS:**

32. **REFERENCES:**-

33. **NAME OF PROJECT:** Metropolitan Water District Inland Feeder Project Cultural Resource Investigation.

34. **TYPE OF INVESTIGATION:** Preliminary surface reconnaissance

35. **SITE ACCESSION NO.:** **CURATED AT:**

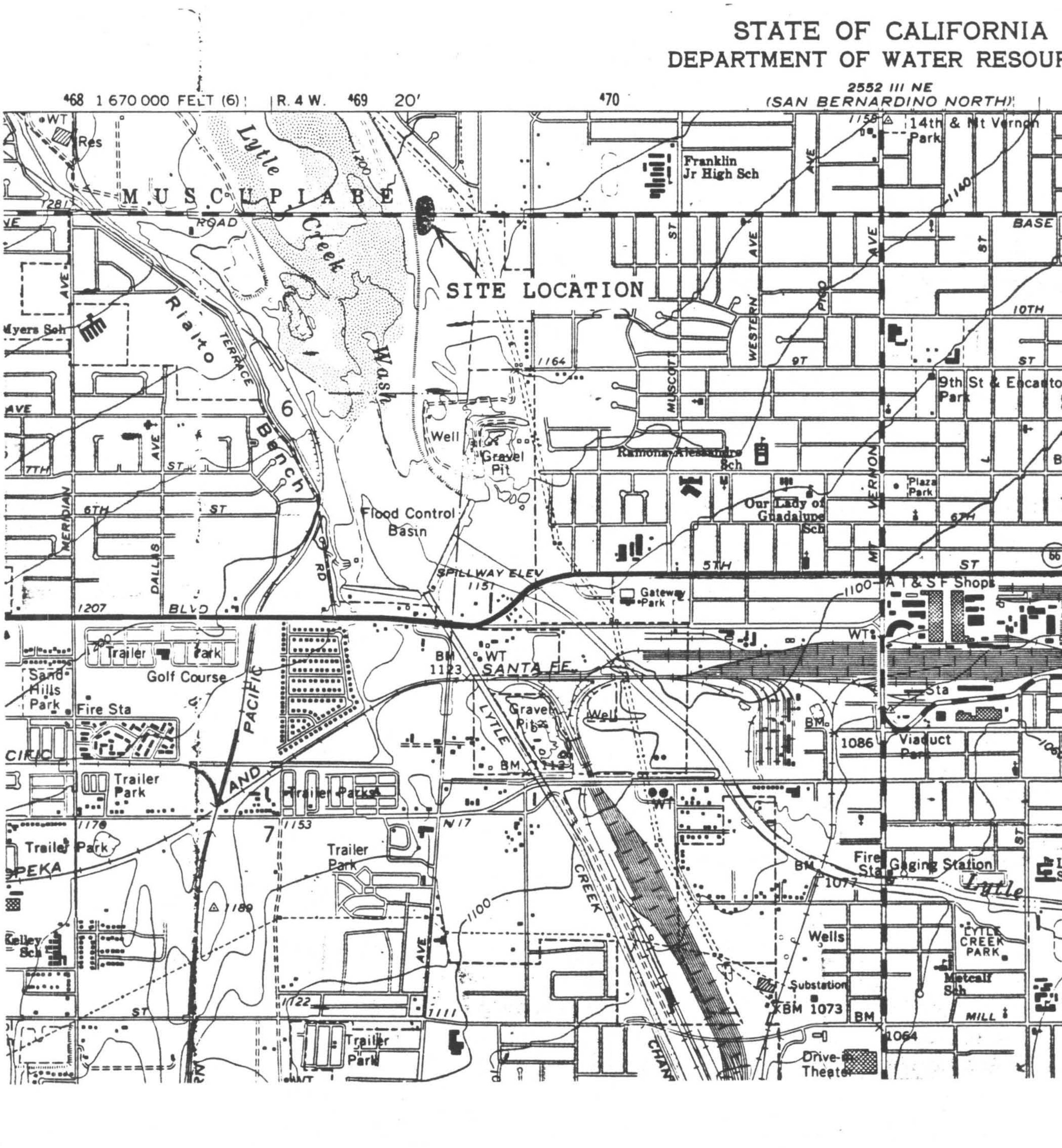
36. **PHOTOS:** Overviews, B & W prints. **TAKEN BY:** Bruno Texier

37. **PHOTO ACCESSION NO.** N/A **ON FILE AT:** Greenwood and Associates

P36-006863

ARCHAEOLOGICAL SITE LOCATION MAP

PAGE: 3 OF 5
PERMANENT TRINOMIAL: SBR-6863H
DATE OF ORIGINAL RECORD:
TEMPORARY NUMBER: SBS-C #6
DATE OF THIS FORM: 12/13/90
AGENCY DESIGNATION:
U.S.G.S. 7.5' QUADRANGLE: San Bernardino South



P36-006863

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

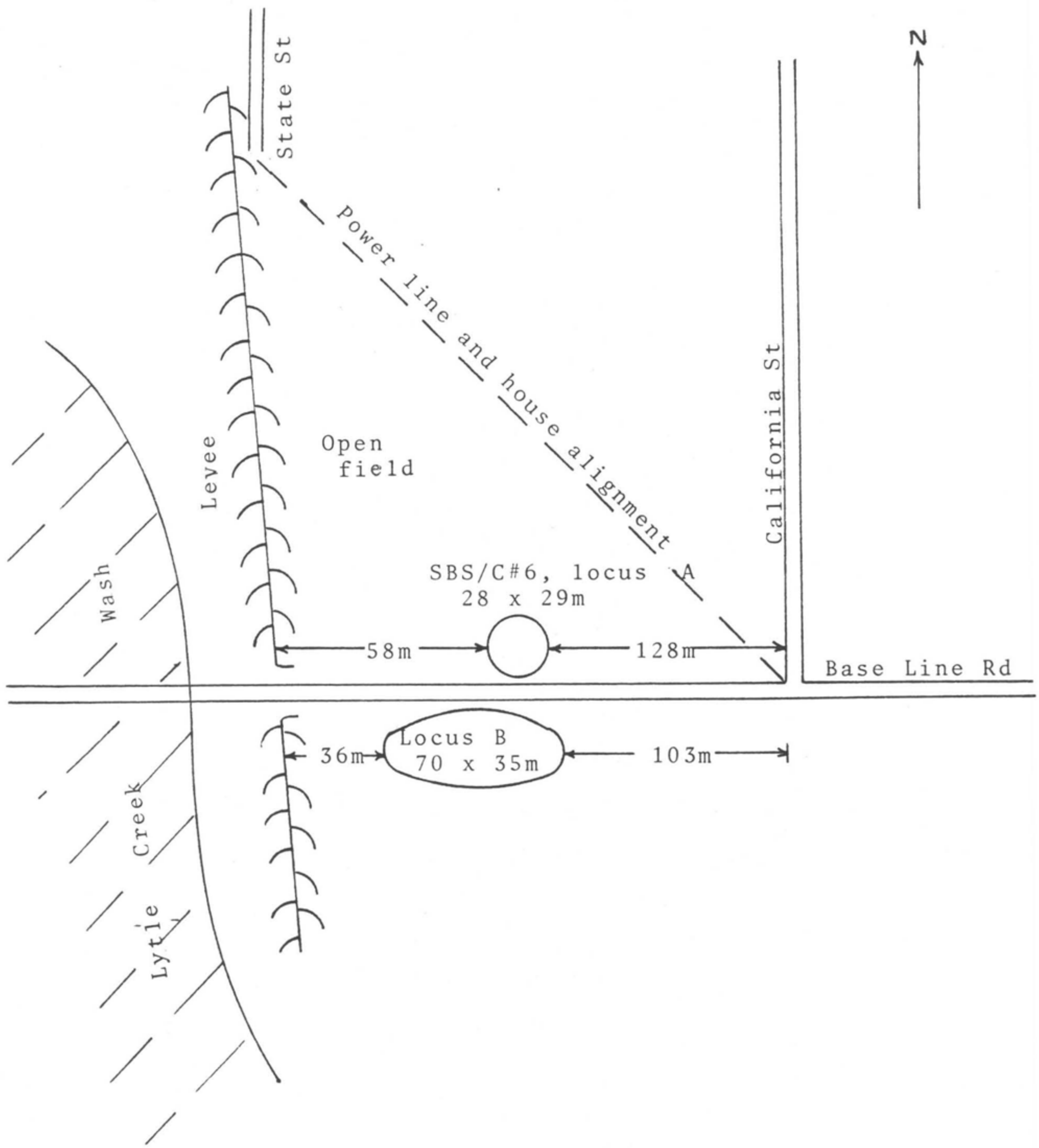
ARCHEOLOGICAL SITE MAP

Page 4 of 5 .

Permanent Trinomial: SBR-6863H / 12 90
mo. yr.

Temporary Number: SBS/C#6

Agency Designation:



Not to scale

DPR 422F (Rev. 8/82)

P36-006863

ARCHAEOLOGICAL SITE RECORD - CONTINUATION

PAGE: 5 OF 5 **PERMANENT TRINOMIAL:** SBR-6863H
DATE OF ORIGINAL RECORD: **TEMPORARY NUMBER:** SBS-C #6
DATE OF THIS FORM: 12/13/90 **AGENCY DESIGNATION:**

CONTINUATION

ITEM NO.

(3.) 469340 m Easting; 3775400 m Northing: 20 mm. S, 164 mm. E

(9.) Locus B is a diffuse scatter of historical trash within an area of current dumping activity. Most of the artifacts noted in this area were deposited in and around a small east/west running ditch.

(13.) "P.C.G.W.", one marked "Bludwine Bottli..." on the side near the base, another with "..SAYMA..." marked on the side, and one base with a five-pointed star design. Fragments of 4 aqua glass bottles with "SODA WORKS" on the side and "THIS BOTTLE IS NEVER SOLD" "MUST BE RETURNED" in a circle on the base surrounding a large "R". A hand tooled rectangular bottle of aqua glass with "WHITTEMORE", "BOSTON", "USA" on the side. An aqua glass bottle base with "PUTNAM", "838". An additional 100+ fragments of aqua glass, 10 of cobalt, 50 of amber, 75 clear, 20 common green, and 5 of blue. One straw glass vase fragment. 50+ fragments of whiteware, one with portion of maker's mark with a crown and "GRINDLEY H...", "ENG...", "V...". Ten fragments of hotel ware with burgundy and green line edge border. Fragments of stoneware crockery. One piece flow blue. 25+ fragments of porcelaneous stoneware, one with a multicolored Japanese geisha scene with gold embellishments. Two California license plates dated 1932. One shell button.

Locus B: 30+ fragments of sun colored amethyst glass, including one base with Owens type suction mark. Five widely scattered fragments of a straw glass bowl with a floral pattern on base. Fragments of cobalt, clear, amber, green, and milk glass. One hand tooled, clear glass bottle with graduated scale on side, marked on opposite side "TIME TO FEED YOUR BABY", "PETITE", "DOLL". 15 fragments of California colored ware in yellow, green, and blue. Base of a brown glazed, earthenware bottle with mark "SHENAGO", "CHINA", "NEWCASTLE, PA". Sanitary crimp cans.

State of California—The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # P36-010315 **UPDATE** HRI # Trinomial CA-SBR-10315H NRHP Status Code 2S2

Other Listings
Review Code ____________ **Reviewer** ______________________ **Date** ____________

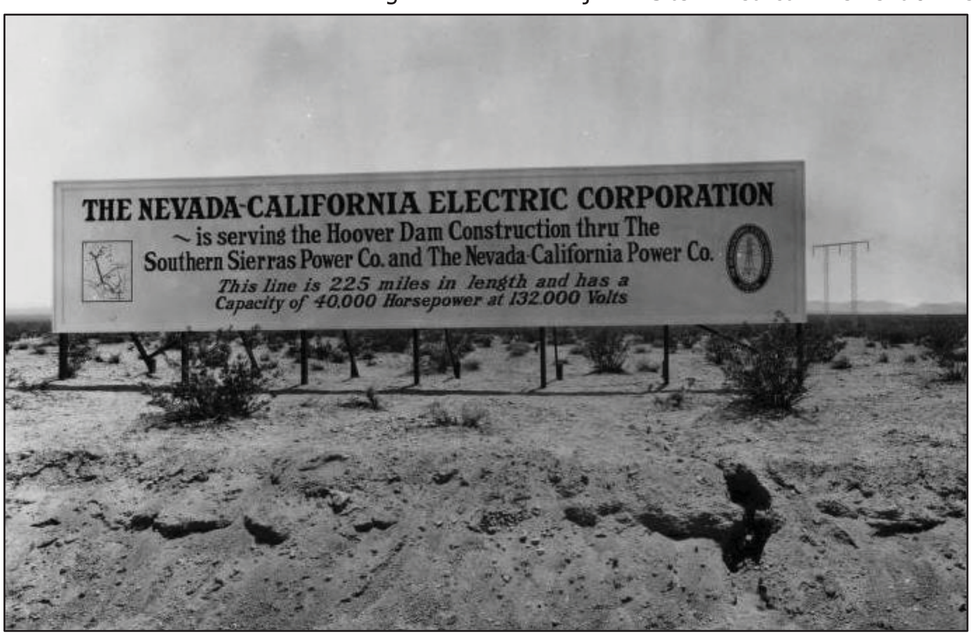
 *__Resource Name or #:__ 132kV Hoover Dam Transmission Line

P1. Other Identifier: Boulder Dam-San Bernardino 115kV Transmission Line
***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted** ***a. County:** San Bernardino
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Various See Below **Date:**____ **T**__; **R**__; __**¼ of** __**¼ of Sec**__; **SBBM**
c. Address: City: Zip:
d. UTM: Zone:11S; 470719mE / 3772534mN at Caletric Substation (formally San Bernardino); 469736mE / 3796410mN; 464469mE / 3818428mN at Victor Substation; 484900mE / 383335mN; 512228mE / 3857615mN; 584161mE/ 3904354mN; 638741mE / 3934155mN at Ivanpah Substation (NAD 1983)
e. Other Locational Data: San Bernardino South, San Bernardino North, Devore, Silverwood Lake, Hesperia, Bald Mesa, Adelanto, Victorville, Apple Valley, Turtle Valley, Stoddard Well, Barstow SE, Dagget, Minneola, Yermo, Harvard Hill, Manix, Dunn, Cave Mountain, West of Soda Lake, Baker, Halloran Springs, Turquoise Mountain, Solomon's Knob, Valley Wells, Mescal Range, Clark Mountain, Ivanpah Lake

***P3a. Description:** The Boulder Dam-San Bernardino transmission line was constructed in 1930-1931 from San Bernardino to the Boulder Dam (now Hoover) site to import electricity for the construction of the dam. The construction of the 225 mile line was awarded jointly to the Southern Sierras Power Company and the Nevada-California Power Company by the Bureau of Reclamation, along with the construction of a substation near the rim of the canyon. The transmission line and substation provided power to construct the dam and domestic power to Boulder City. As stated above, the transmission line was energized on June 25, 1931 to initially convey power to the dam for construction purposes. Commercial power production from the Hoover Dam began on October 26, 1936 and by August 1937, the power was reversed on the line to carry electricity to San Bernardino. The Southern California Edison Company acquired the Boulder-San Bernardino transmission line in 1964 as part of their merger with the California Electric Power Company, a predecessor of the Southern Sierras Power Company and the Nevada-California Power Company.

When first constructed the line began at the San Bernardino Substation (renamed Caletric Substation) to Hoover Substation. Over the years numerous substations were added along the line. Today the Boulder Dam-San Bernardino Transmission line is comprised of seven (7) modern day segments. From east to west the segments are identified as: Ivanpah-Baker-Cool Water-Dunn Siding-Mountain Pass, Cool Water-Gale (built as loop-in/tap to Cool Water post 1959), Gale-PS512, Victor-Black Mountain-Support-Southcap-Southdown (Portions), Victor-Aqueduct-Phelan, and Arrowhead-Calectric-Devil Canyon-Shandin (Portions). Ivanpah Substation was constructed in 2013 and the portions of the historic line from Ivanpha to Eldorado Substation were rebuilt. In addition, the original alignment of the line between Eldorado Substation and Boulder Dam was rebuilt in the 1970s. Today the historic alignments ends at Ivanpah approximately 67 miles west of Hoover Dam.

***P3b. Resource Attributes:** HP11 Engineering Structure (Transmission Line)
***P4. Resources Present:** ☐Building ☐Structure ☐Object ■Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: SCE Photographs and Negatives collection of The Huntington Library; Call No. 07-00111 / Image No. SCE_07_00111, date April 1931; © The Huntington Library, San Marino, California.
***P6. Date Constructed/Age and Sources:** ■ Historic 1930-1931 ☐ Prehistoric ☐ Both
***P7. Owner and Address:** Southern California Edison Company, 2244 Walnut Grove Ave. Rosemead CA, 91770
***P8. Recorded by:** Audry Williams, SCE Senior Archaeologist
***P9. Date Recorded:** August 2015
***P10. Survey Type:** intensive
***P11. Report Citations:** None

***Attachments:** ☐None ■Location Map ■Site Map ■Continuation Sheets ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Feature Sketch ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2

B1. Historic Name: 132kV Hoover Dam Transmission Line

B2. Common Name: Boulder Dam - San Bernardino Transmission Line

B3. Original Use: Electrical transmission line to supply power for the construction of the Boulder (Hoover) Dam

B4. Present Use: Electrical transmission line to supply power to the Los Angeles area from the Hoover Dam

***B5. Architectural Style:** Utilitarian Electrical Engineering single circuit transmission line, constructed on lattice steel structures

***B6. Construction History:** On October 28, 1930, the U.S. Bureau of Reclamation signed a contract with the Southern Sierras Power Company and the Nevada-California Power Company for the construction of a 225 mile-long power transmission line from a steam-powered generating station at San Bernardino, CA to the dam site and the construction of a substation near the dam, on the Nevada side of the river. Construction of the line began in December 1930, and power was available for the dam construction project on June 25, 1931. As part of the contract, eight months were allotted for the construction of the transmission line and Boulder Substation. Three days after the contract was signed, survey parties were in the field for project design and construction activities began within six weeks. The line crews worked at a record-setting pace, completing the 225-mile long (132,000-volt) line from San Bernardino to the dam site in only 225 days, despite having to navigate some of the most rugged and inhospitable terrain in the country. Electrical power delivery across the new line to the Boulder Substation began on June 25, 1931. During the next six years, over 100 million kilowatt-hours were sold to the dam construction project.

***B7. Moved?** ☐**No** ■**Yes** ☐**Unknown Date:** Various dates **Original Location:** See location maps

***B8. Related Features:** Boulder (Hoover) Dam

B9a. Architect: Southern Sierras Power Company - R. H. Halpenny (Electrical Engineer); E. J. Waugh (Construction Engineer)

b. Builder: Southern Sierras Power Company - C. H. Rhudy (Transmission Line Construction Supervisor

***B10. Significance: Theme:** A contributing element to the Hoover Dam Hydroelectric System associated with an important event and innovative electrical engineering technology, embodying hydroelectric facility design and methods.

Area: National, California, and Nevada **Period of Significance:** 1930-19xx

Property Type: Electrical Structure –Electrical Power Conveyance System **Applicable Criteria:** NRHP / CRHR A/1, C/2

The California State Historic Preservation Officer concurred on October 21, 1993 with the Bureau of Land Management's (BLM) assessment of the Boulder Dam-San Bernardino Transmission Line as eligible for listing on the National Register of Historic Places. In 2010, the Boulder Dam-San Bernardino (115kV) Transmission Line was documented on a Historic American Engineering Record (HAER) No. NV-45.

The most common tower used in the construction of this transmission line was a 52-foot, H-frame steel structure consisting of two lattice masts, each 2 feet square in section and spaced 17 feet apart, which support a 34 foot long horizontal, trussed channel cross-arm (Type "H" Standard Tower). At least one of these towers in every mile of tangent (straight-line) run was guyed. Self-supporting A-frame towers (Type "AL" Towers) were used for line angles between 25 and 50 degrees. For angles over 50 degrees, an Angle Structure (Type "AP" Tower) consisting of three vertical, guyed masts joined at the top by a horizontal arm of the same design, were used. Lattice steel H-frame Transposition Towers (Type "T" Towers), 64 feet in height, were used to change the relative positions of the three conductors. This was done to prevent the buildup of inductive currents and attendant electromotive forces that interfered with radio signals and nearby communications-line transmissions. The transmission line was additionally provided with Sectionalizing Switch Towers (Type "SW" Towers) for opening the line at six points in the 225 miles of length. Tower bases, which are comprised of a steel cage structure, were set into the ground by means of earth boring machines and, in some cases, air driven tools where it was necessary to drill into solid rock. The towers were then individually constructed on site, using the prefabricated steel components. After the construction crew completed the tower structure, it was ready for the line stringing and guying crews. In order to lay out the conductor at the base of the towers, the stringing crew mounted three cable reels, each containing 4,000 feet of cable, onto three specially designed trailers. These individually drawn reel carriers made it possible to distribute the cable over rough terrain. When a cable spool ran out, line conductor was spliced together by means of two, 24" aluminum sleeves, through which the ends of the cable were inserted and twisted together. Spaced 750 feet apart on average, the towers carried a single circuit consisting of three aluminum cable steel reinforced (ASCR) conductors, each made up of six strands of aluminum wrapped around a steel core, with an outside diameter of about 5/8 inch. Insulators generally consisted of nine units strung together where the conductor was suspended, and ten units where the conductor was dead-ended.

B11. Additional Resource Attributes: Tower Details

Type "H" Standard Tower and "HD" Dead End Tower (Lattice Steel H-Frame Towers)

This lattice steel H Frame tower is constructed as the standard straightaway tower type with the use of suspension insulators or with the use of dead-end insulators for construction of the line at angles of 0-4 degrees, and is the most common tower type found on the line. The Type "H" and "HD" tower stands 52' tall and has two steel lattice legs spaced 17' apart at center. Each leg measures 2' square and the top cross-arm that ties the vertical masts together measures 34' long and 2' wide at the widest point. Suspension tower insulator strings attaching each the three conductors to the tower have nine individual porcelain insulation units; dead-end towers have ten. At least one tower in each mile of standard construction was guyed; however, others appear to have been guyed at a later date in lake areas and others areas prone to flooding or wind-loading. A guy wire is a tensioned cable designed to add stability

***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2

to structures. One end of the cable is attached to the structure, and the other is anchored to the ground at a distance from the structure's base. They are often configured radially (equally spaced about the structure) in trios, quads (pairs of pairs) or other sets. This allows the tension of each guy wire to offset that of the others.

<u>Type "AL" Tower, "AH" Tower, and "AHS" Tower (A-frame Dead End Tower)</u>
This tower is a lattice steel A-Frame tower Types "AL", "AH" and "AHS" all stands 55' tall, not including the footings, which are buried at a depth of 8' below grade. The total length of the upper cross-arm is 32'. While most cross arms are placed symmetrically atop the base structure, some are offset to increase the clearance of conductor jumpers from tower components. Tower legs are spaced about 17' apart on front/back and 15' apart on sides. These towers are all configured as dead-end structures with insulator strings comprised of 10 individual porcelain insulation units. These towers are self-supporting (no guy wires). Type "AL" Tower is used for line angles between 5-25 degrees, "AH" for line angles between 25-50 degrees, and "AHS" for special dead end construction.

<u>Type "AP" Tower (Three-legged Angle Tower)</u>
The tower is a three legged lattice steel tower (double H Frame). This structure is used for line angles of 50 to 90 degrees. The tower stands 54' tall, not including the footings. The total length of the upper cross-arm is 36'. Tower legs are spaced about 15' apart on. These towers are all configured as dead-end structures with insulator strings comprised of 10 individual porcelain insulation units. These towers are always guyed.

<u>Type "T" Tower (Transposition)</u>
The method of transposing the three conductors on this line was developed to meet the particular conditions encountered. The line followed the same general route as the transcontinental line of the Southern California Telephone Company, and this design was developed to prevent inductive disturbances on the telephone circuits. The design of these towers attracted attention at the time because transposition was accomplished with a single tower, rather than with two towers, as had been common practice. The Type "T" towers are comprised of lattice steel masts connected at the top by a cross-arm of the same configuration. They stand 64' tall, with legs and a cross-arm that are 2' square. These towers in suspension configuration have 9 unit insulator strings (2 strings total) and 10 unit insulator strings in dead-end configuration (6 strings total). These towers are always guyed.

<u>Type "SW" Tower (Sectionalizing Switch Tower)</u>
These towers are self-supporting (no guy wires) and similar to Type "AL" Tower (A-frame) in configuration except the cross-arm on top of the base structure is inverted to support dead-end and switching functions. The line was provided with switches for opening the line at six points in the 225 miles of length. The Type "SW" Tower stands 54' tall, not including the footings, which are buried at a depth of 9' below grade. The total length of the upper cross-arm is 34'. Legs are spaced about 17' apart on front/back and 15' apart on sides. Standard 10 unit standard dead-end insulator strings are configured with unique 4 unit vertical insulators.

***B12. References:**
Sheila McElroy. 2010. Boulder Dam-San Bernardino (115kV) Transmission Line, Eldorado Substation to Ivanpah Substation Primm Vicinity, Clark County, Nevada HAER No. NV-45

Nevada-California Electric Corporation. 1931. Nevada-California Electric Corporation Hoover Dam Line Construction, 1930-31. Southern California Edison Collection (Collection 13, Volume 152), Huntington Library, San Marino, CA.

Selected original drawings, Southern Sierras Power Company and Southern California Edison Company.

York, Andrew. 1995. Class III Cultural Resource Inventory for the Los Angeles Department of Water and Power, Mead to Adelanto Transmission Line Project, Stateline and Baker Divisions.

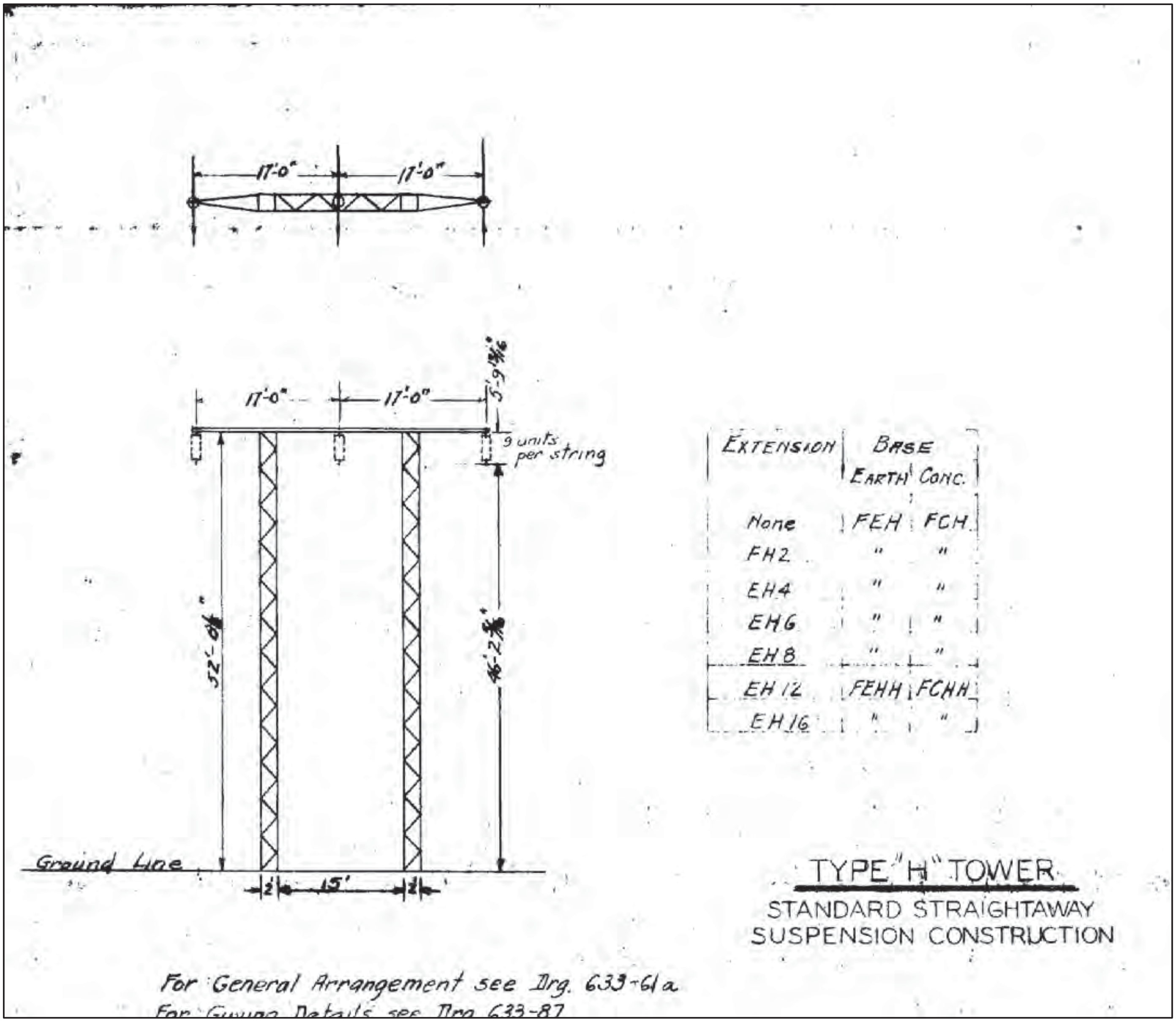
B13. Remarks: None
***B14. Evaluator:** Dames and Moore ***Date of Evaluation:** 1993

(This space reserved for official comments.)

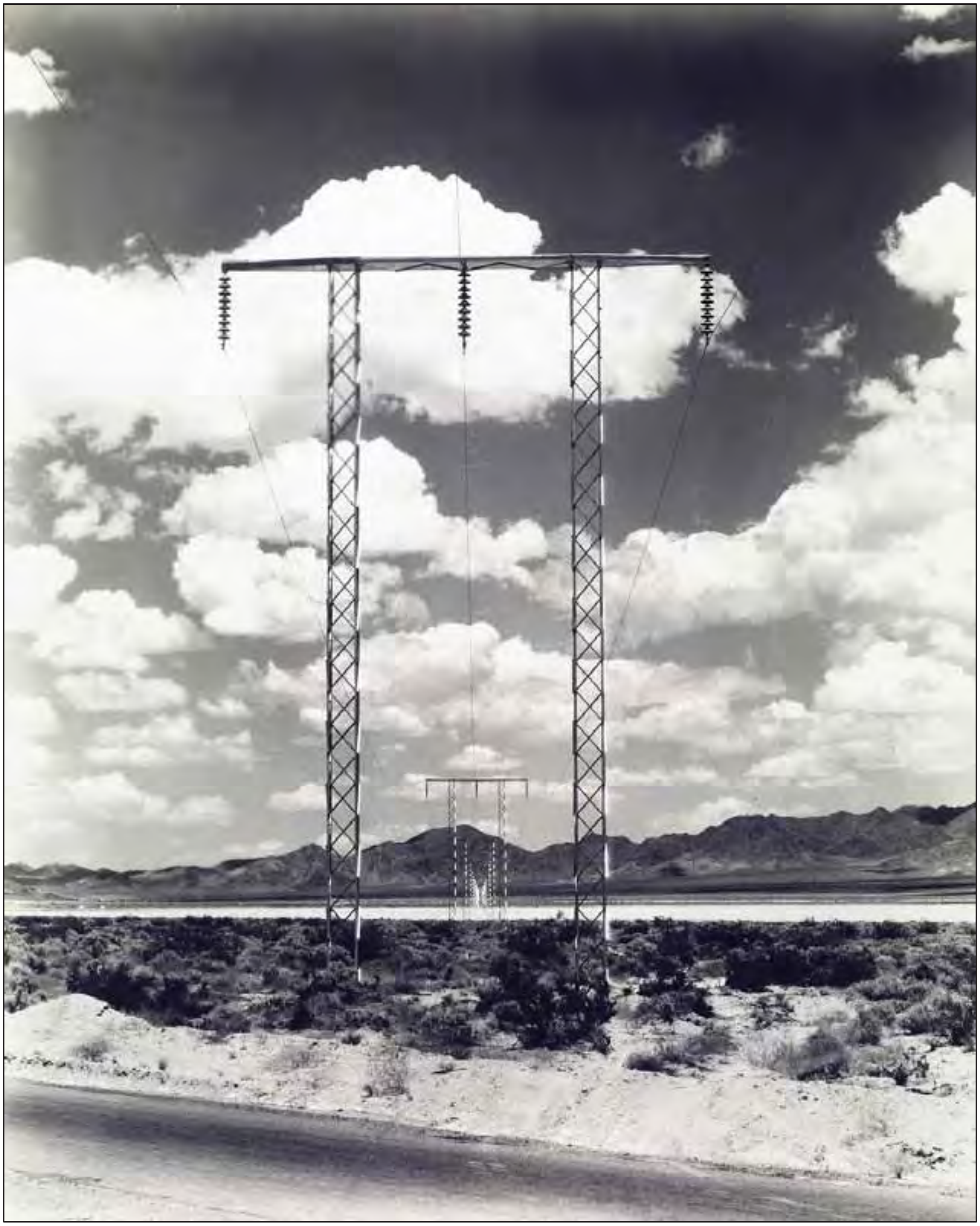
See Sketch Map and Location Maps

***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** ☐ **Update**

Portion of SCE Drawing No. 572256-1, dated 1930, Type "H" Tower-Standard Straightway Suspension Construction

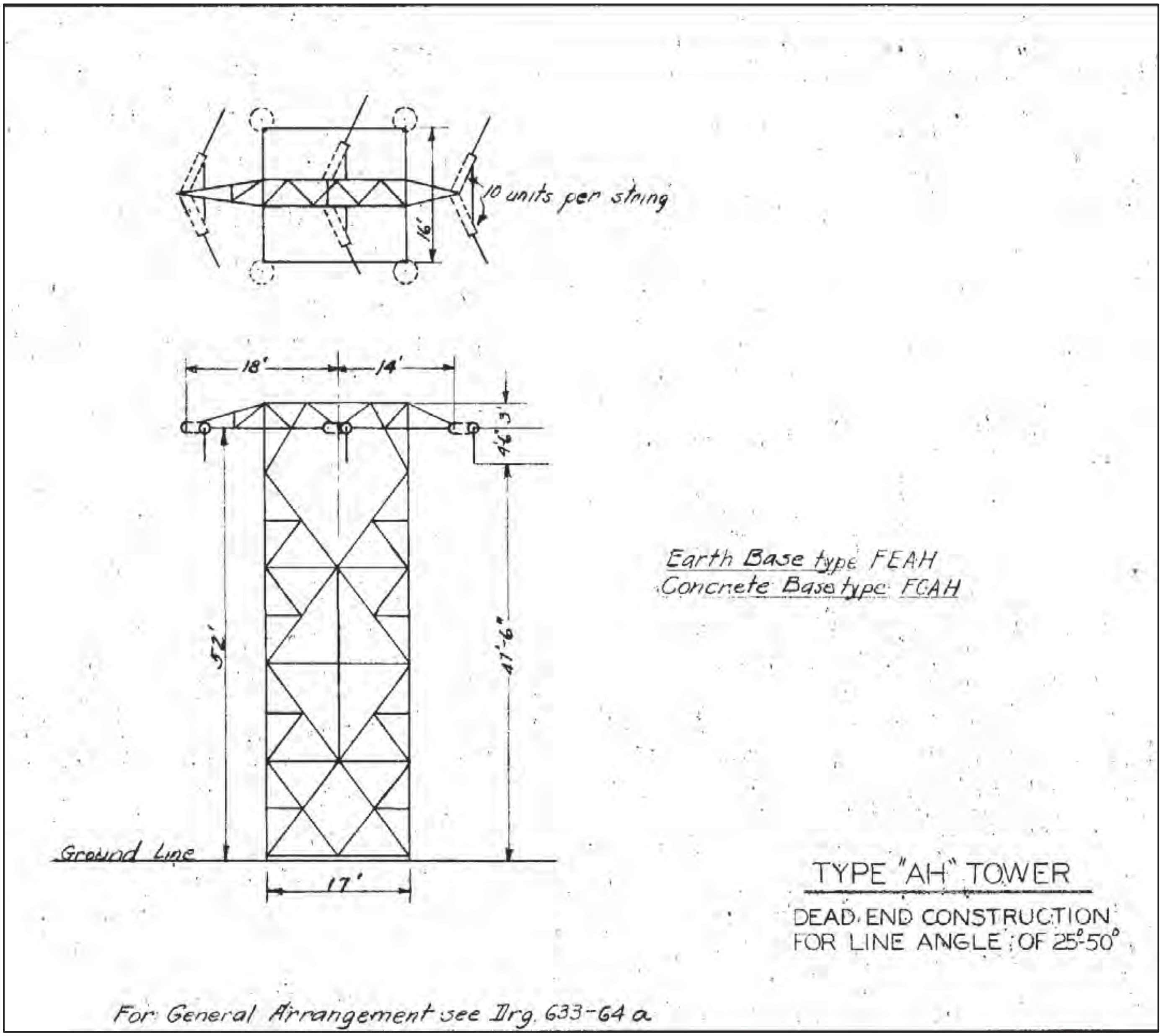


Type "H" Tower on the Boulder Dam-San Bernardino Transmission Line, Southern California Edison Photographs and Negatives collection of The Huntington Library, Call No. 07-02611 / Image No. SCE_07_02611, date 1931. © The Huntington Library, San Marino, California



***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** ☐ **Update**

Portion of SCE Drawing No. 572256-1, dated 1930, Type "AH" Tower- Dead End Construction for Angle 50º-90º



***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** □ **Update**

Angle Tower on the Boulder Dam-San Bernardino Transmission Line Source: Southern California Edison Photographs and Negatives collection of The Huntington Library, Call No. 07-02585 / Image No. SCE_07_02585, date 1931. © The Huntington Library, San Marino, California

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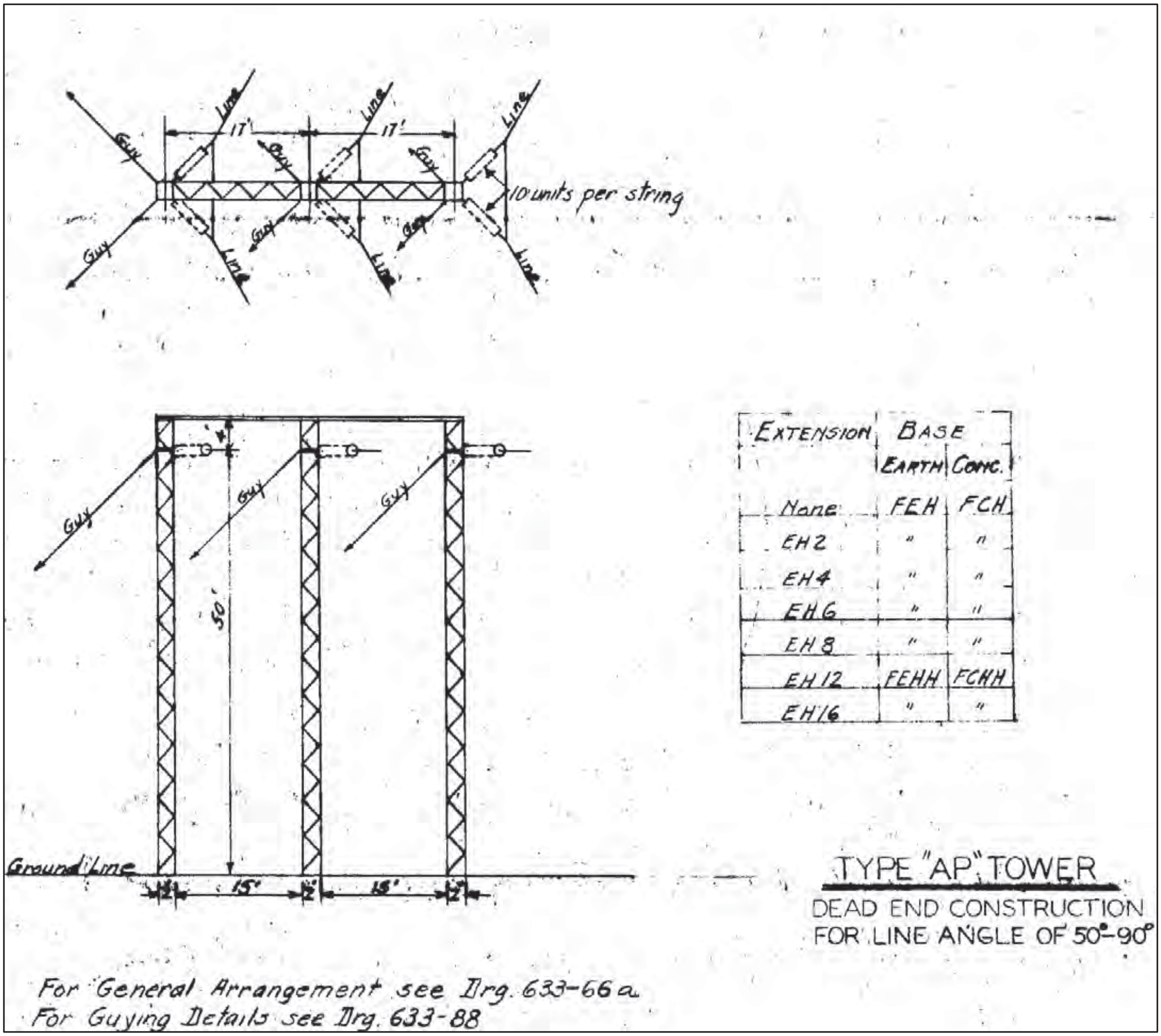
CONTINUATION

Primary # P36-010315 **UPDATE**
HRI#
Trinomial#

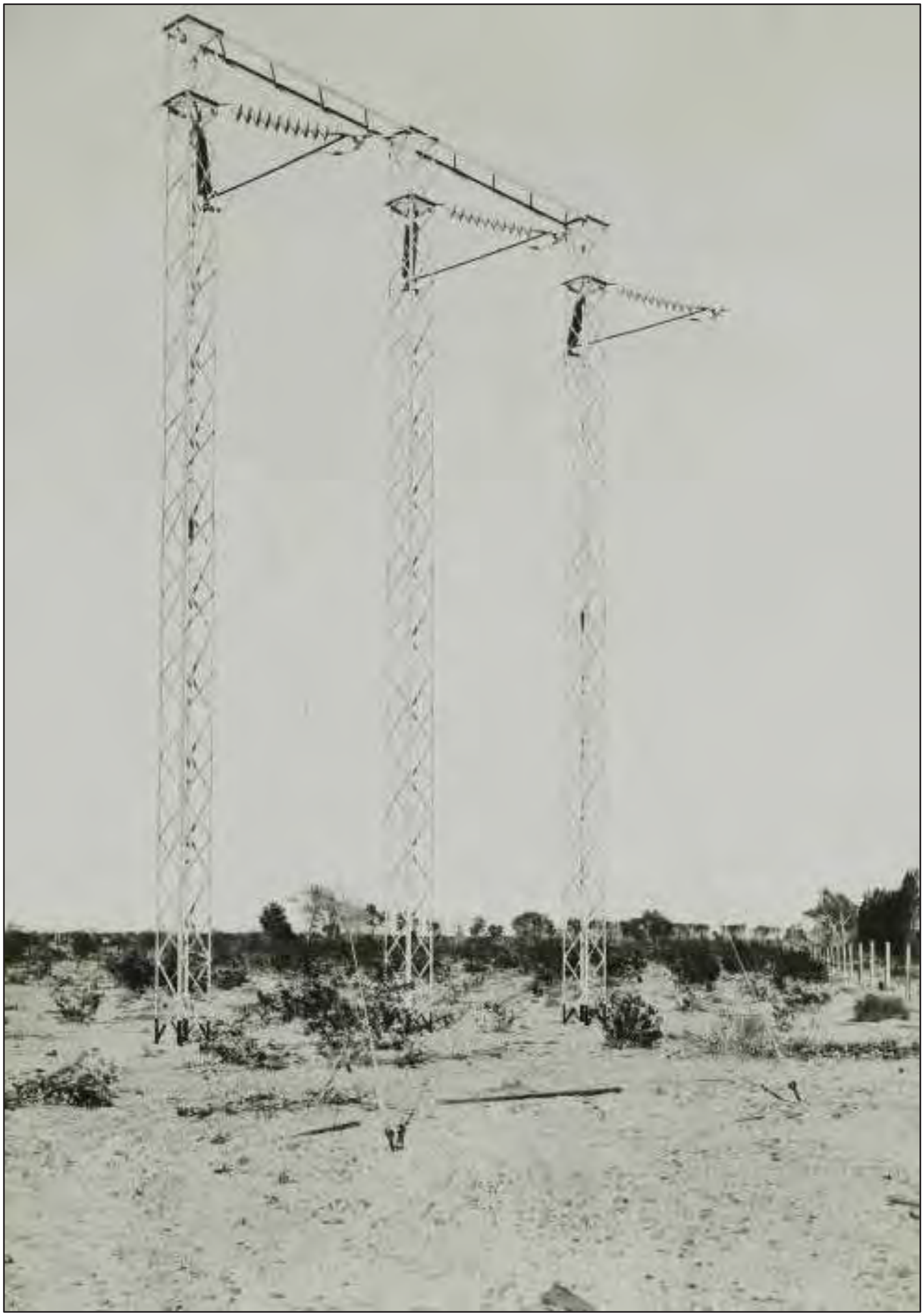
***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** □ **Update**

Portion of SCE Drawing No. 572256-1, dated 1930, Type "AP" Tower-Dead End Construction for Angle 50º-90º



Extension	Base Earth	Base Conc.
None	FEH	FCH
EH2	"	"
EH4	"	"
EH6	"	"
EH8	"	"
EH12	FEHH	FCHH
EH16	"	"

Dead End Angle Tower on the Boulder Dam-San Bernardino Transmission Line, Southern California Edison Photographs and Negatives collection of The Huntington Library, Call No. 13-Vol. 15 / Image No. SCE_13_VOL_152_P053, date 1931. © The Huntington Library, San Marino, California



***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** ☐ **Update**

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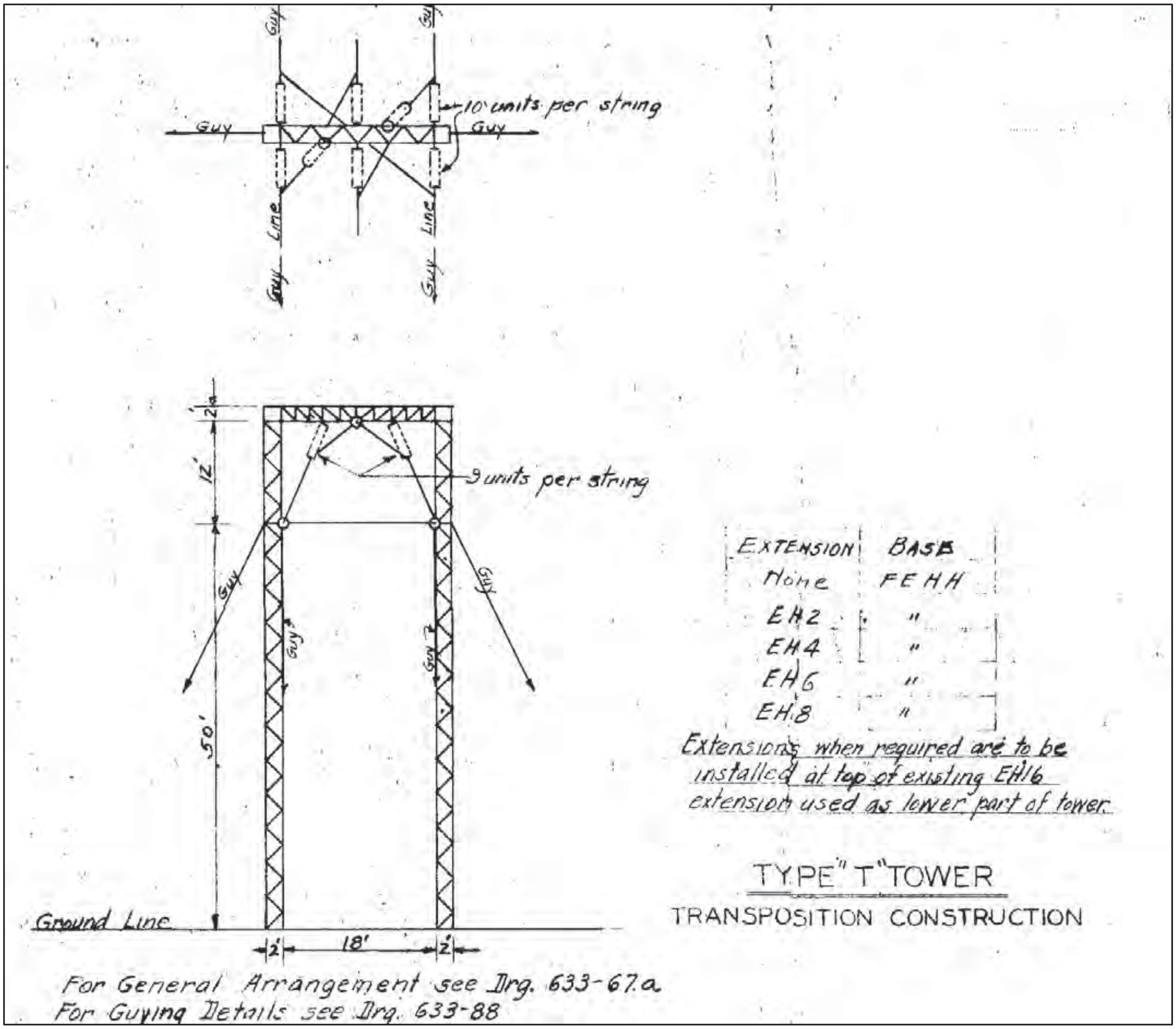
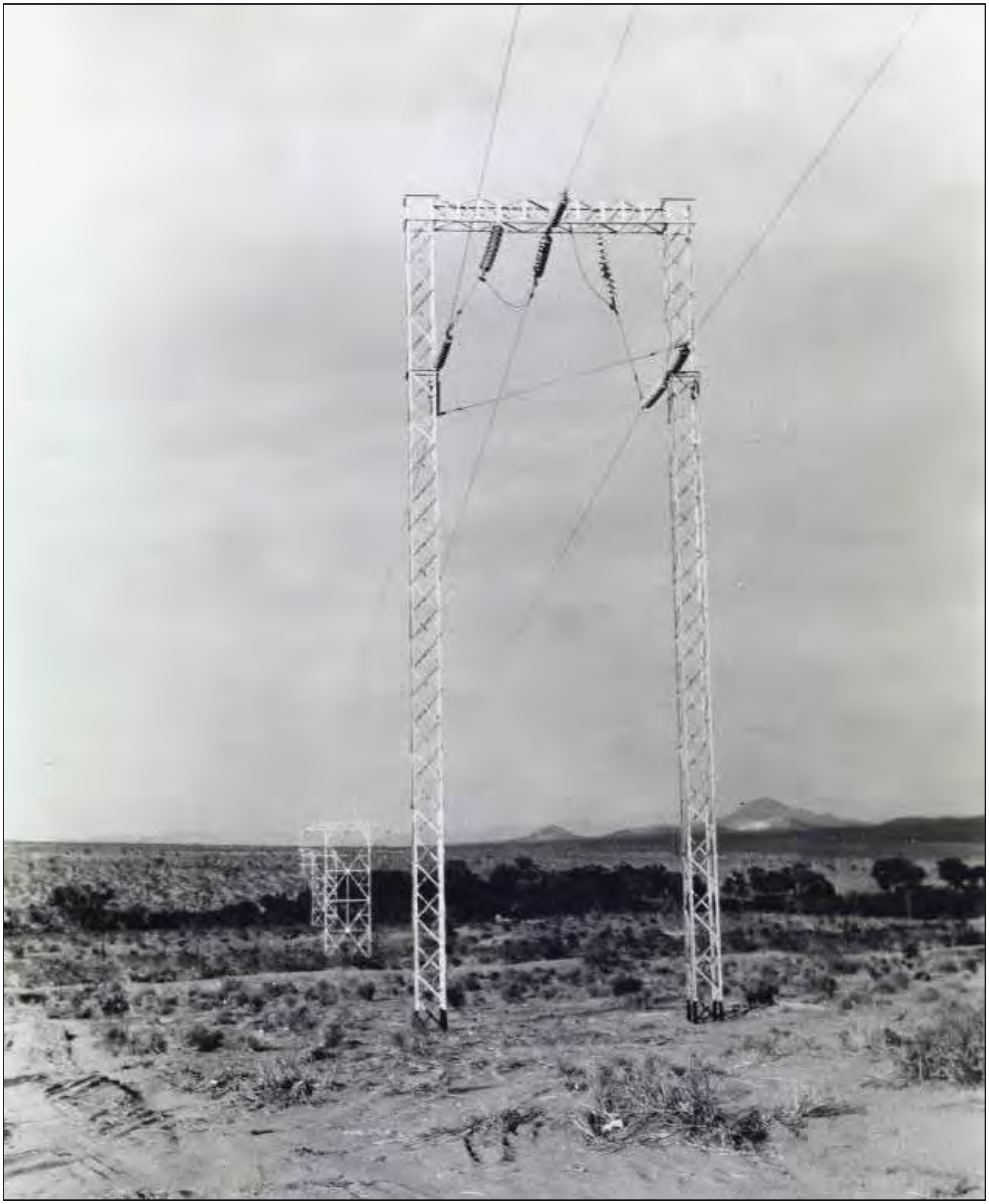
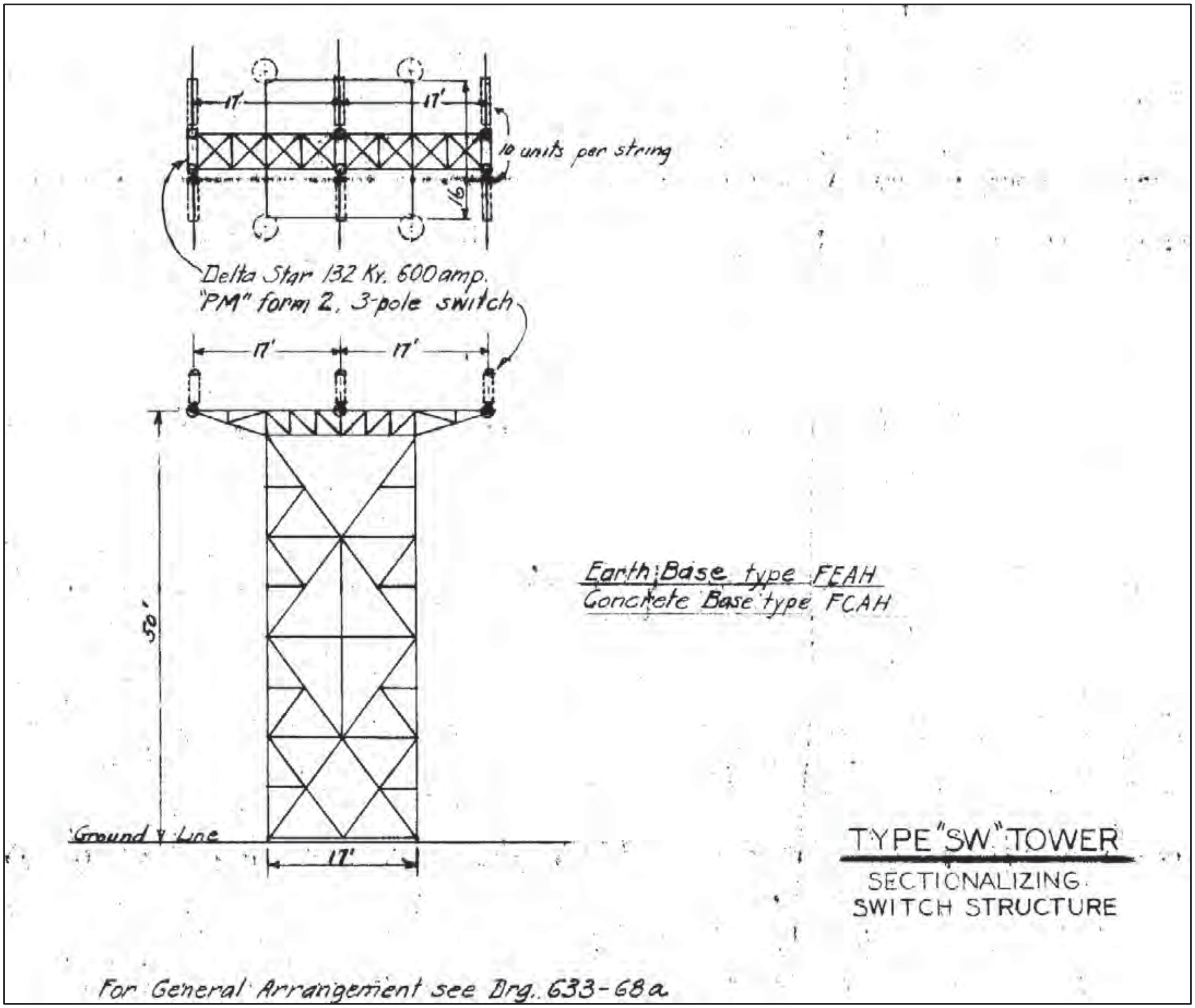


Transposition Tower on the Boulder Dam-San Bernardino Transmission Line, Southern California Edison Photographs and Negatives collection of The Huntington Library, Call No. 07-02586 / Image No. SCE_07_02586, date 1931. © The Huntington Library, San Marino, California

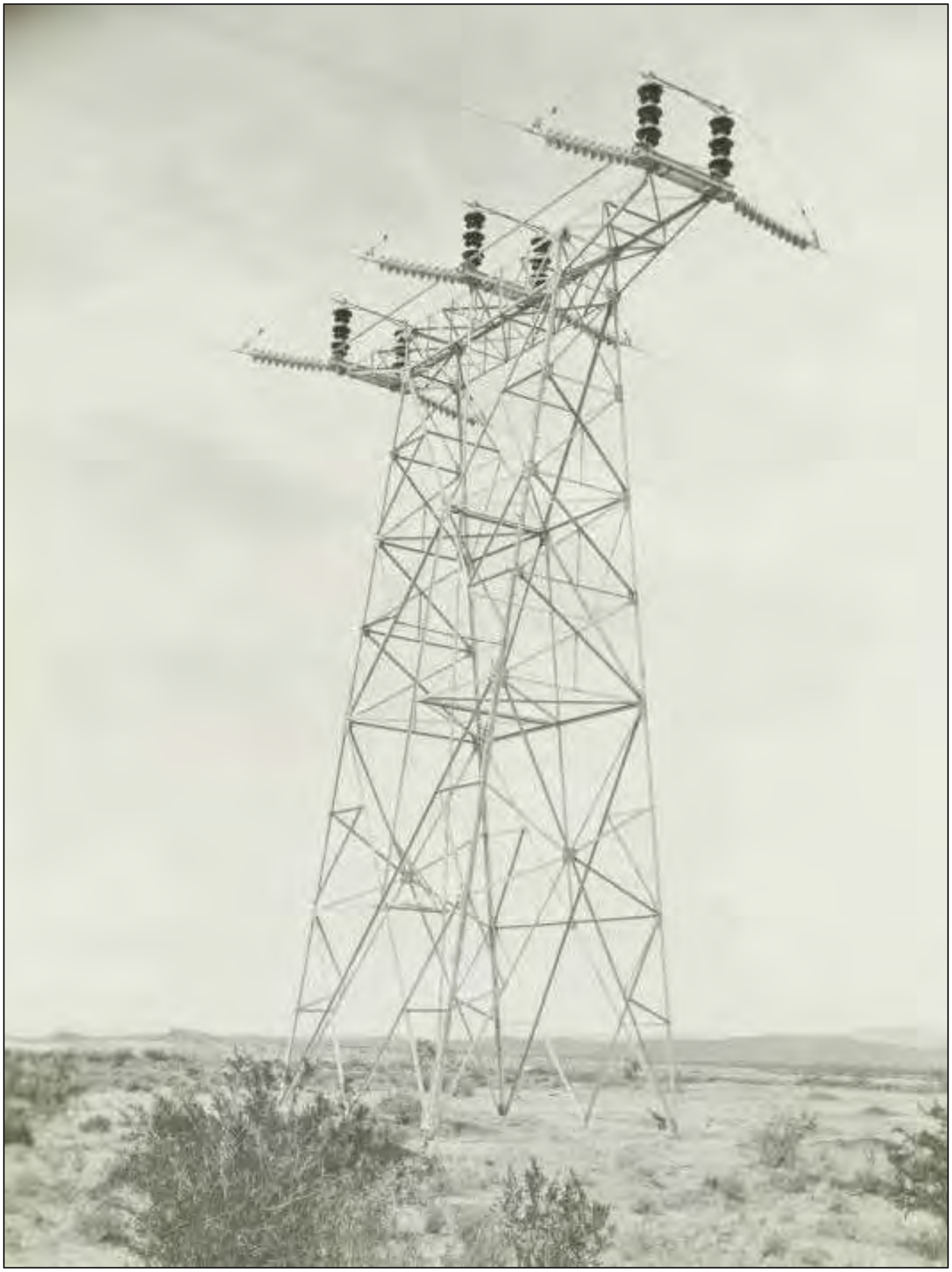


***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** □ **Update**

Portion of SCE Drawing No. 572256-1, dated 1930, Type "SW" Tower-Sectionalizing Switch Structure



Sectionalizing Switch Tower on the Boulder Dam-San Bernardino Transmission Line, Southern California Edison Photographs and Negatives collection of The Huntington Library, Call No. 13-Vol. 15 / Image No. SCE_13_VOL_152_P049, date 1931. © The Huntington Library, San Marino, California



***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** □ **Update**

Tower to the Left is part of the Boulder Dam-San Bernardino Transmission Line, Tower to the Right is Part of the "Tower Line" Bishop-San Bernardino 115kV Double Circuit Line built in 1912 and recorded as P-36-010316. These two transmission lines share a corridor from Victor Substation in Victorville, California to the North side of Silverwood Lake in San Bernardino County within the San Bernardino Mountains. Southern California Edison Photographs and Negatives collection of The Huntington Library, Call No. 07-02155 / Image No. SCE_07_02155_P053, date 1961. © The Huntington Library, San Marino, California

***Resource Name or #** 132kV Hoover Dam Transmission Line ***NRHP Status Code** 2S2
Recorded by: Audry Williams ***Date:** August 2015 ■ **Continuation** □ **Update**

1931 Map of The Nevada-California Power Company's Transmission System, showing the alignment of the Boulder Dam-San Bernardino Transmission Line, Southern California Edison Photographs and Negatives collection of The Huntington Library, Call No. 13-Vol. 15 / Image No. SCE_13_VOL_152_P001, date 1931. © The Huntington Library, San Marino, California. Map edited by author to highlight transmission line.

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Primary # P36-010315H UPDATE
HRI#

SKETCH MAP

Trinomial: CA-SBR-10315H

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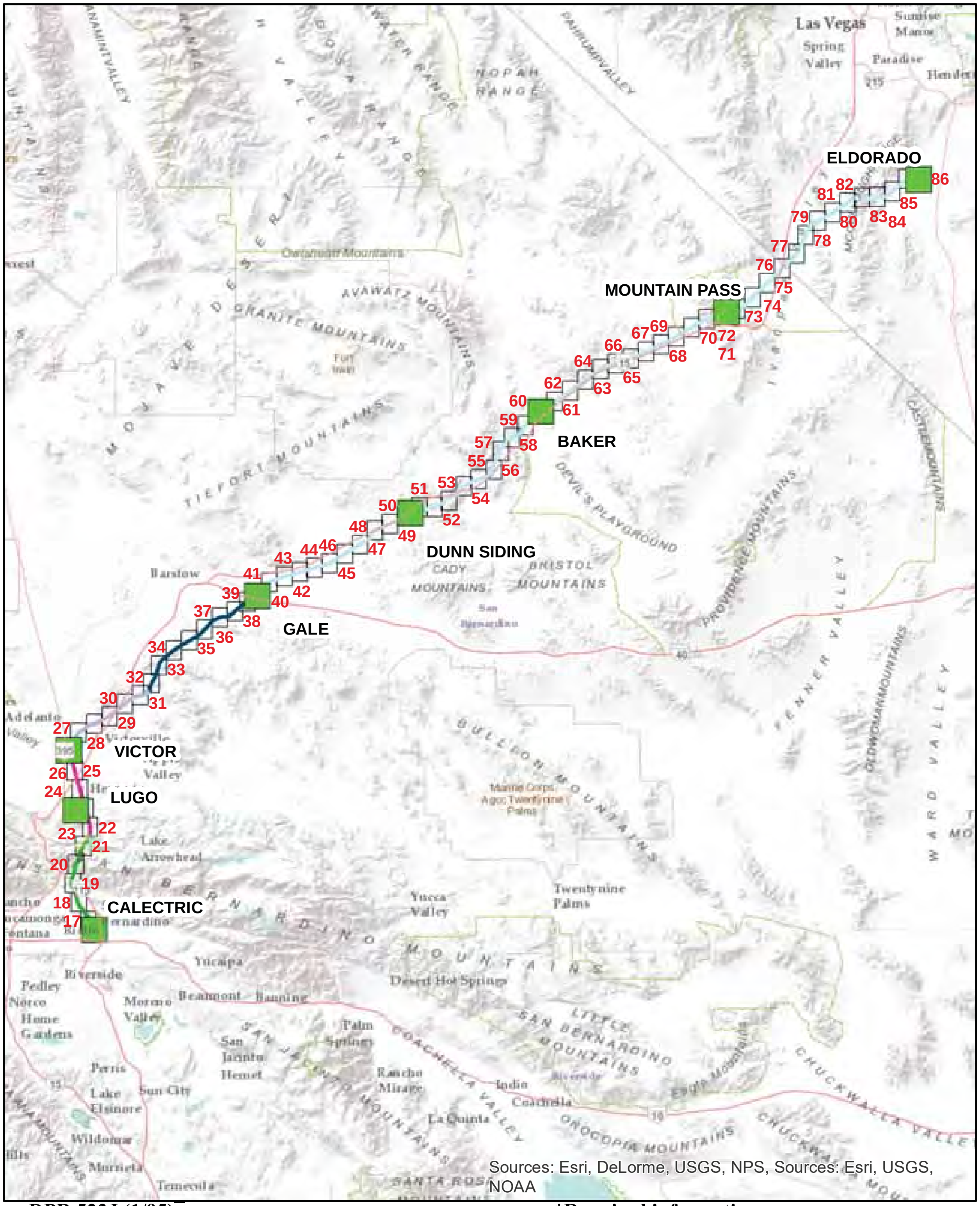
* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1,500,000 *Date of Map: 04/02/2015



DPR 523J (1/95)

*Required information

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Primary # P36-010315H UPDATE
HRI#

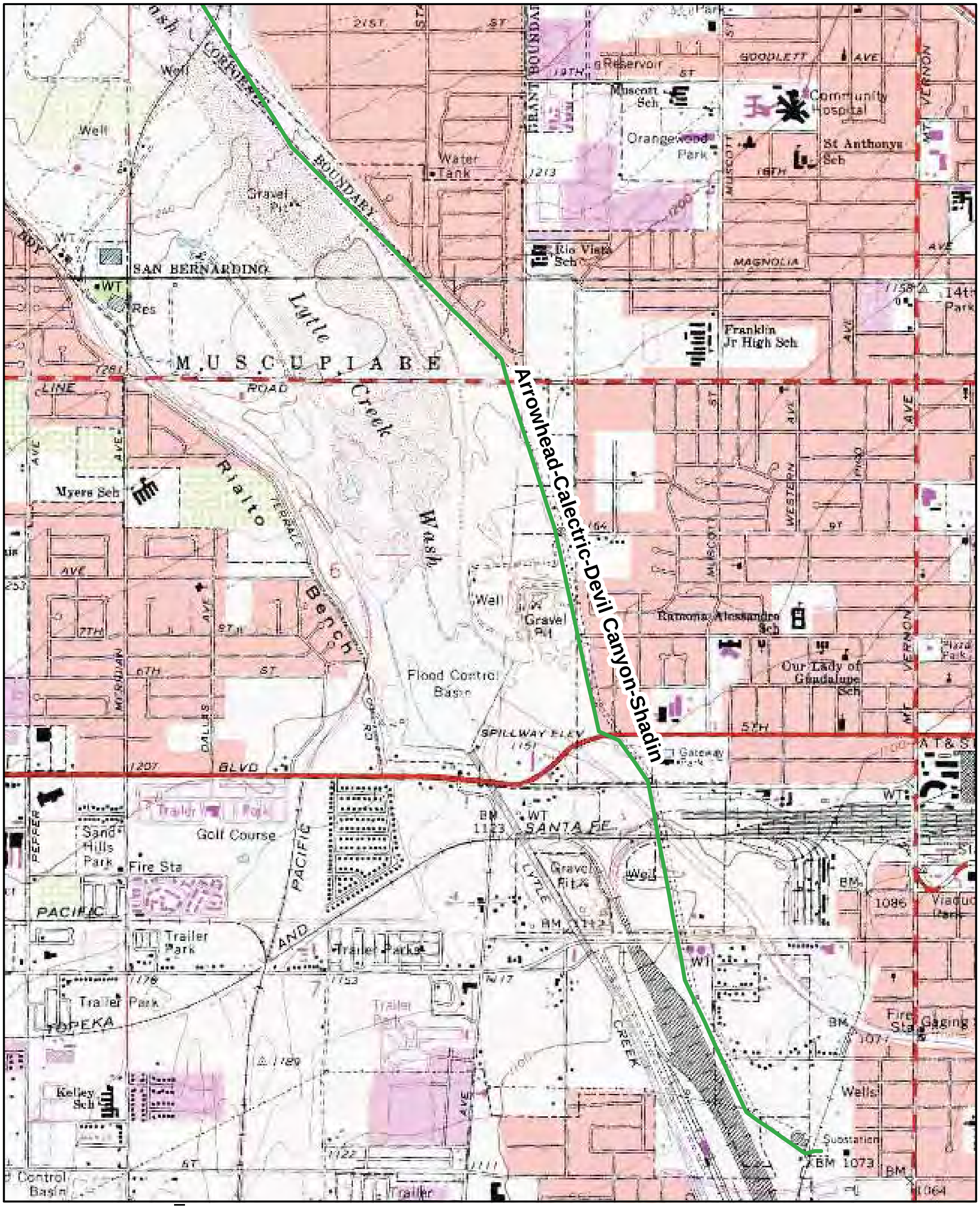
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



*Required information

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Primary # P36-010315H UPDATE
HRI#

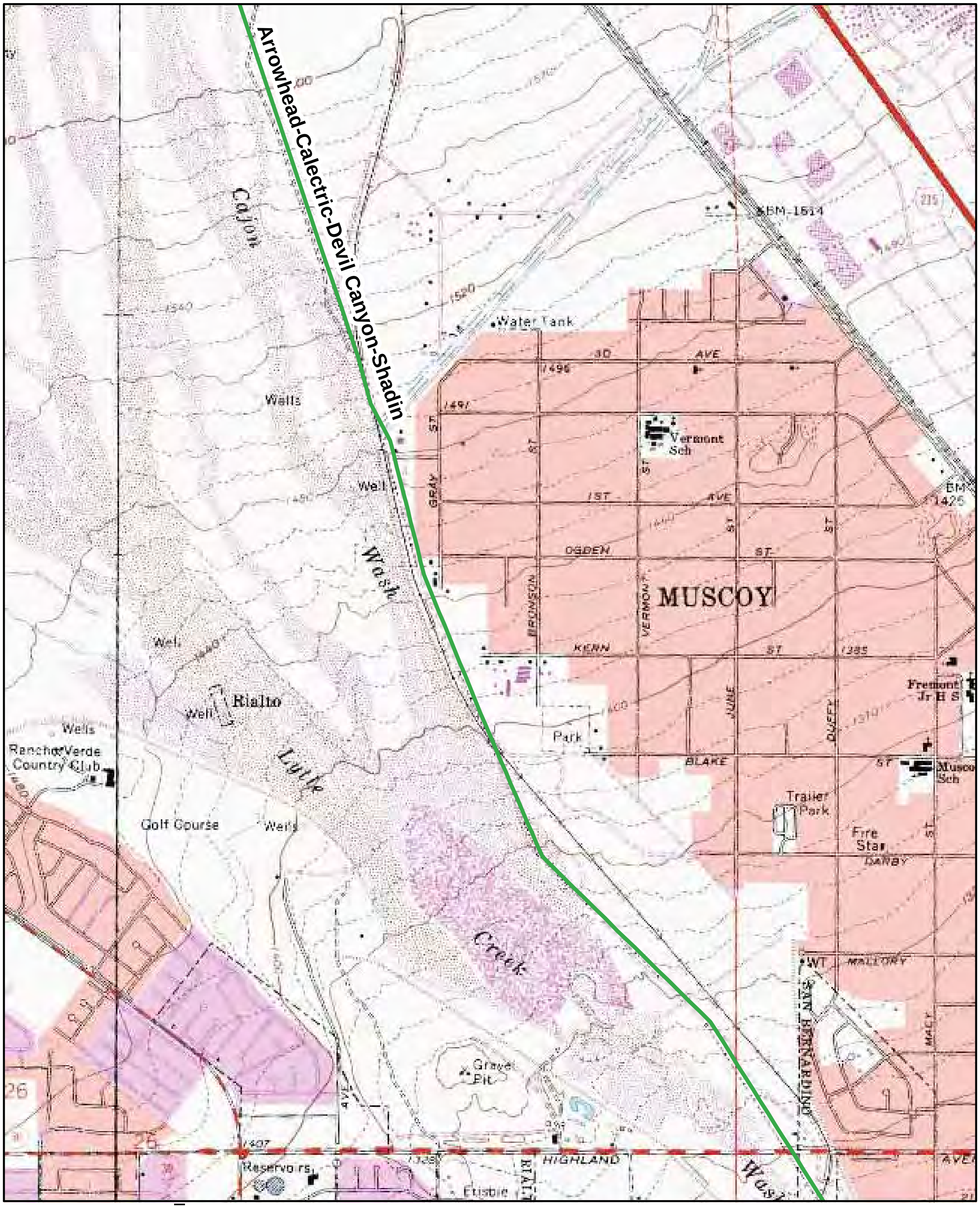
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



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Primary # P36-010315H UPDATE
HRI#

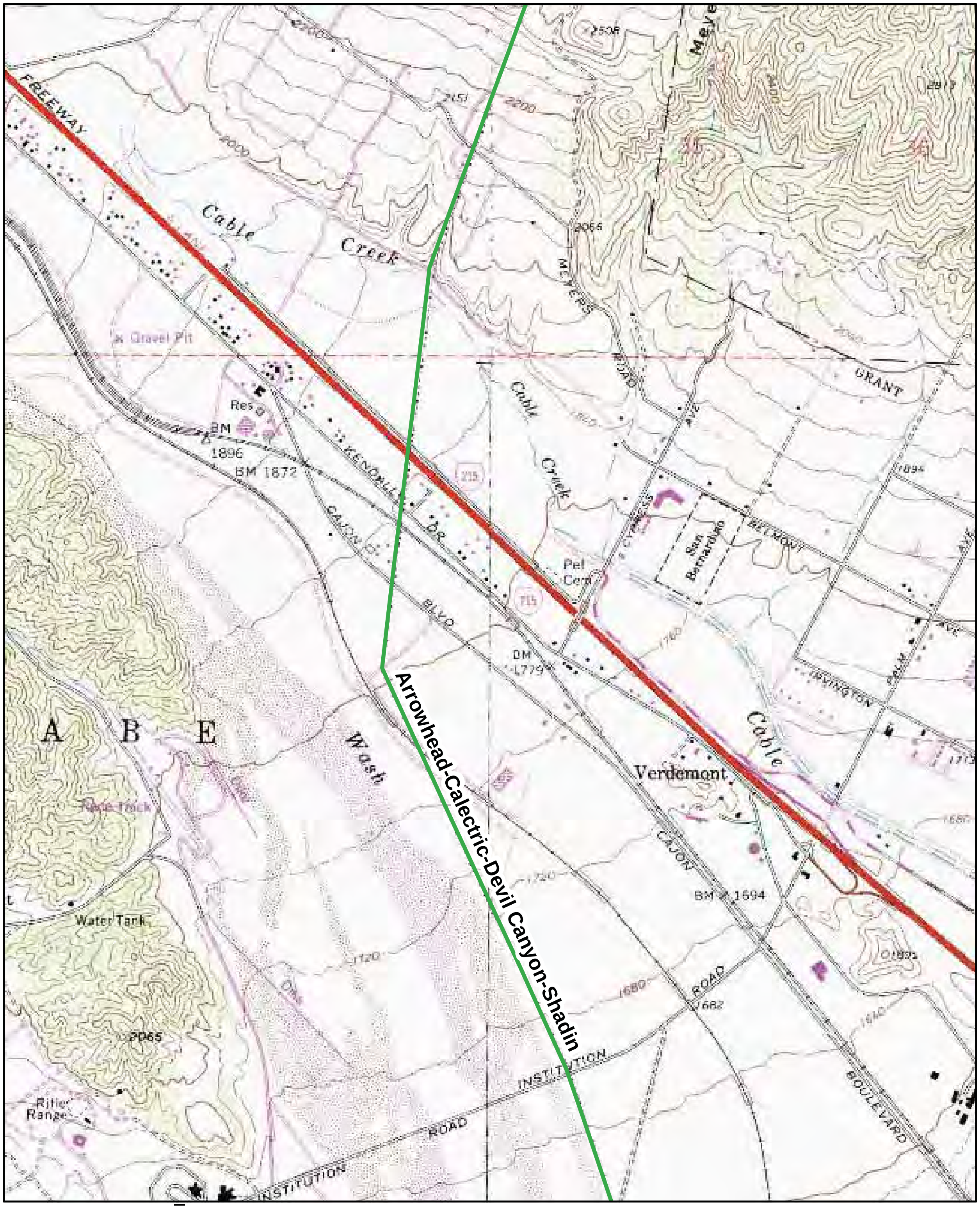
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



*Required information

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015

*Required information

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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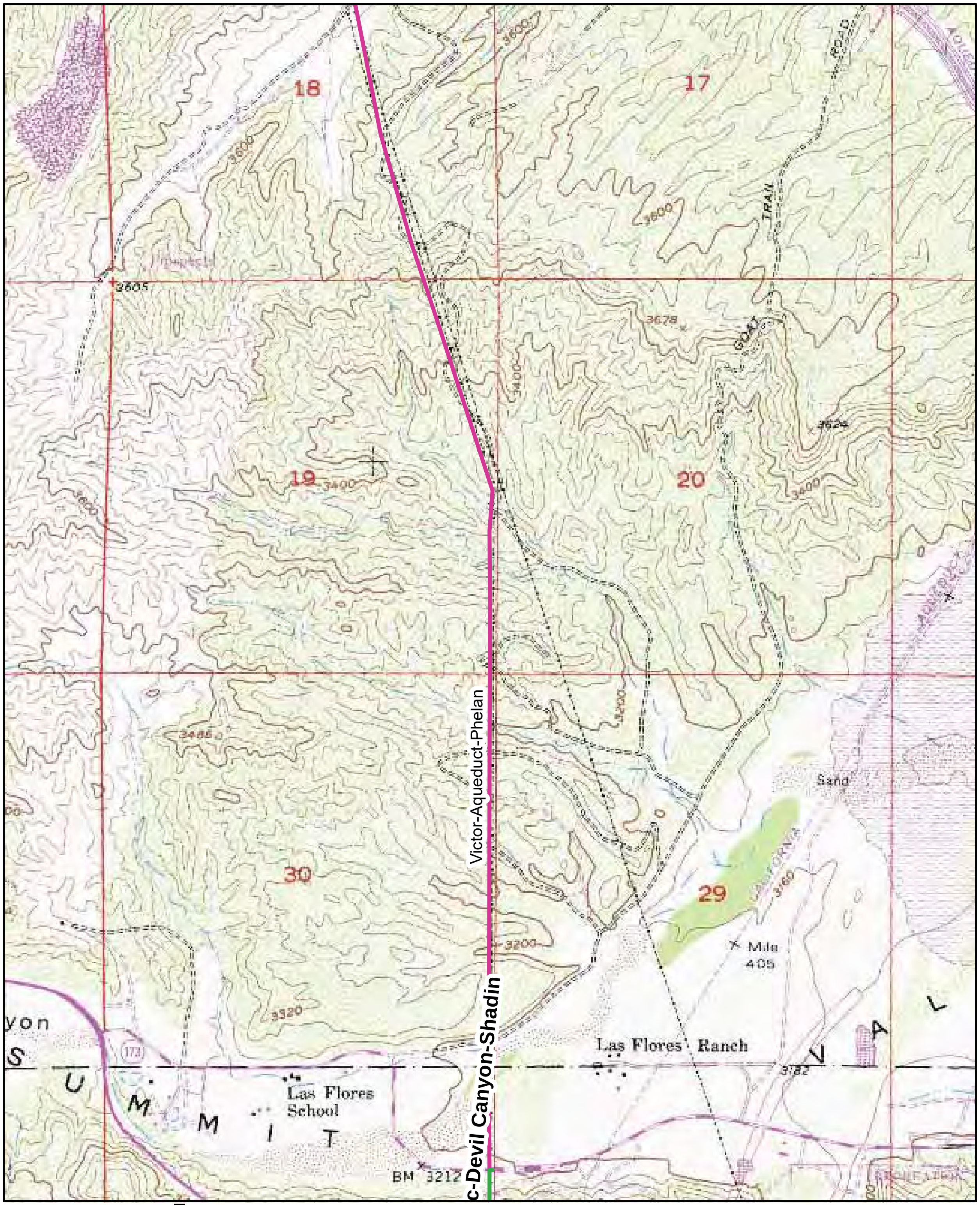
* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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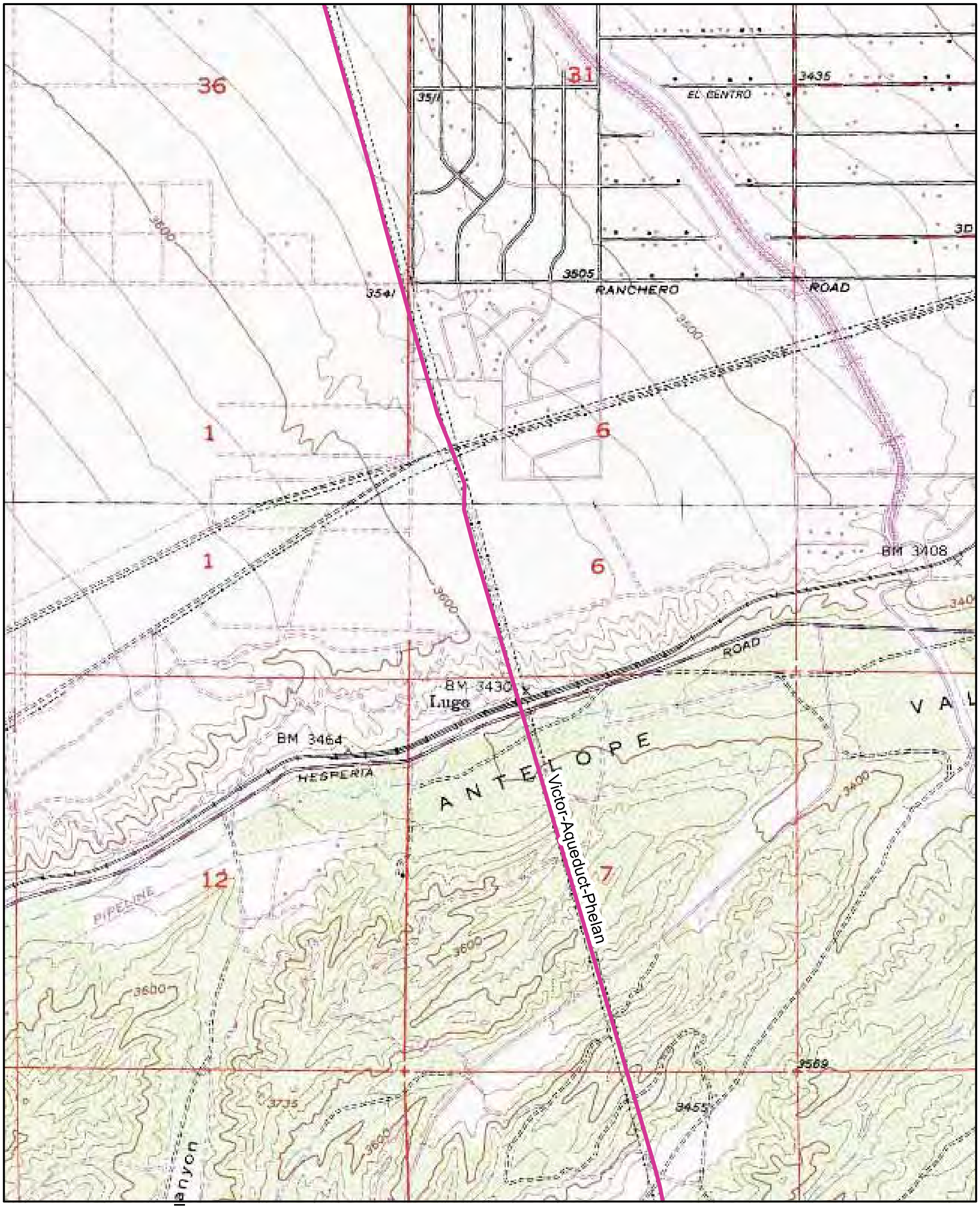

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

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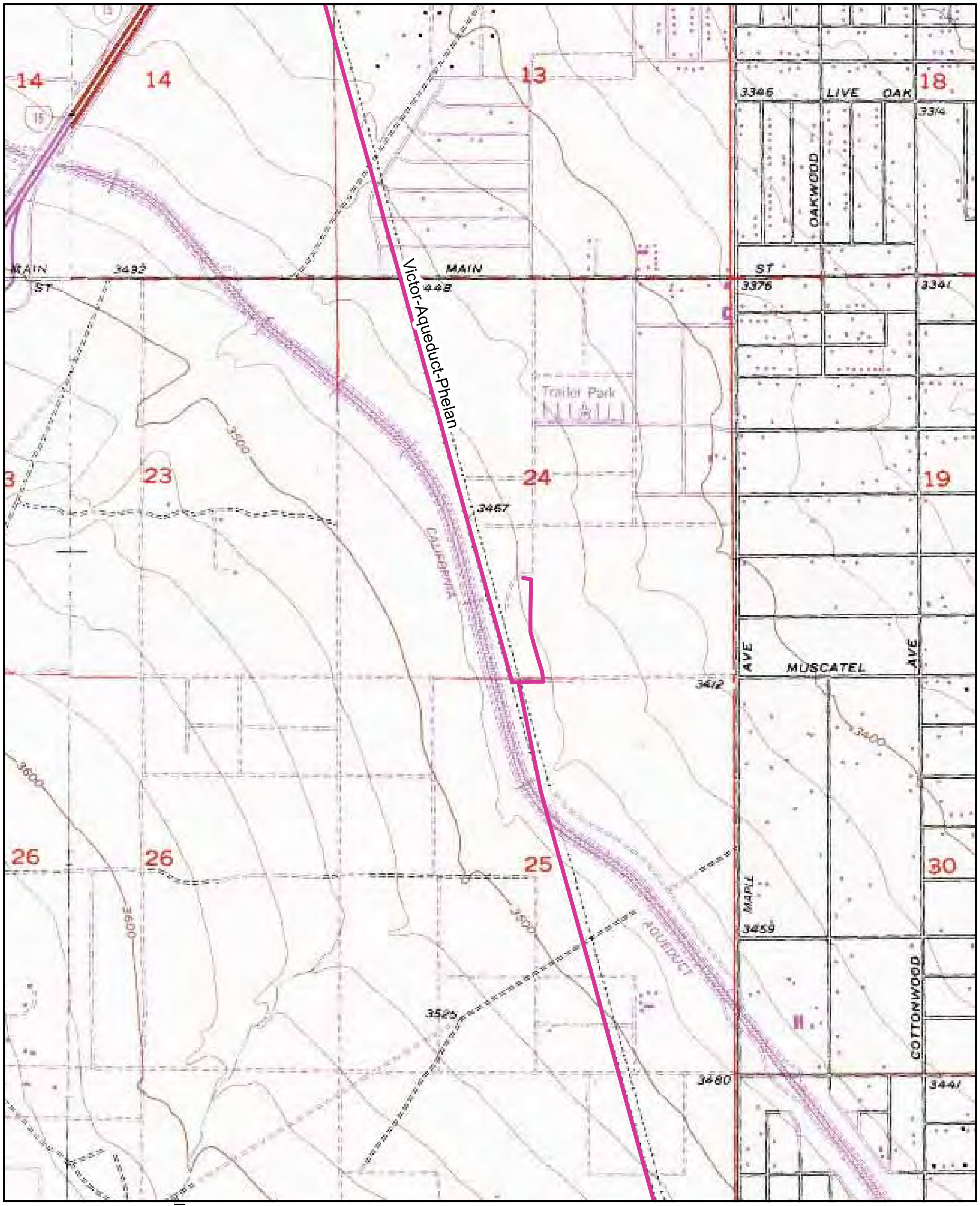

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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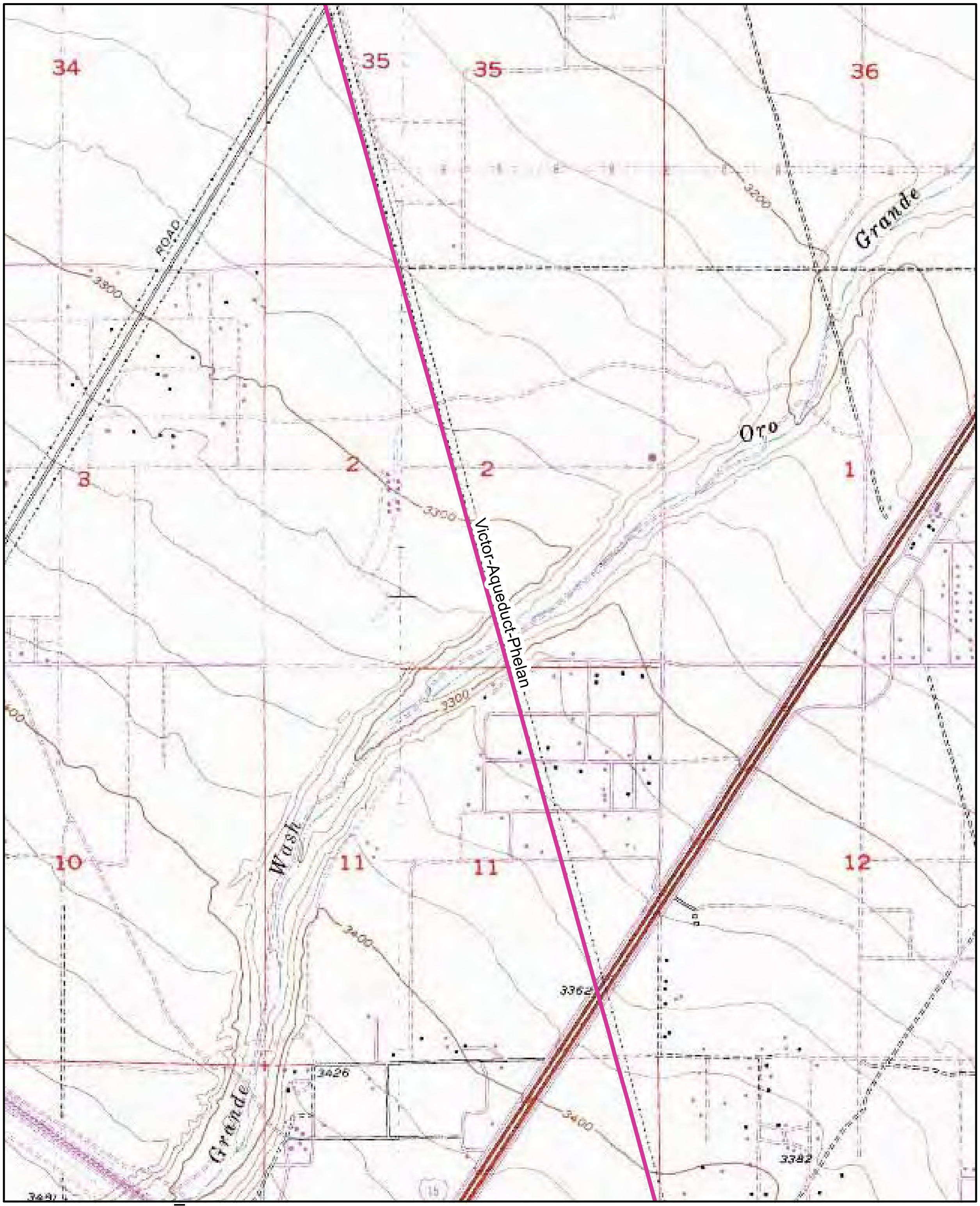
*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



DPR 523J (1/95)

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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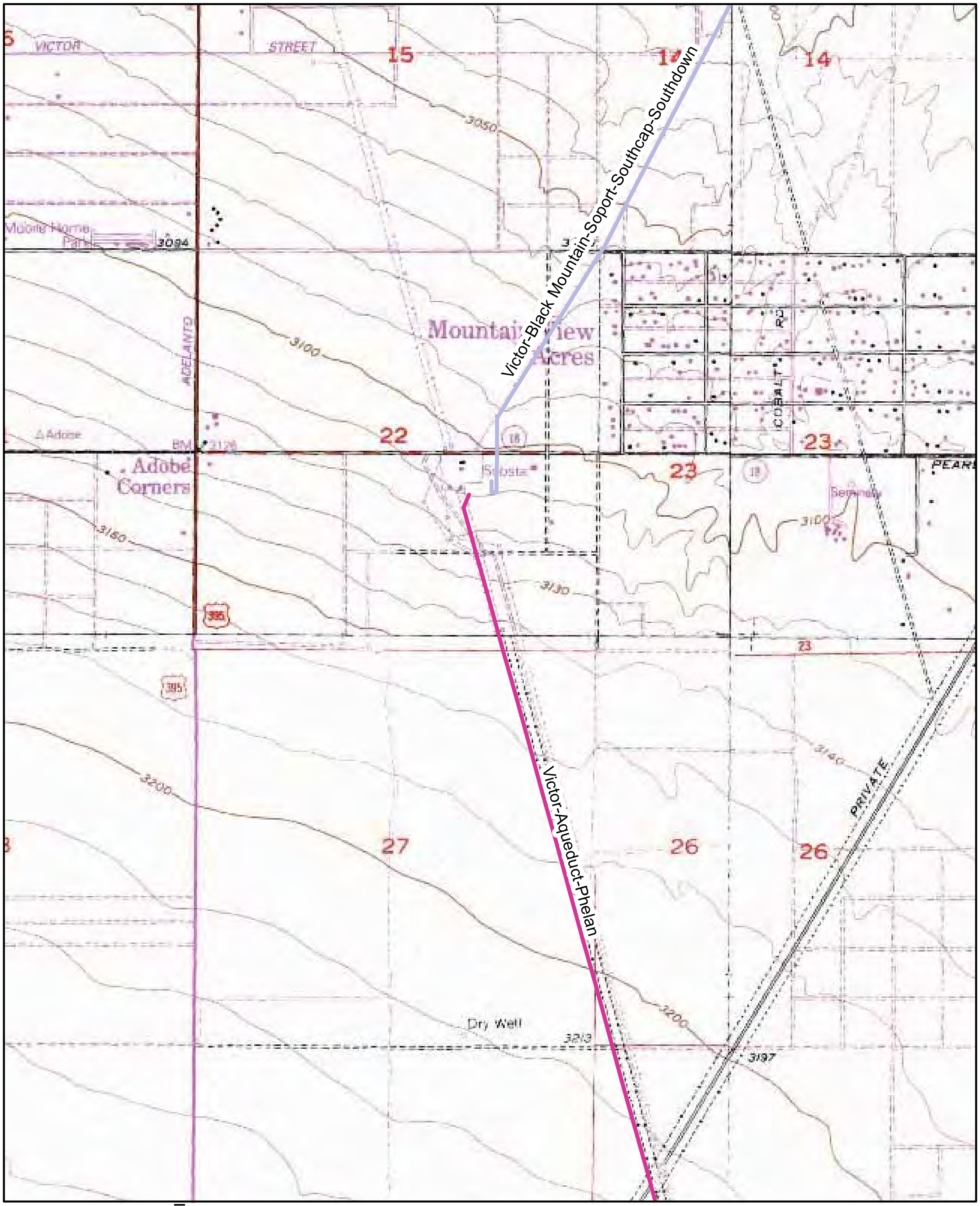
*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



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Primary # P36-010315H UPDATE
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LOCATION MAP

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* Resource Name or #: Boulder Transmission Line

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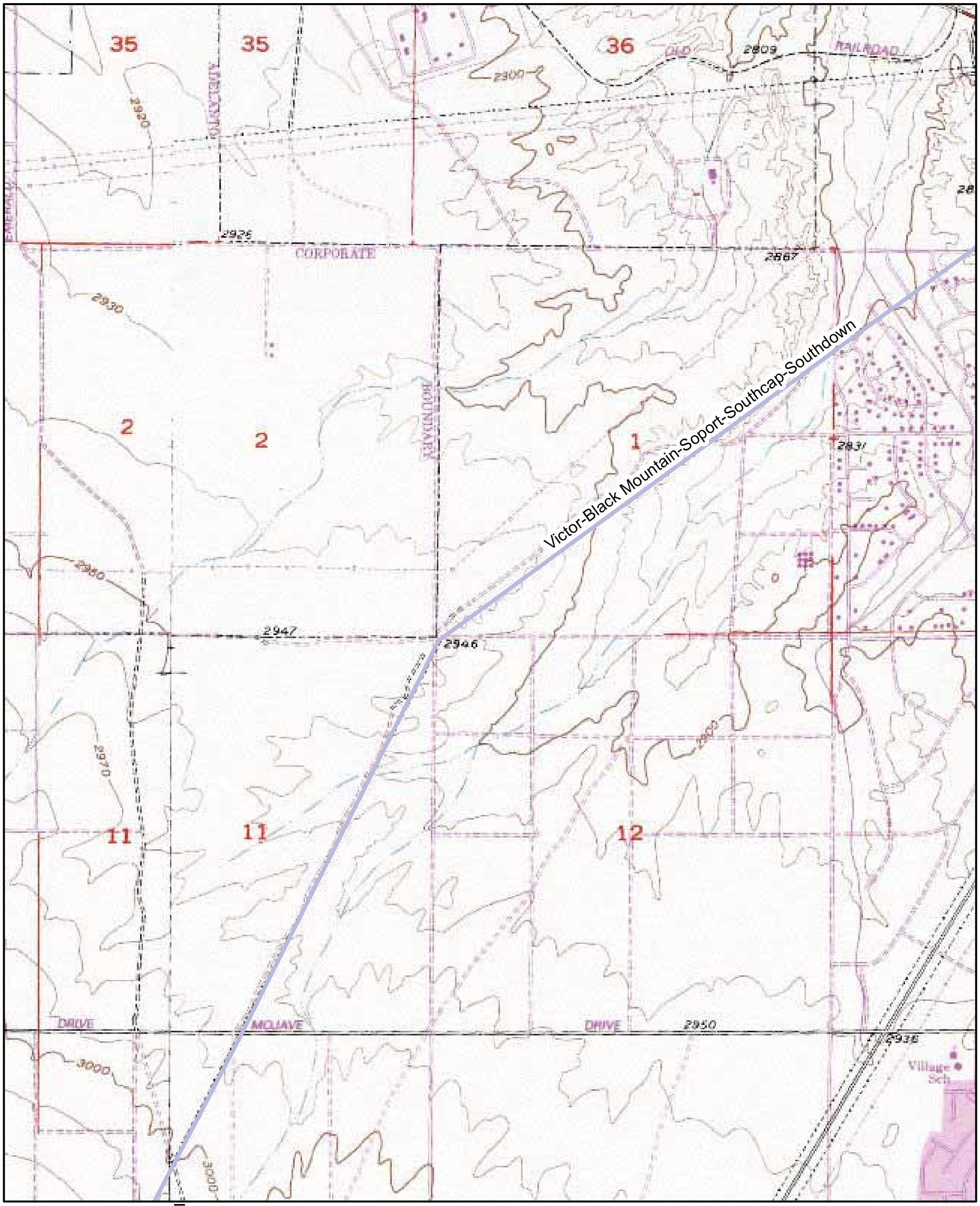
*Scale: 1:24,000 *Date of Map: 04/02/2015



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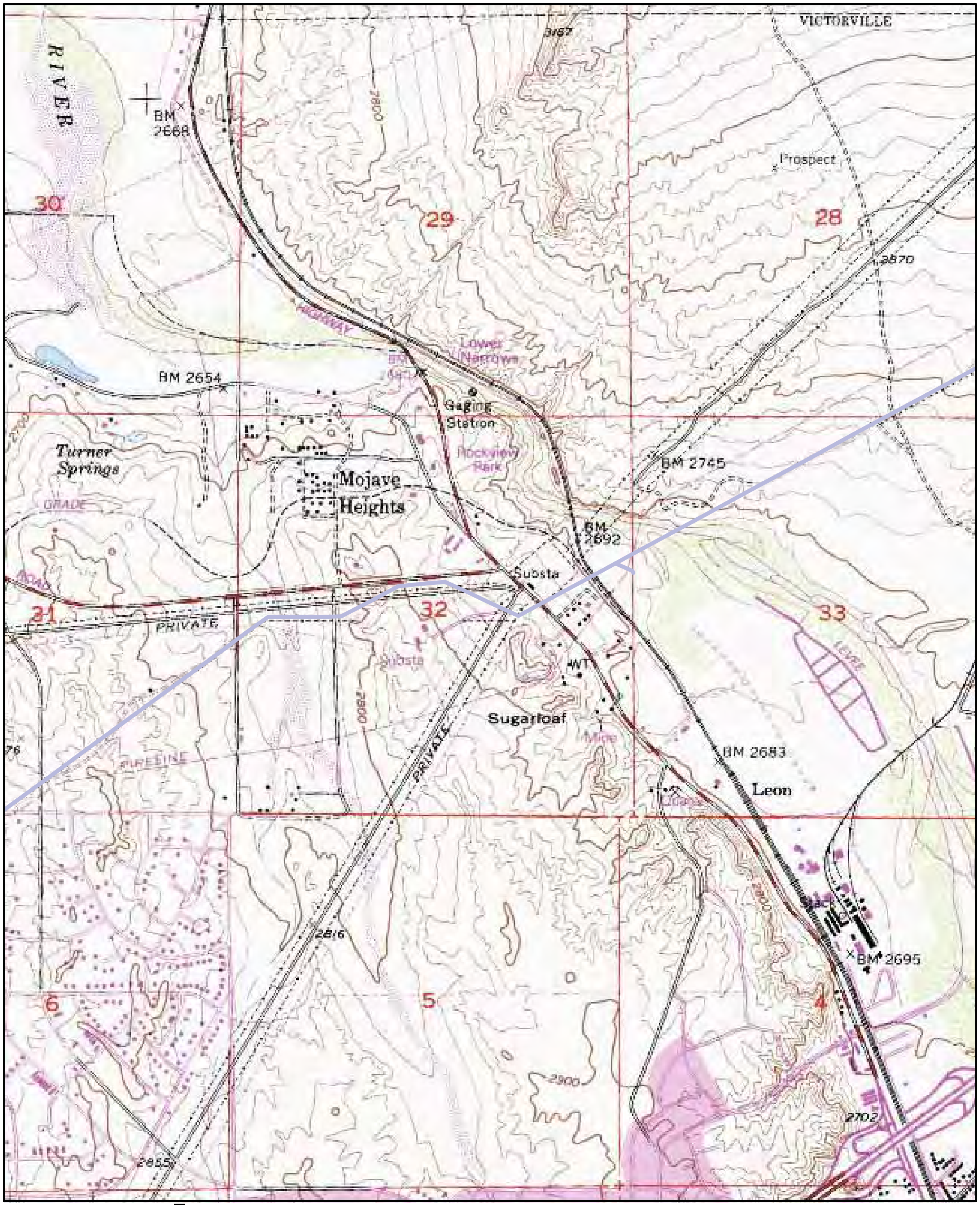
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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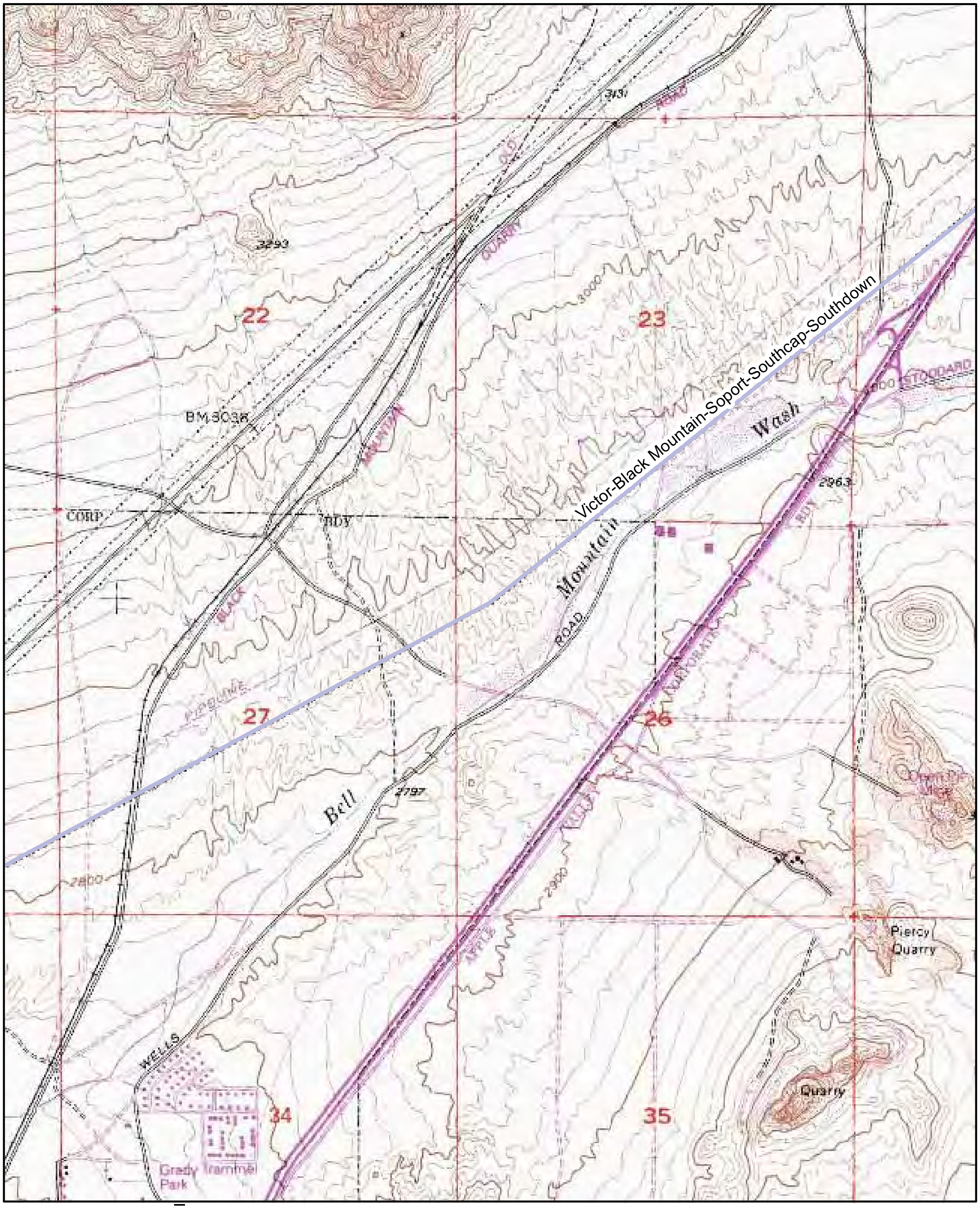
* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



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Primary # P36-010315H UPDATE
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LOCATION MAP

Trinomial: CA-SBR-10315H

* Resource Name or #: Boulder Transmission Line

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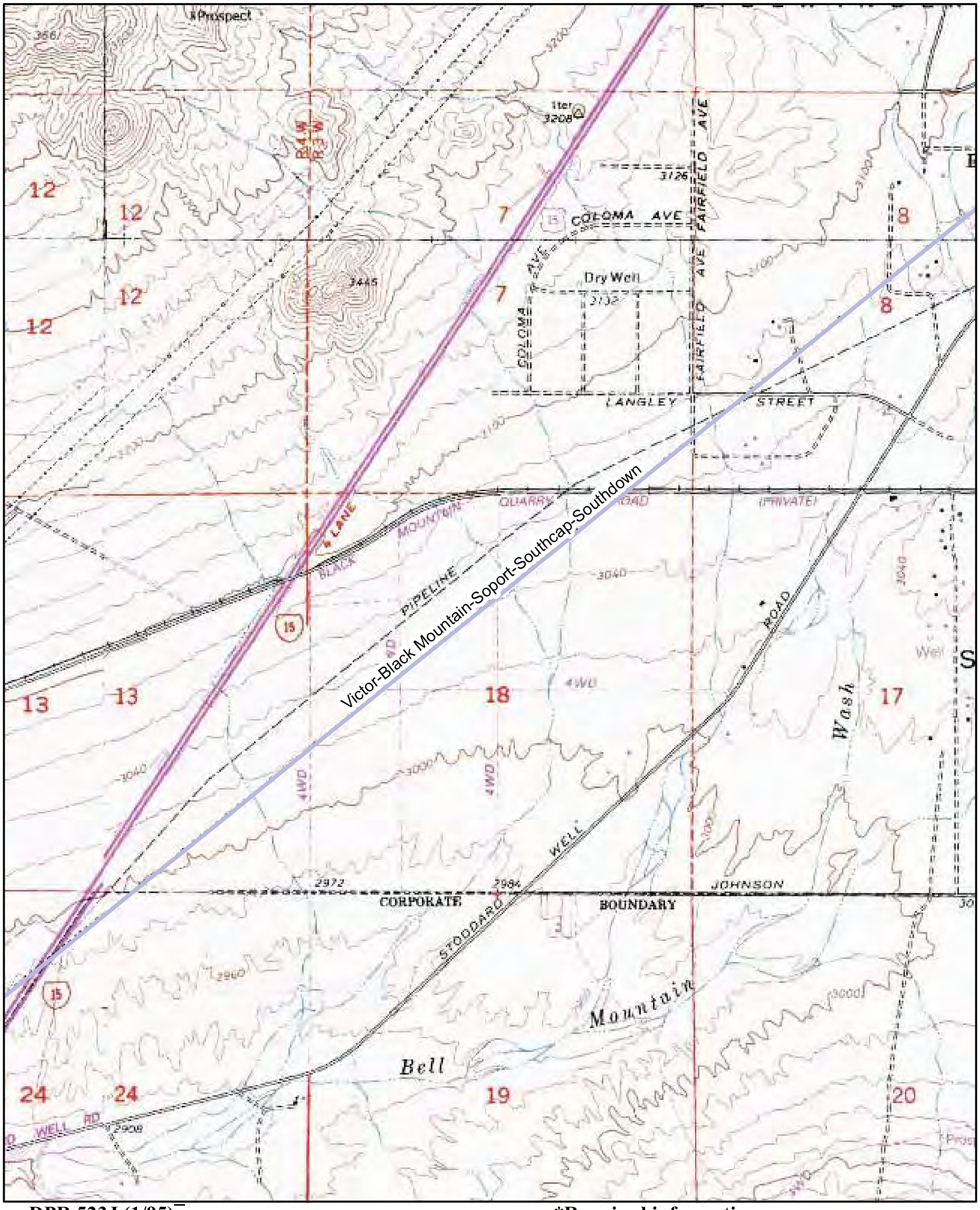

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

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* Resource Name or #: Boulder Transmission Line

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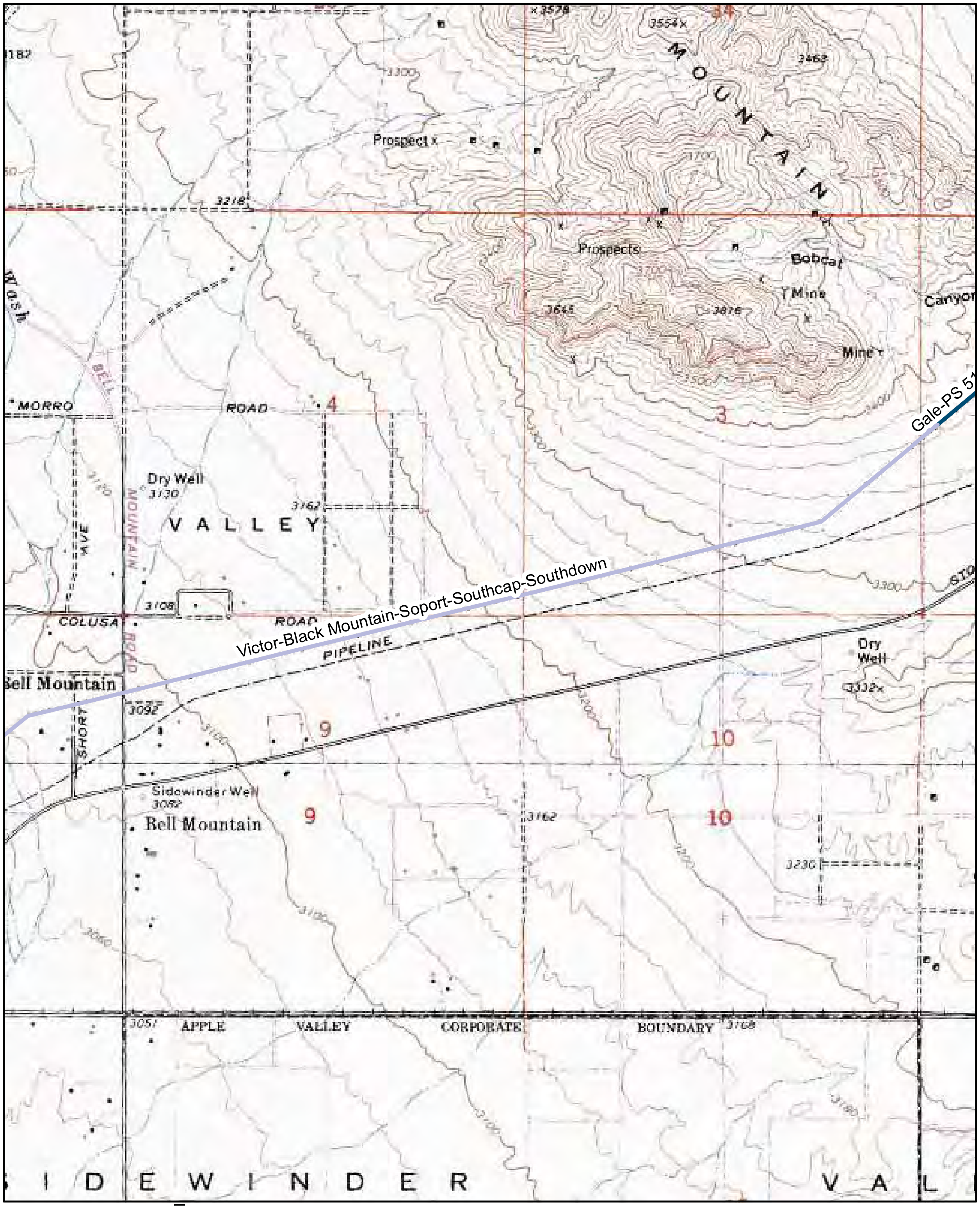

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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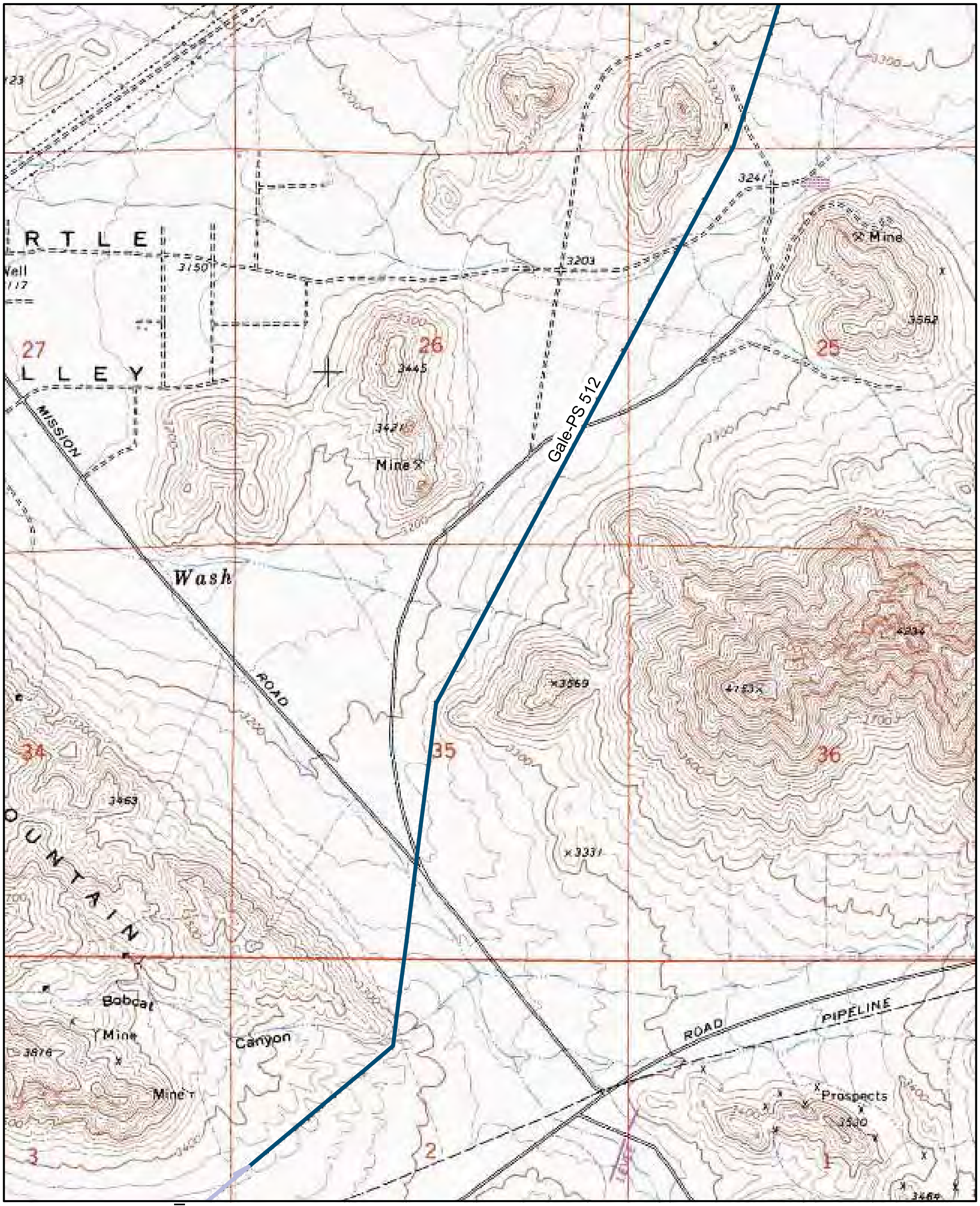
*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



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Primary # P36-010315H UPDATE
HRI#

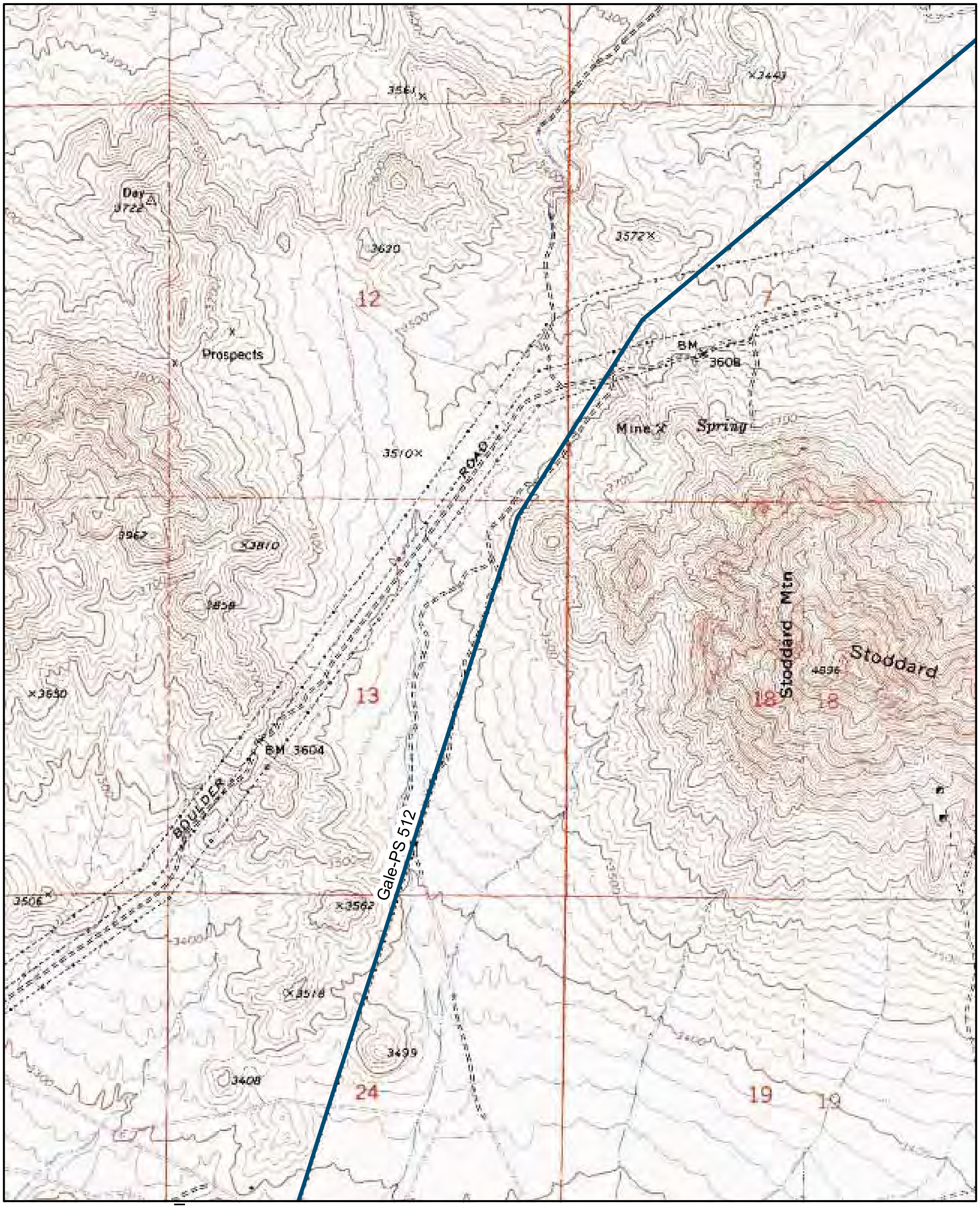
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



*Required information

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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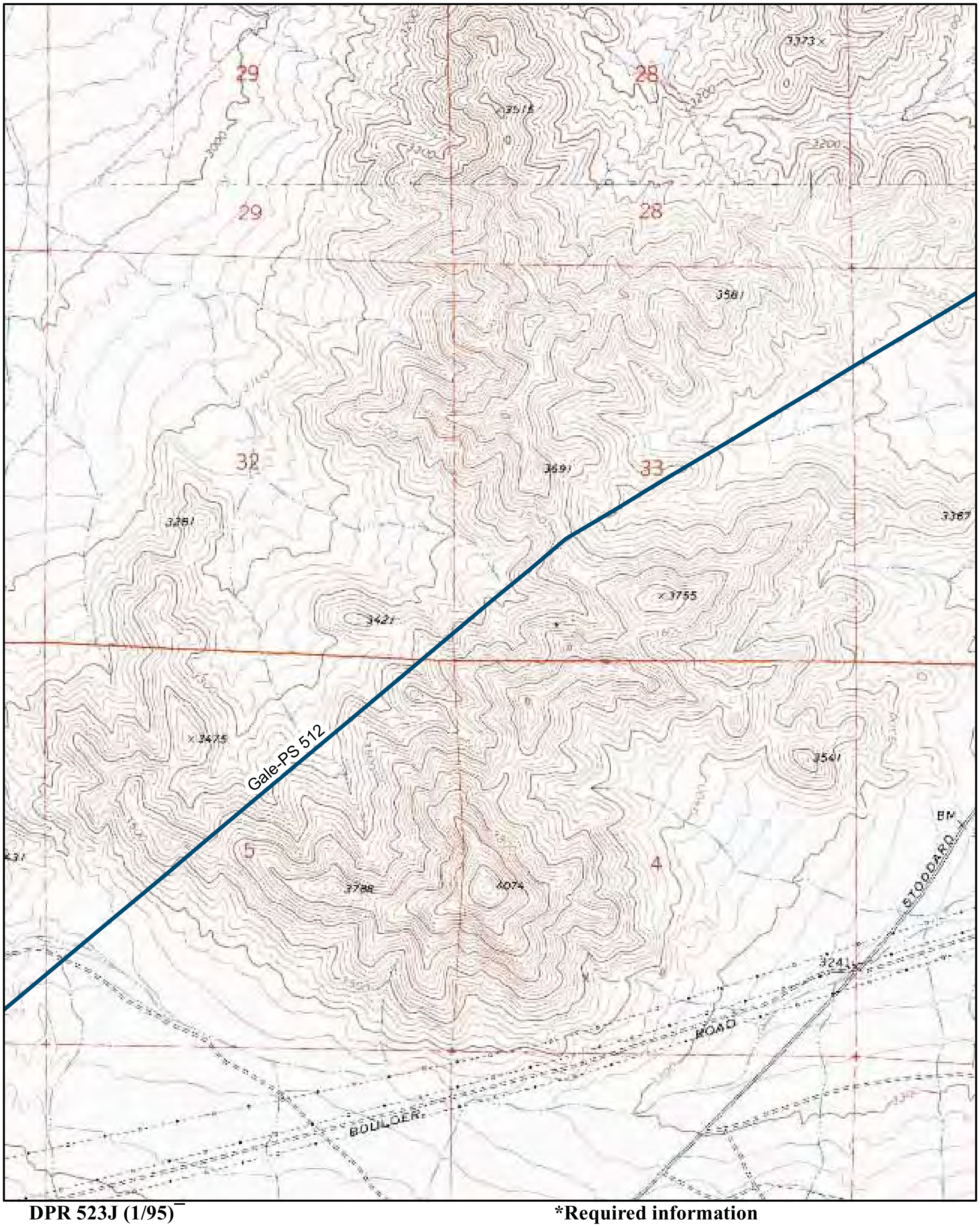
*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



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LOCATION MAP

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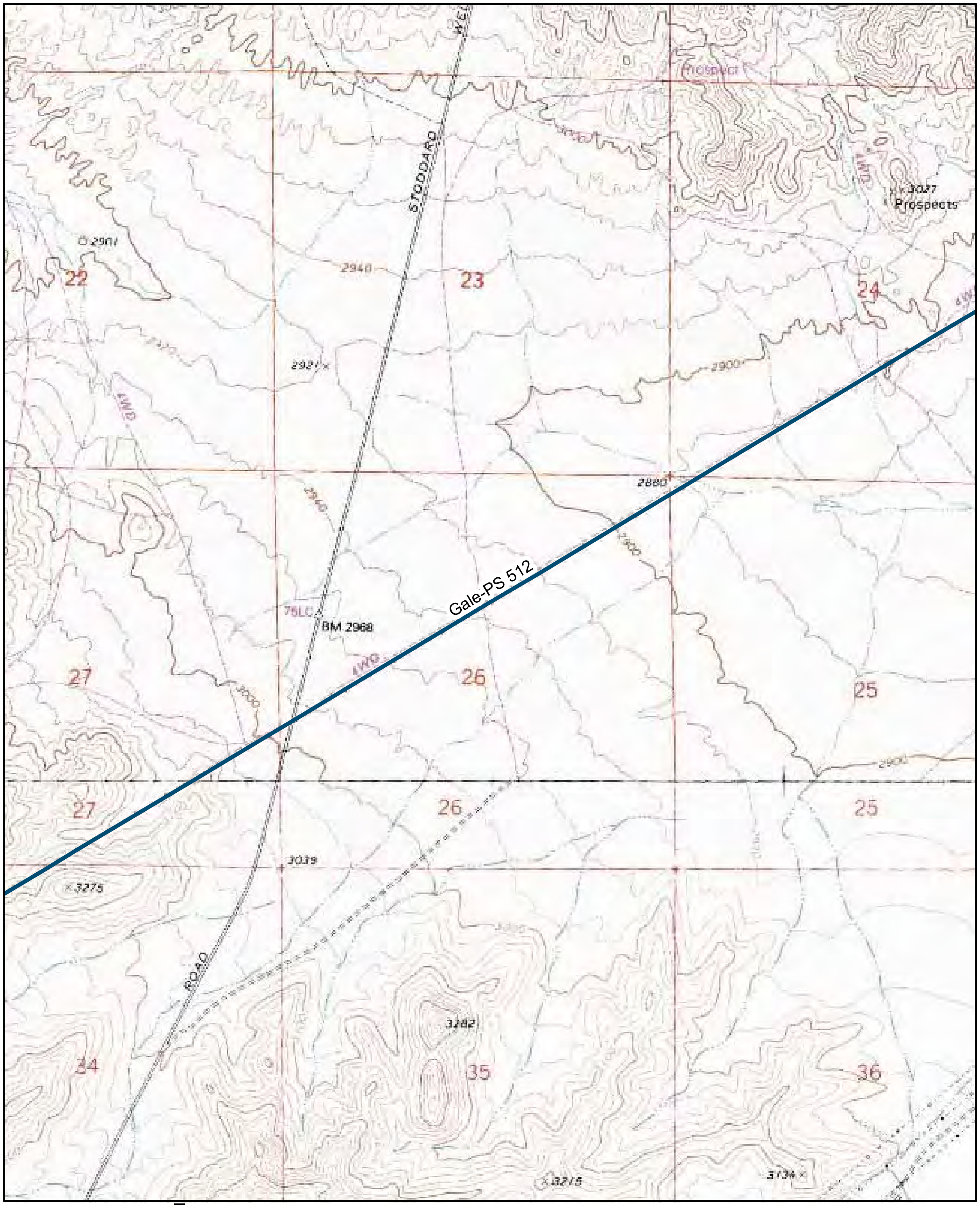
*Scale: 1:24,000 *Date of Map: 04/02/2015



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Primary # P36-010315H UPDATE
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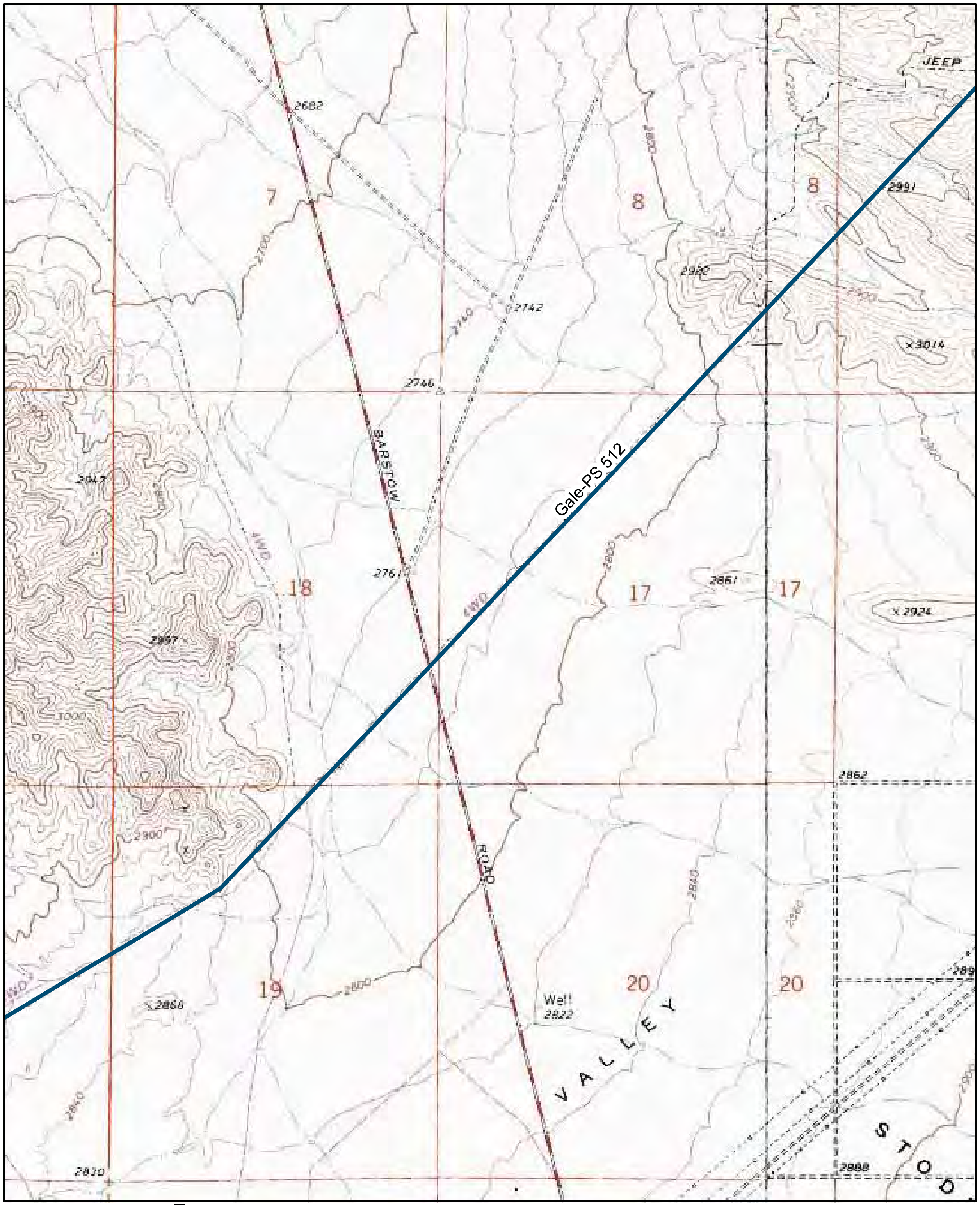
LOCATION MAP

Trinomial: CA-SBR-10315H

* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

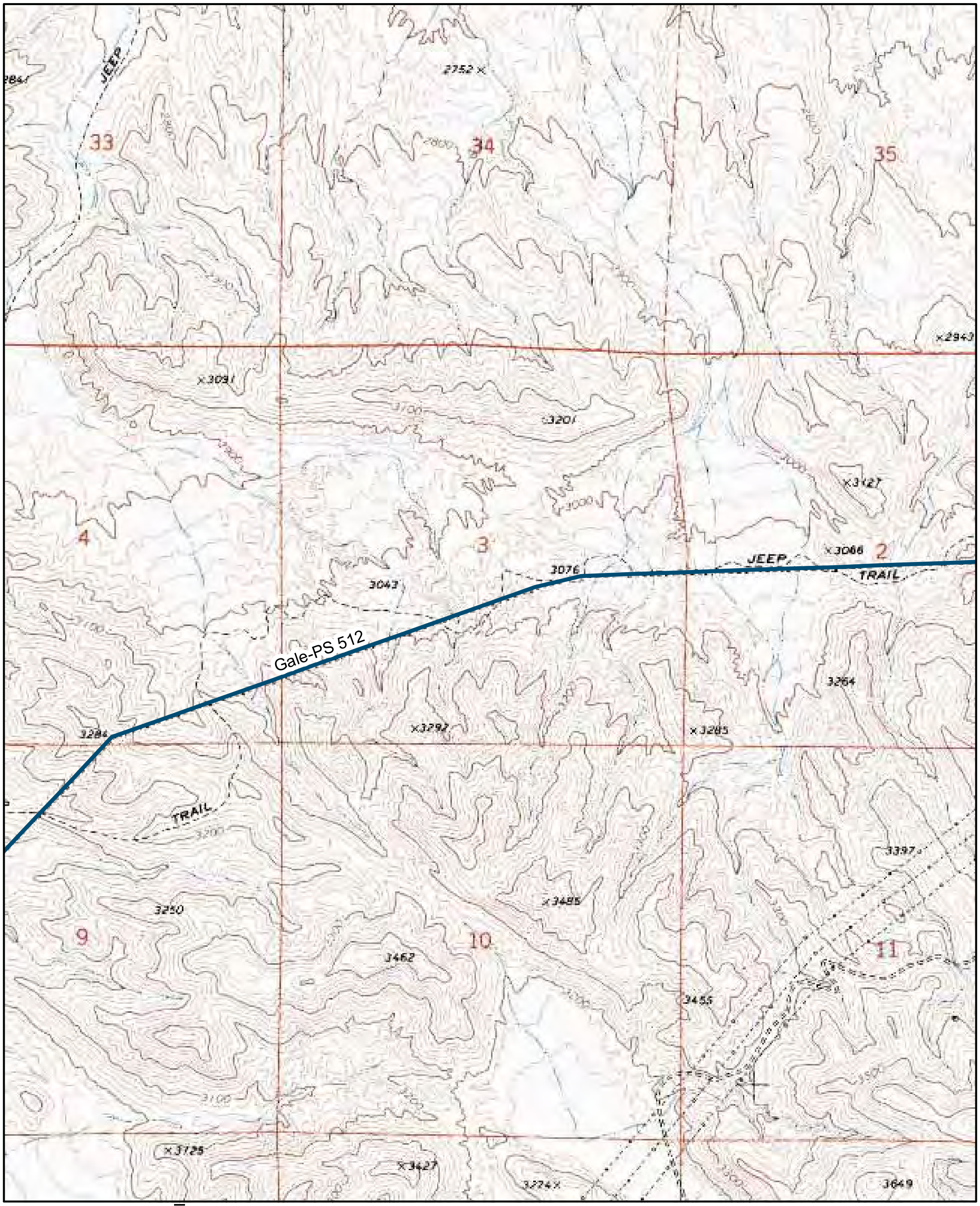
Primary # P36-010315H UPDATE
HRI#

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

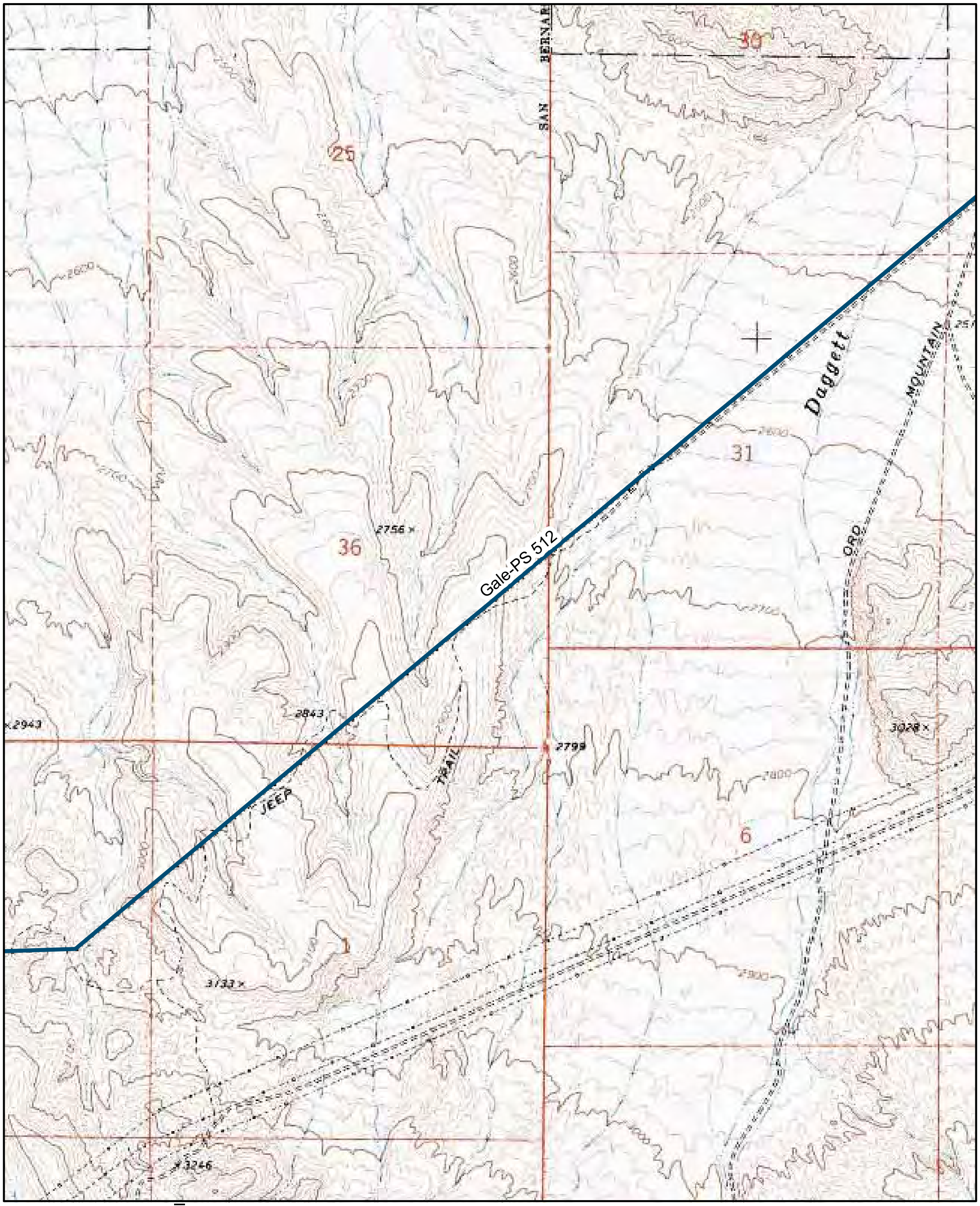
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

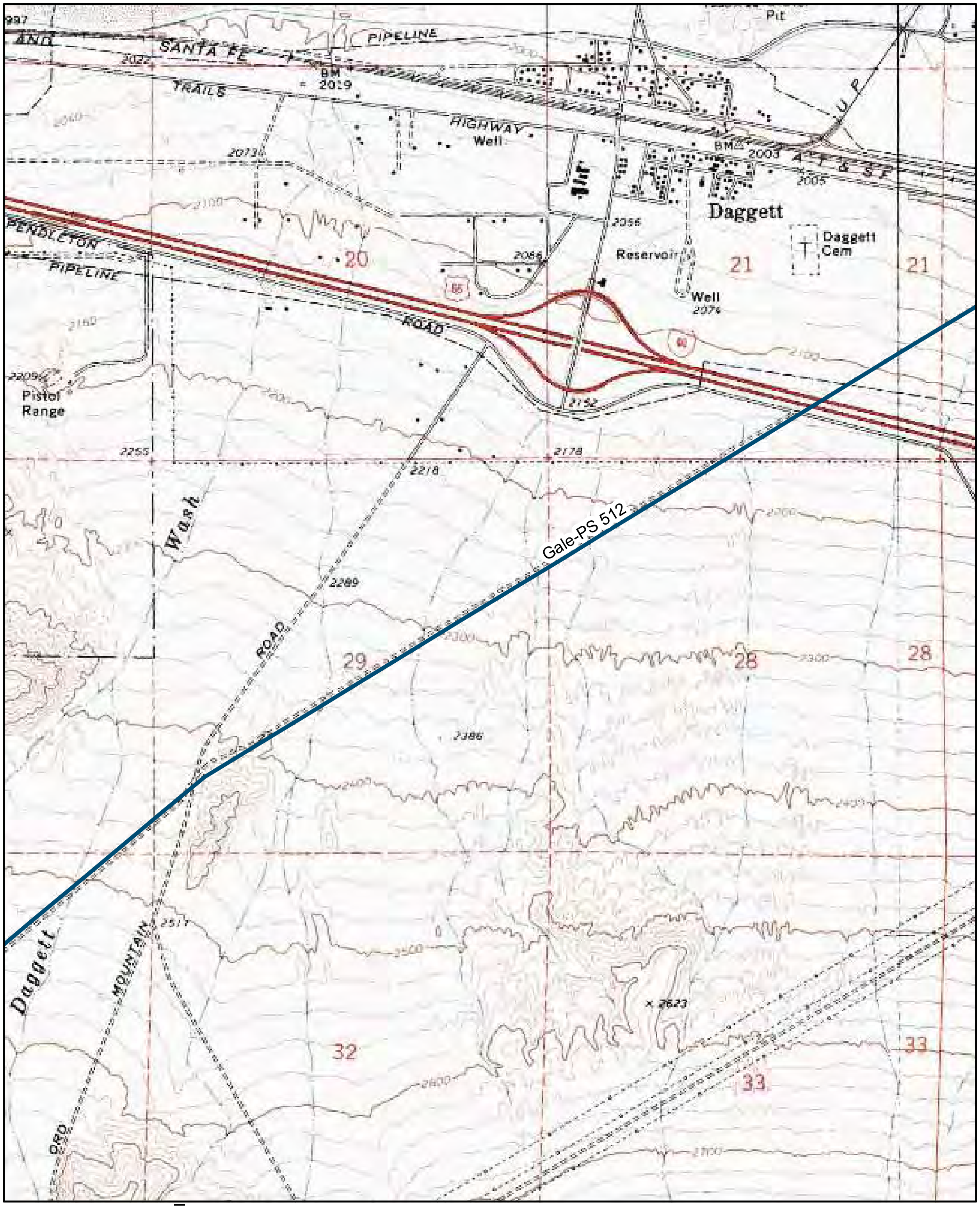
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #:** Boulder Transmission Line

***Drawn by:** Andrew Belcourt

***Scale:** 1:24,000 ***Date of Map:** 04/02/2015



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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

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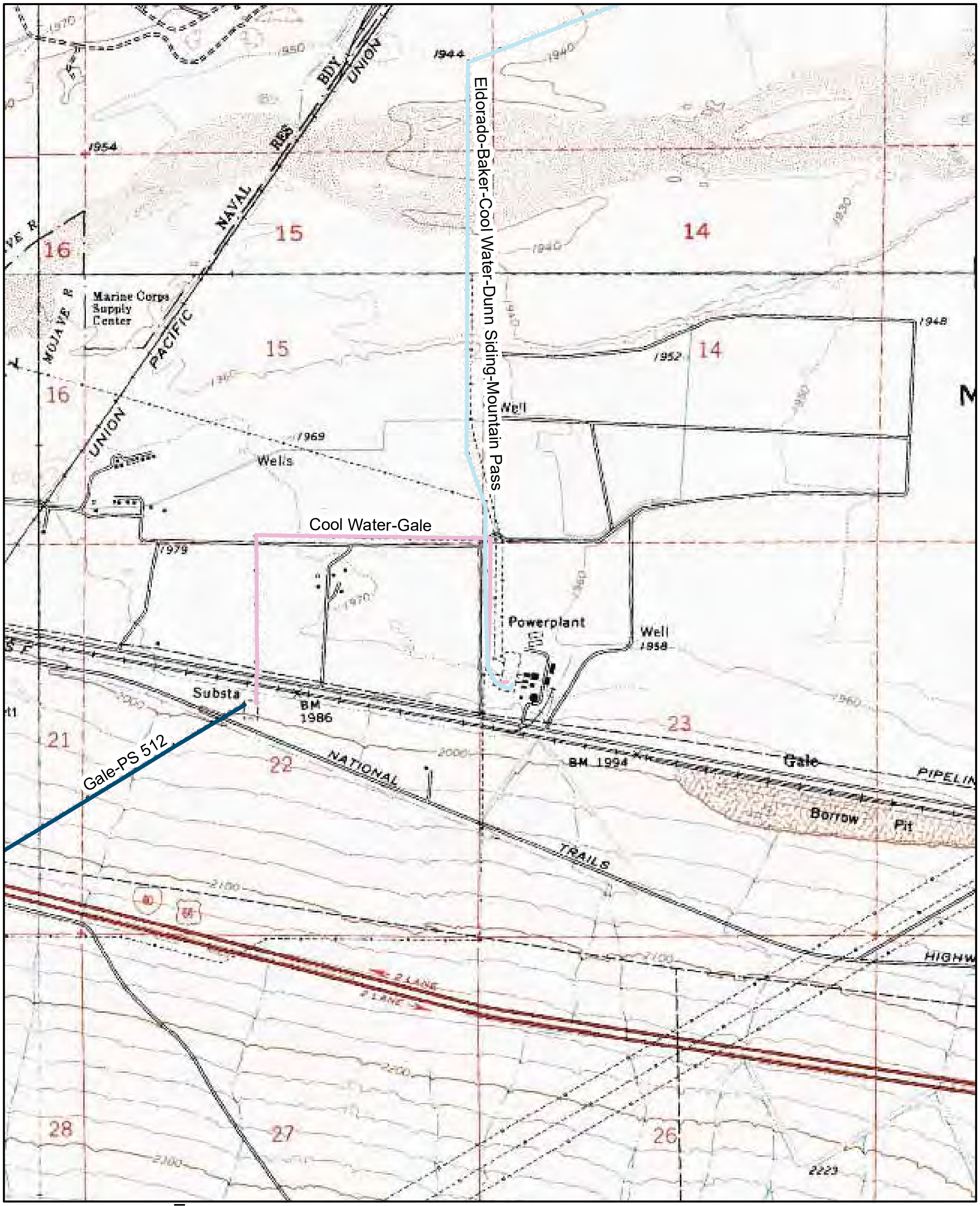

DPR 523J (1/95)

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

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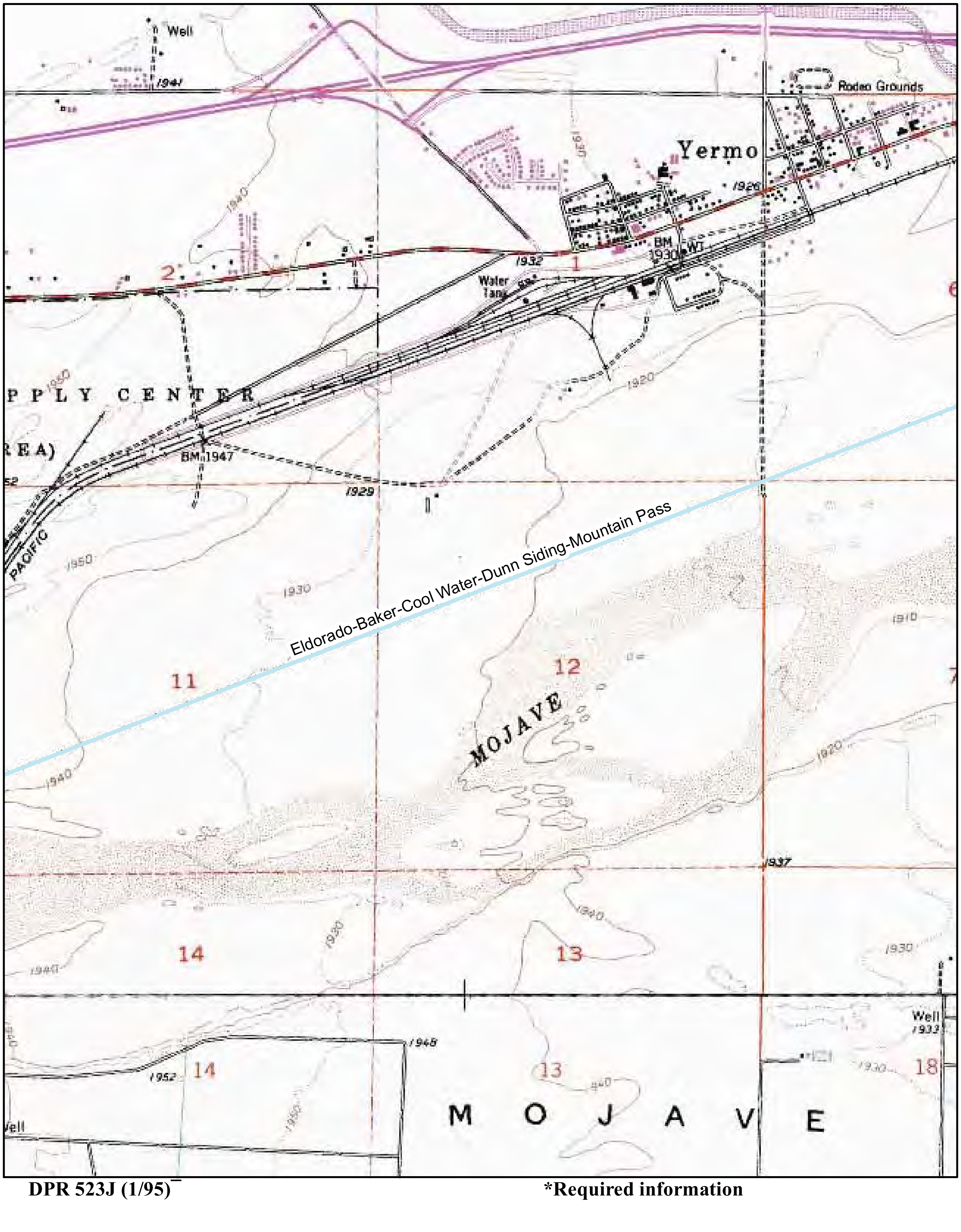

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

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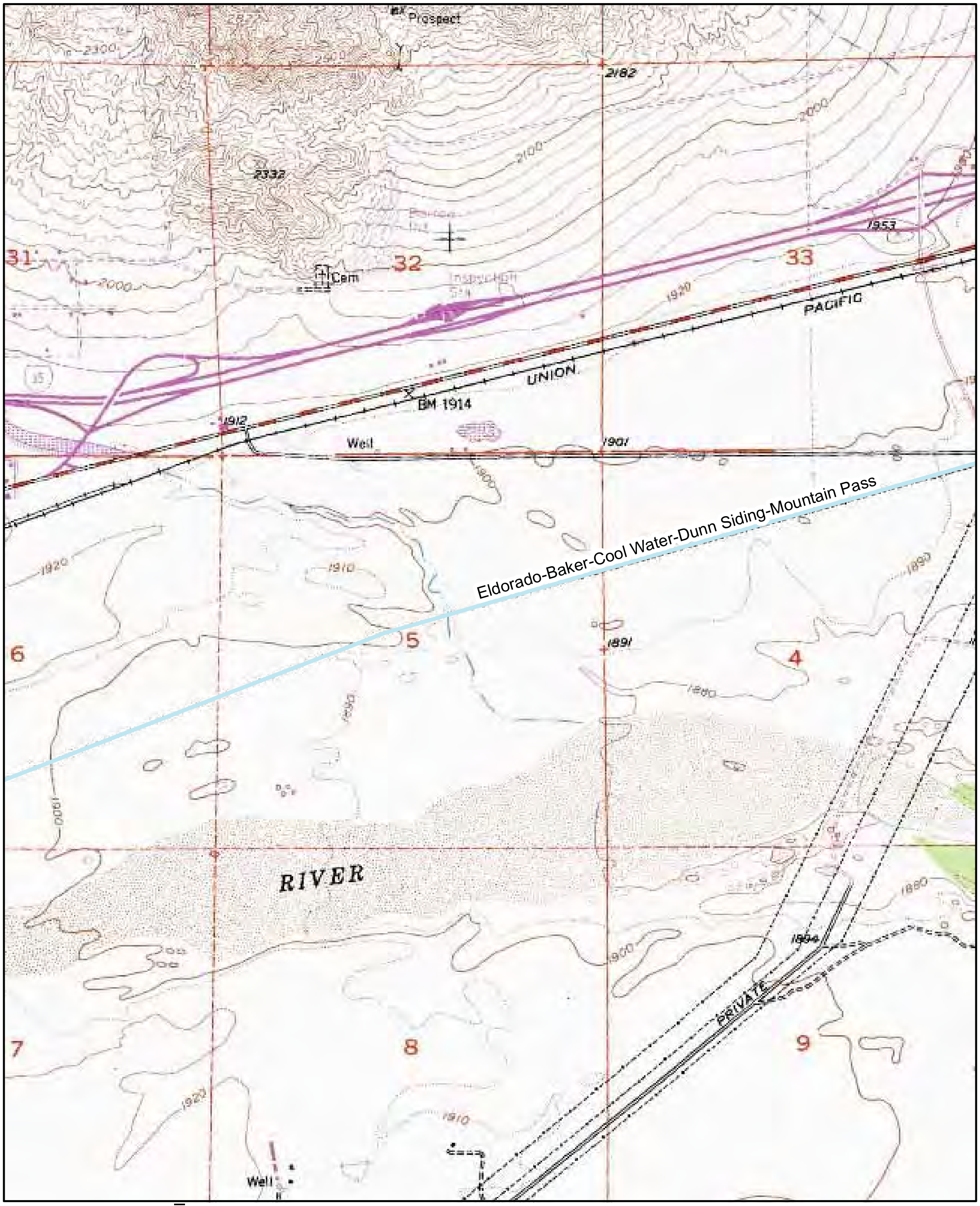

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Primary # P36-010315H UPDATE
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LOCATION MAP

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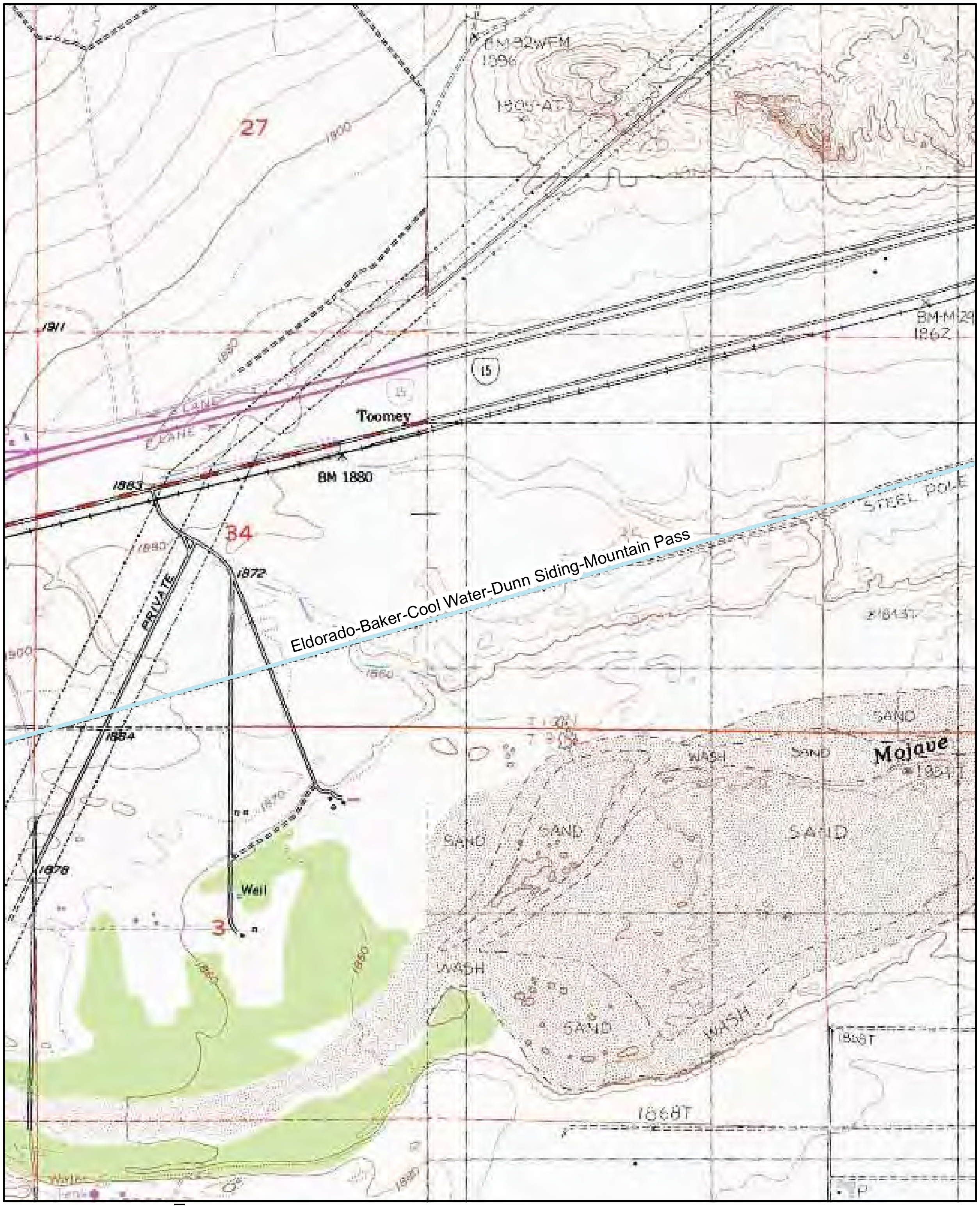

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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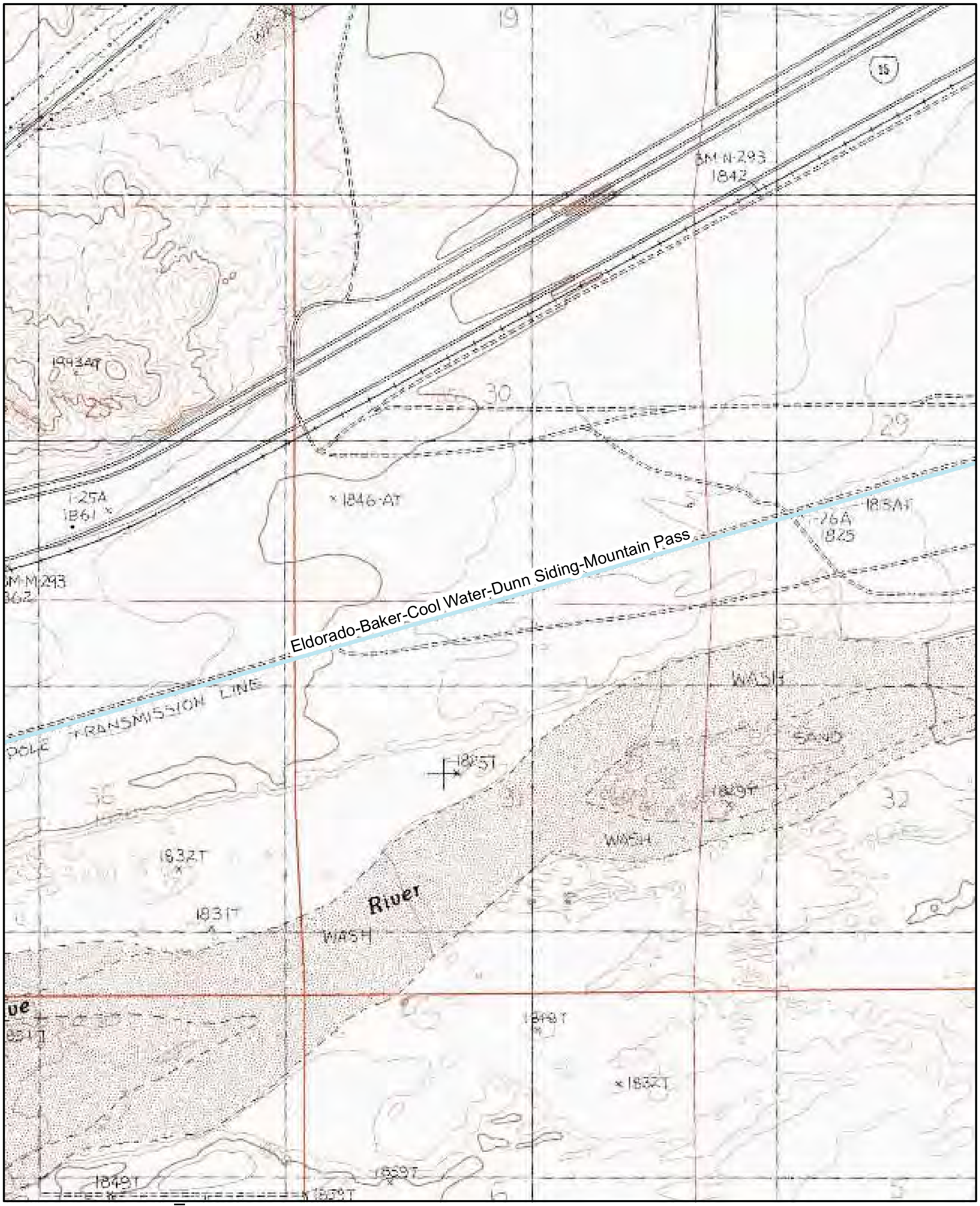
*Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



DPR 523J (1/95)

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
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LOCATION MAP

Trinomial: CA-SBR-10315H

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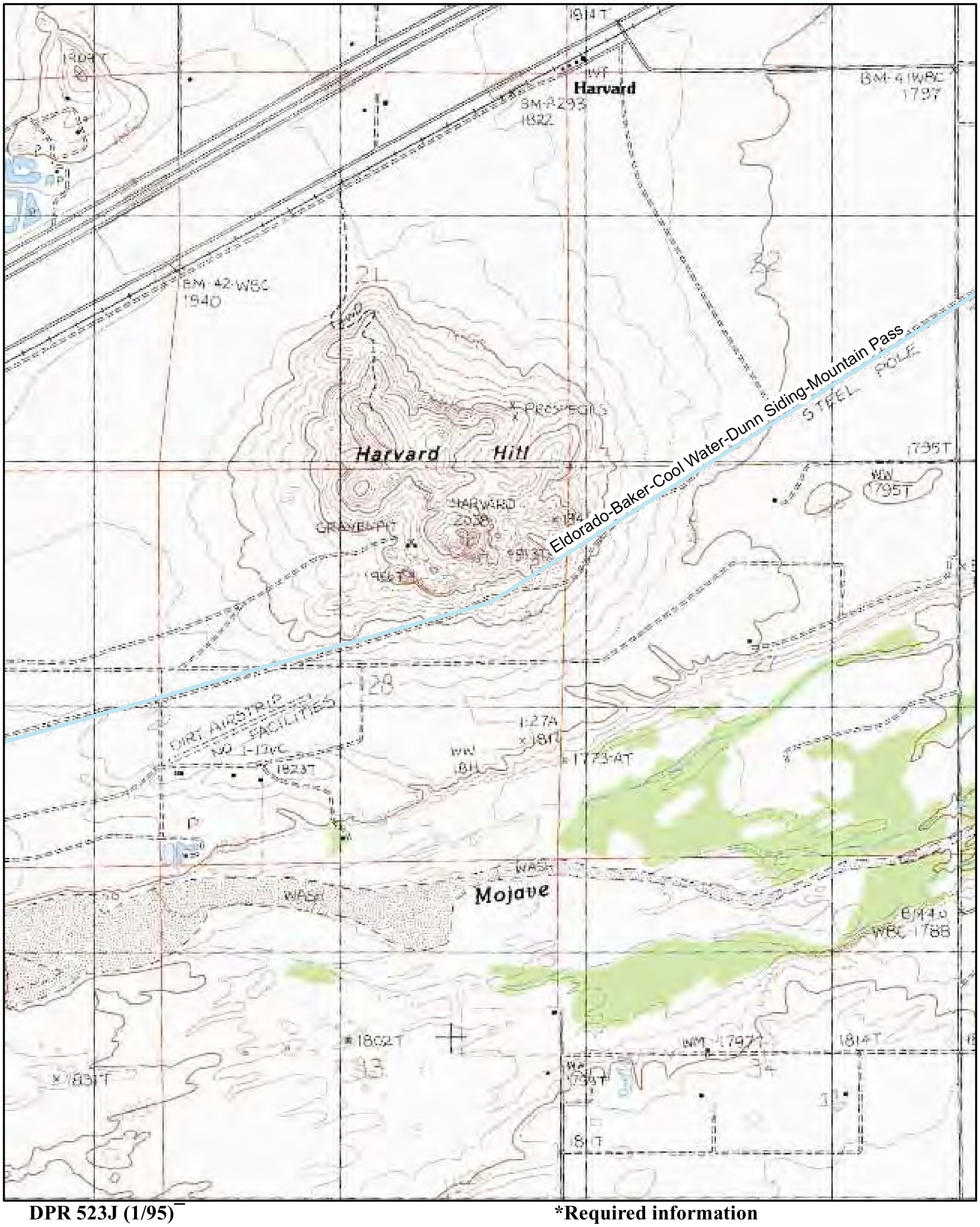

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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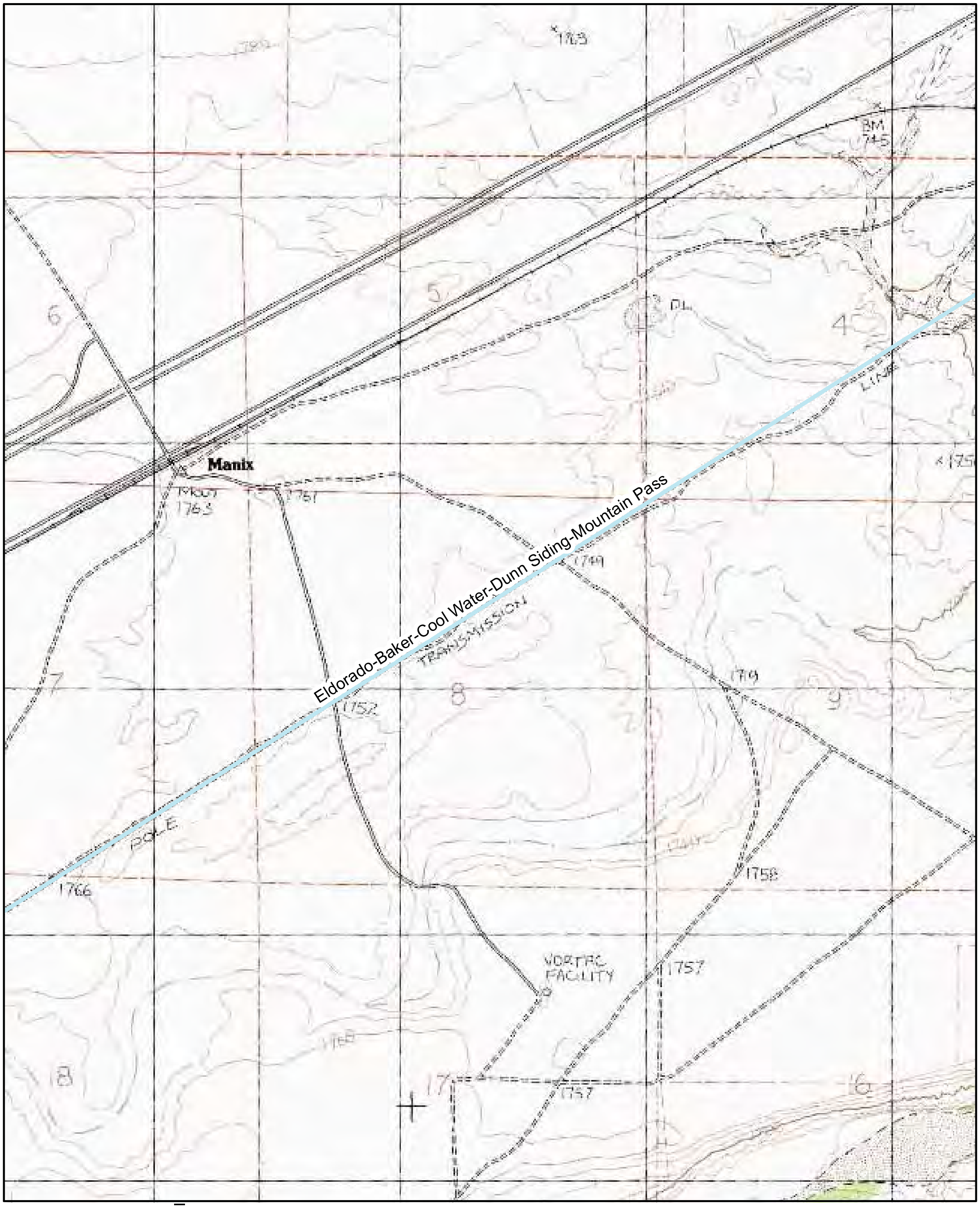

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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*** Resource Name or #: Boulder Transmission Line**

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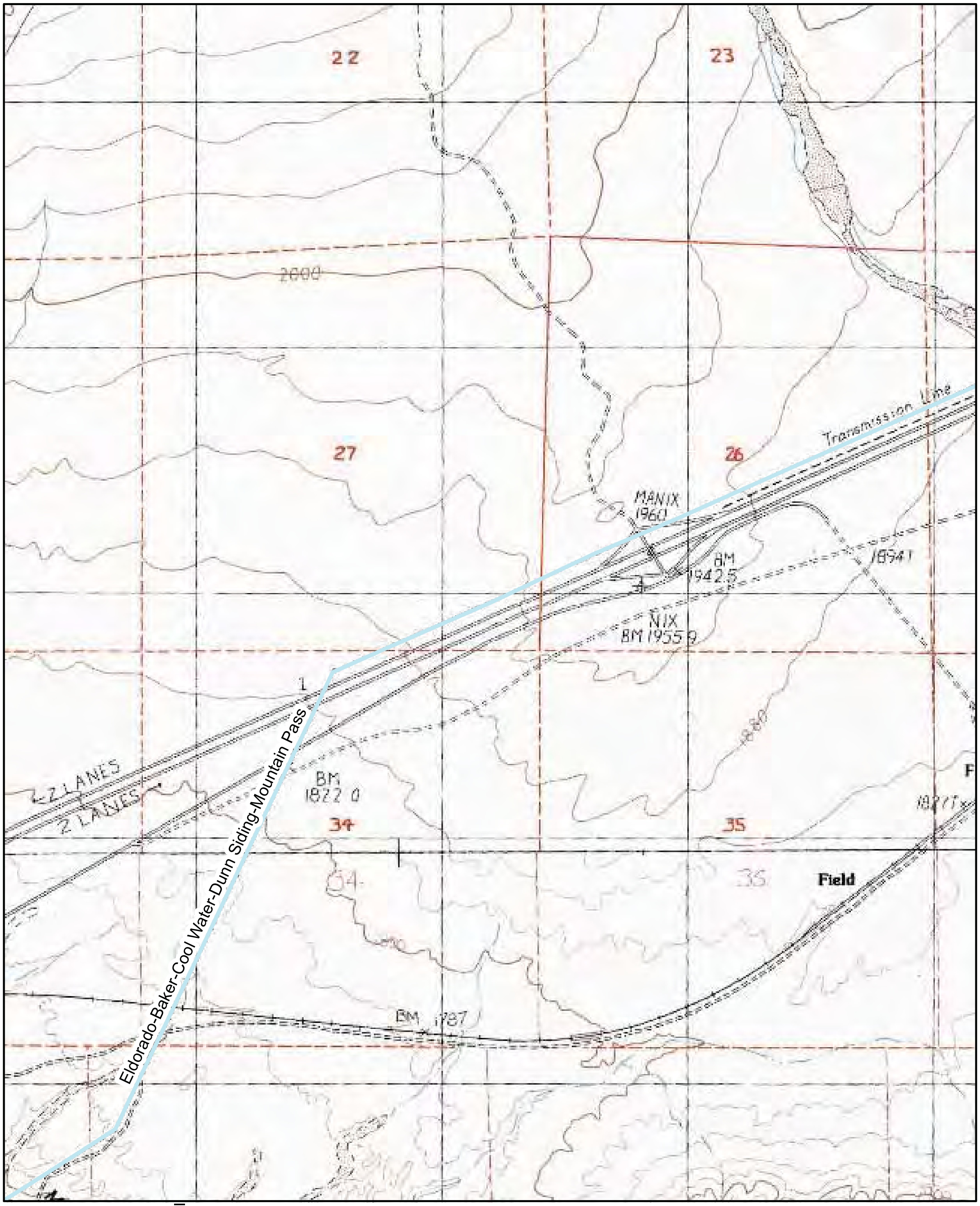
***Scale: 1:24,000 *Date of Map: 04/02/2015**



DPR 523J (1/95)

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

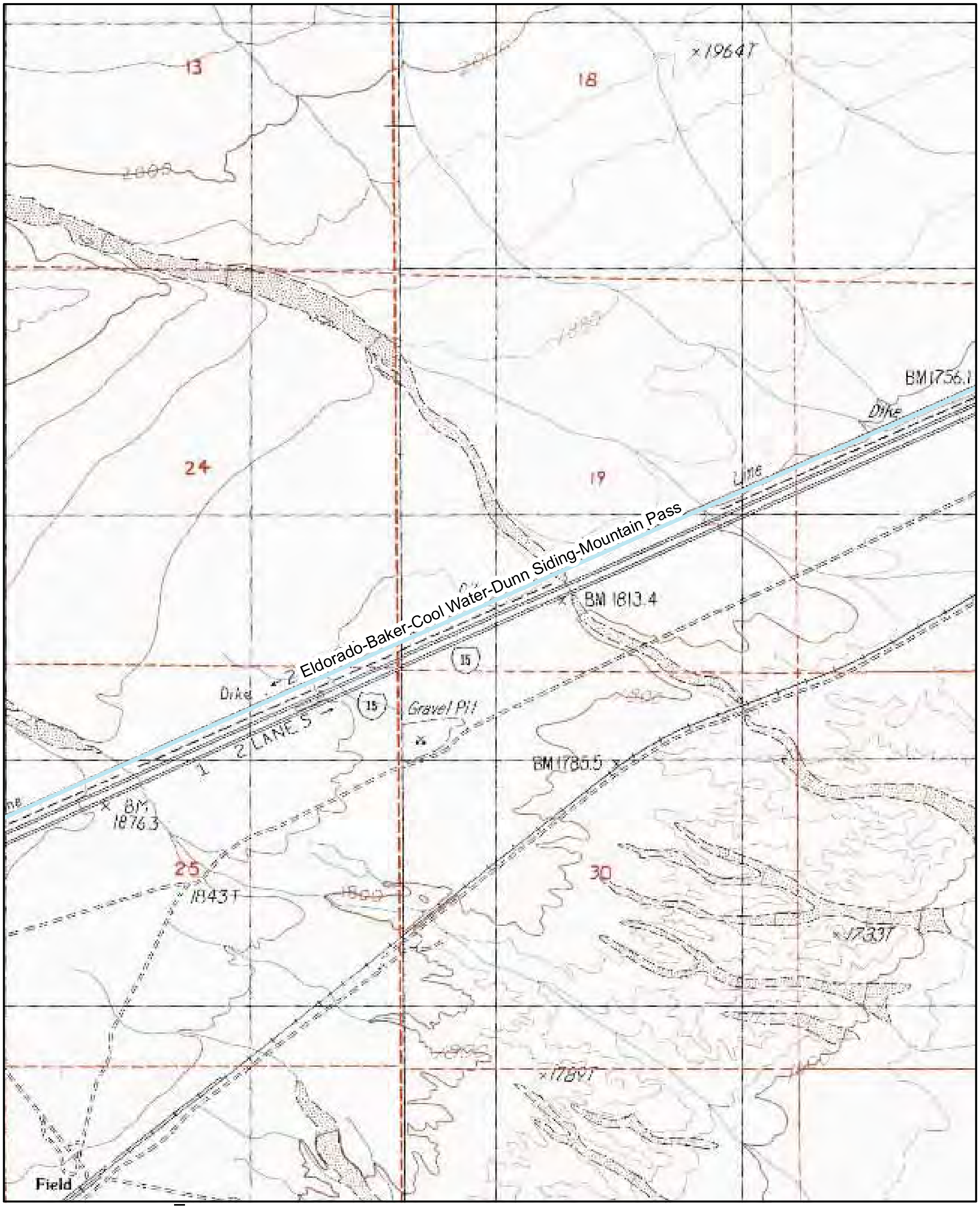
Trinomial: CA-SBR-10315H

Page: 49 of 86

* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



DPR 523J (1/95)

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
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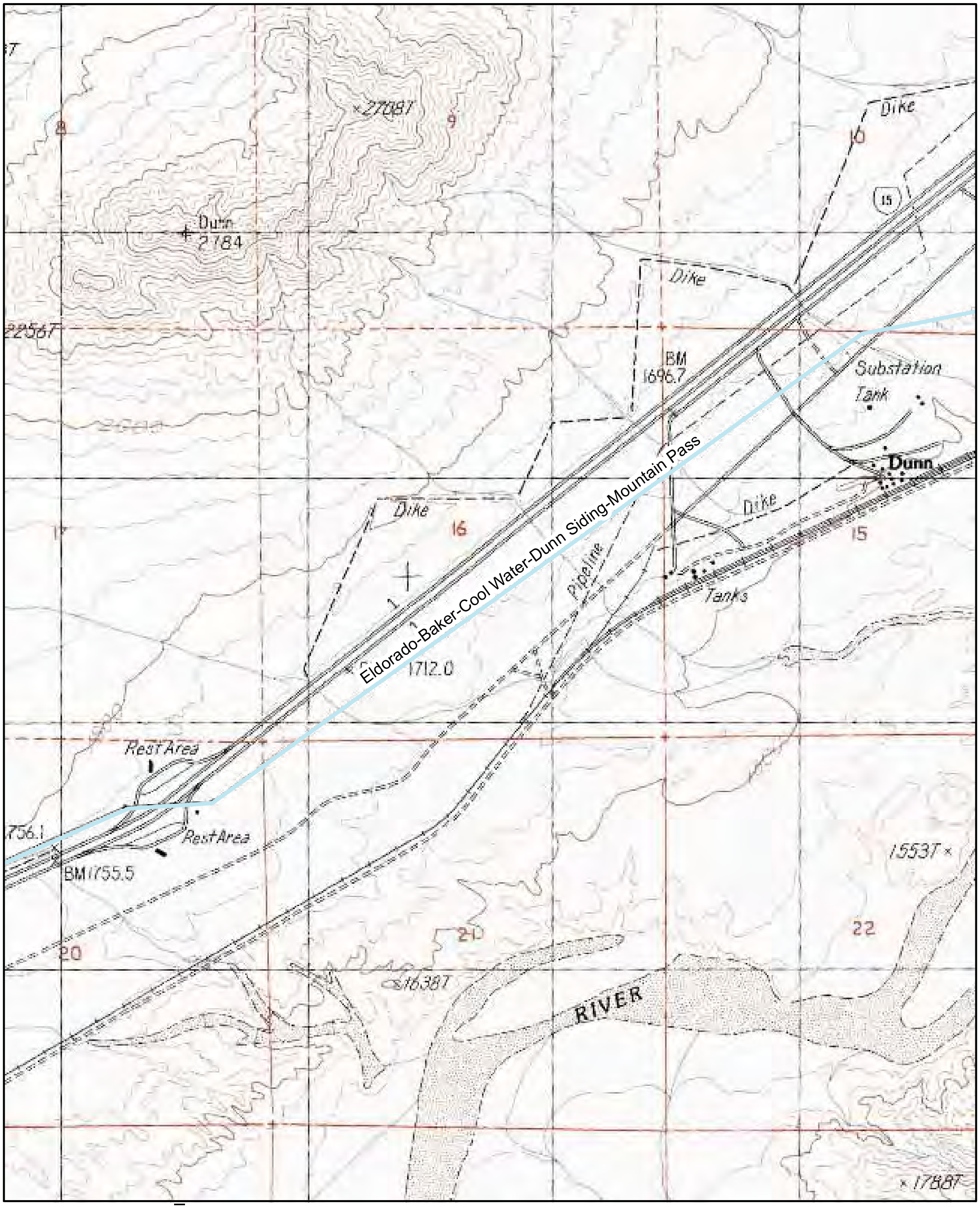

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DEPARTMENT OF PARKS AND RECREATION

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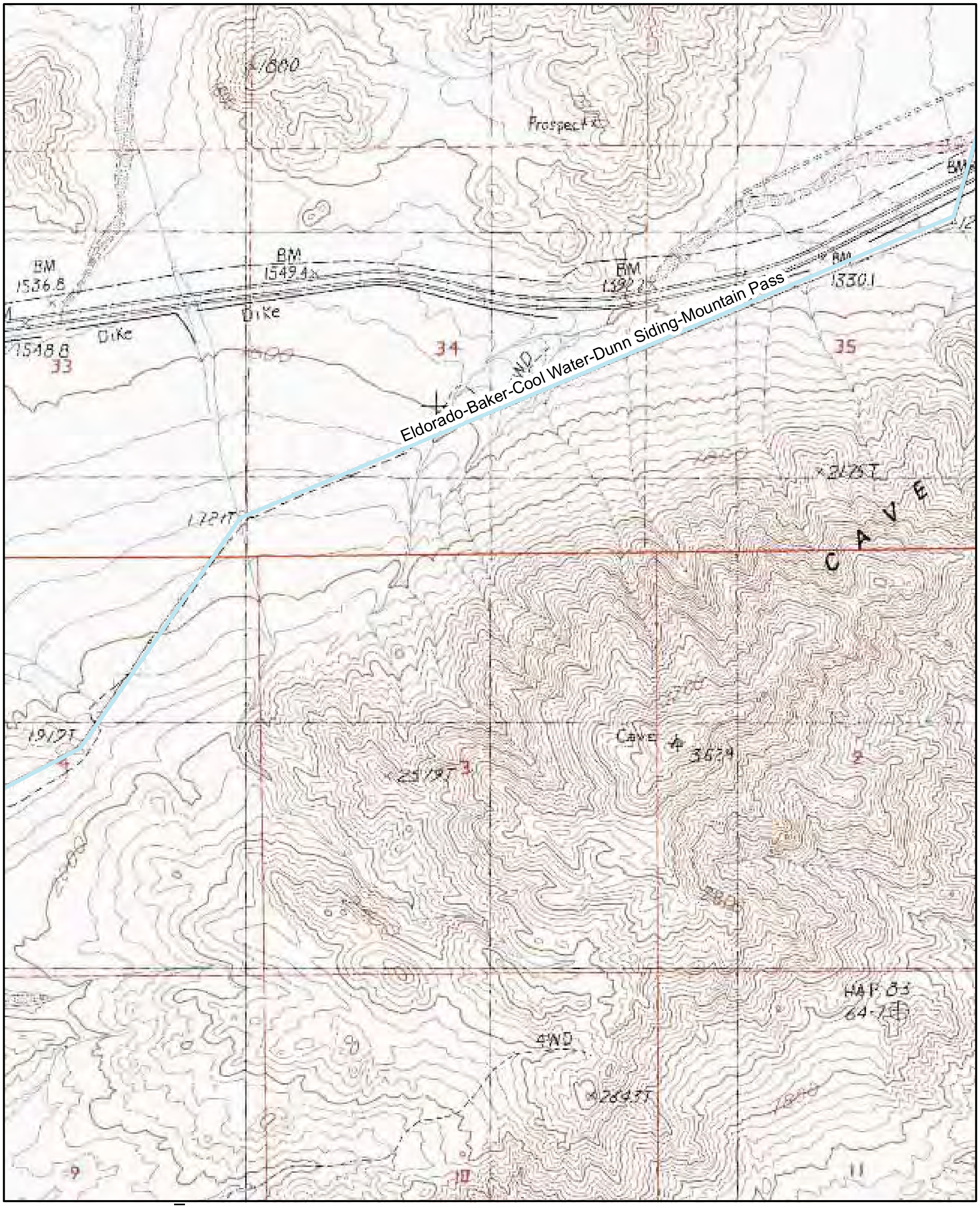

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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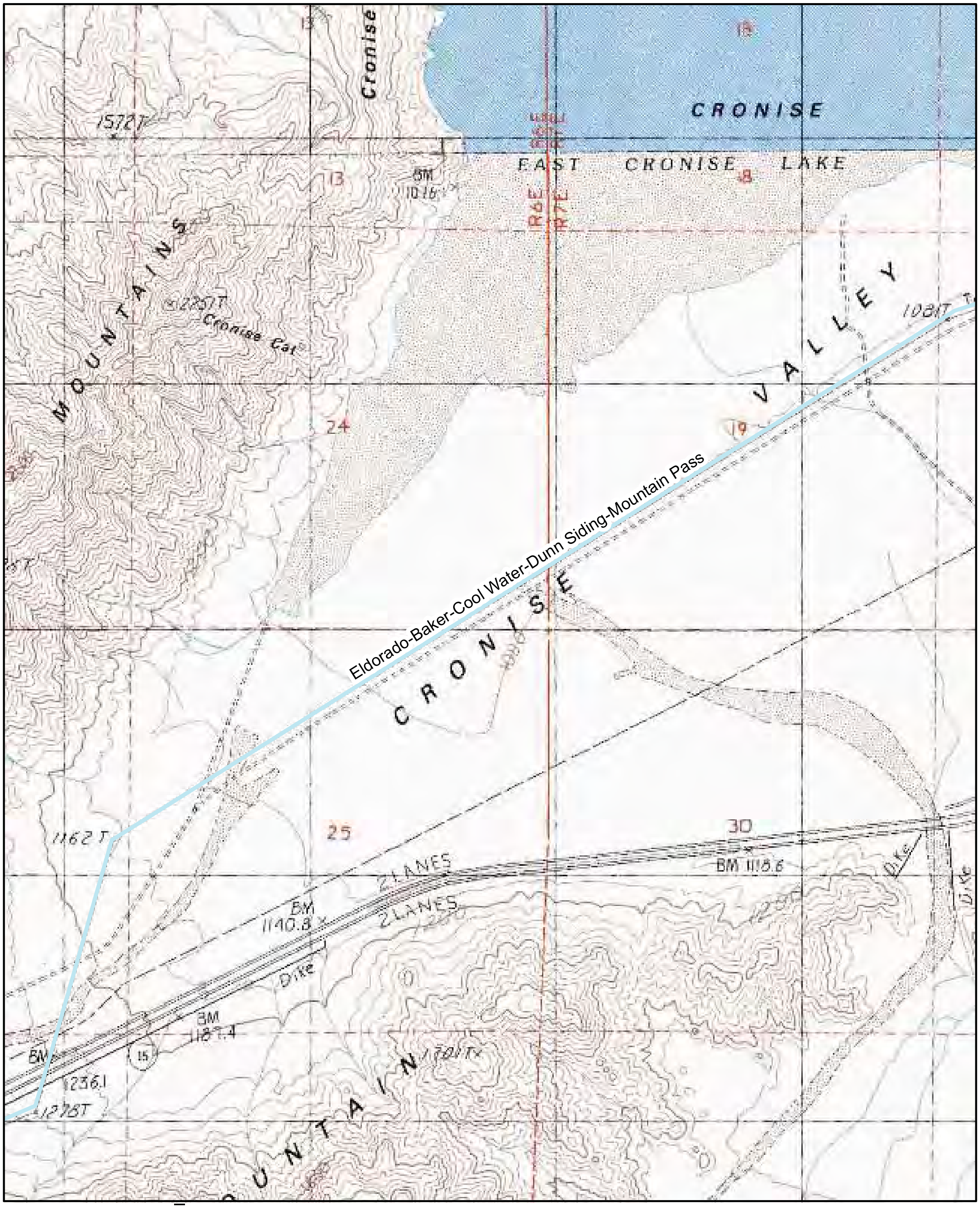

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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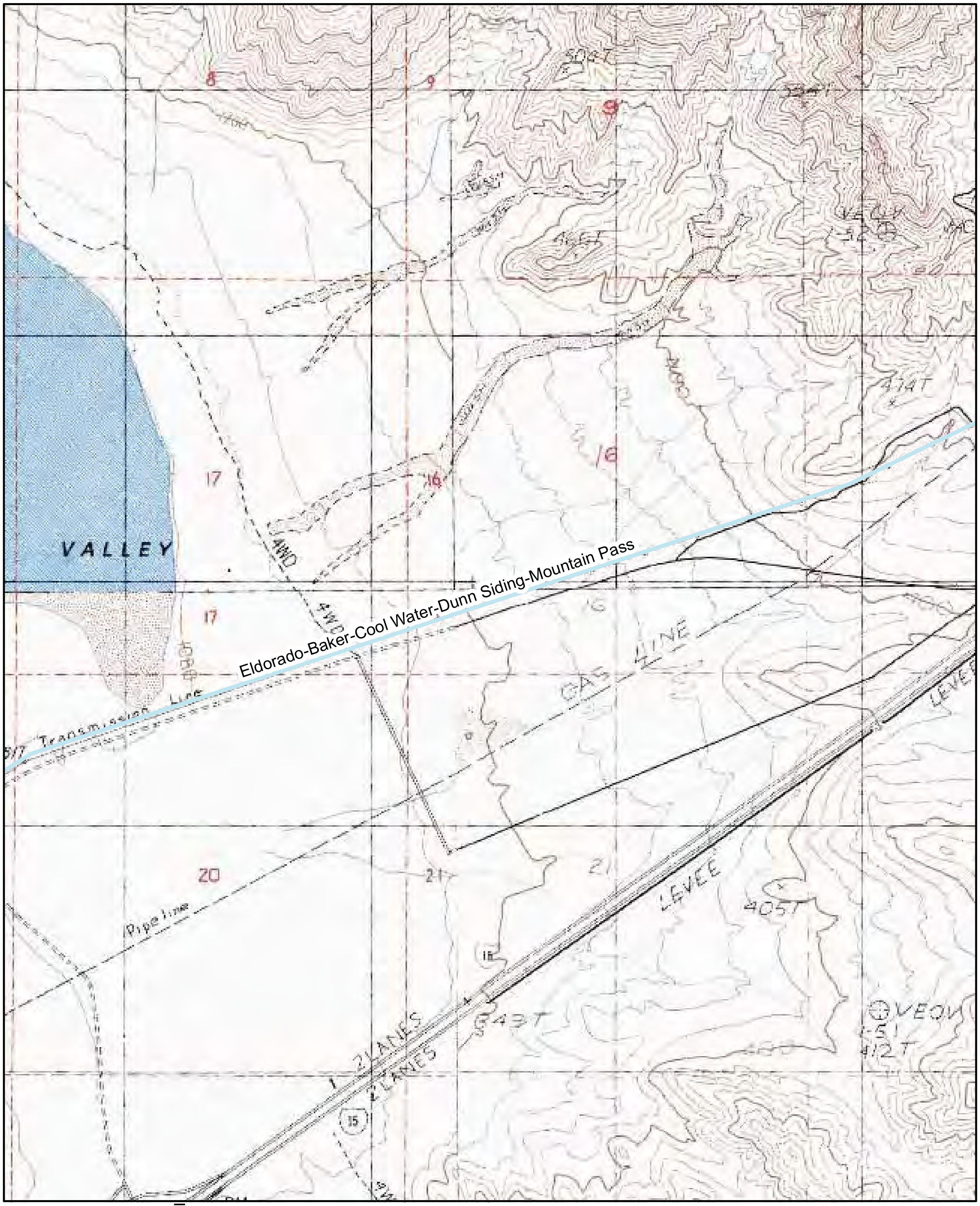

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
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LOCATION MAP

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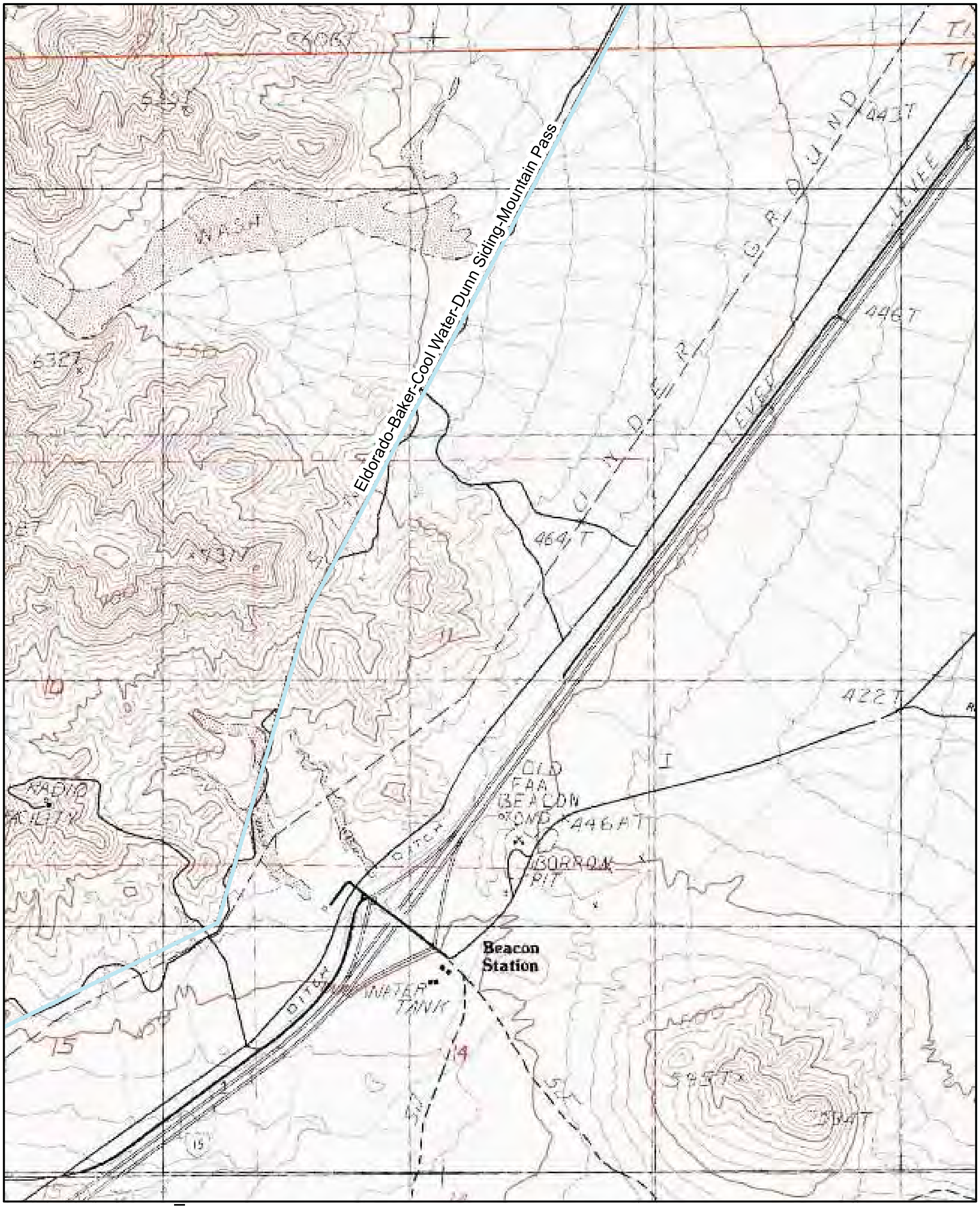

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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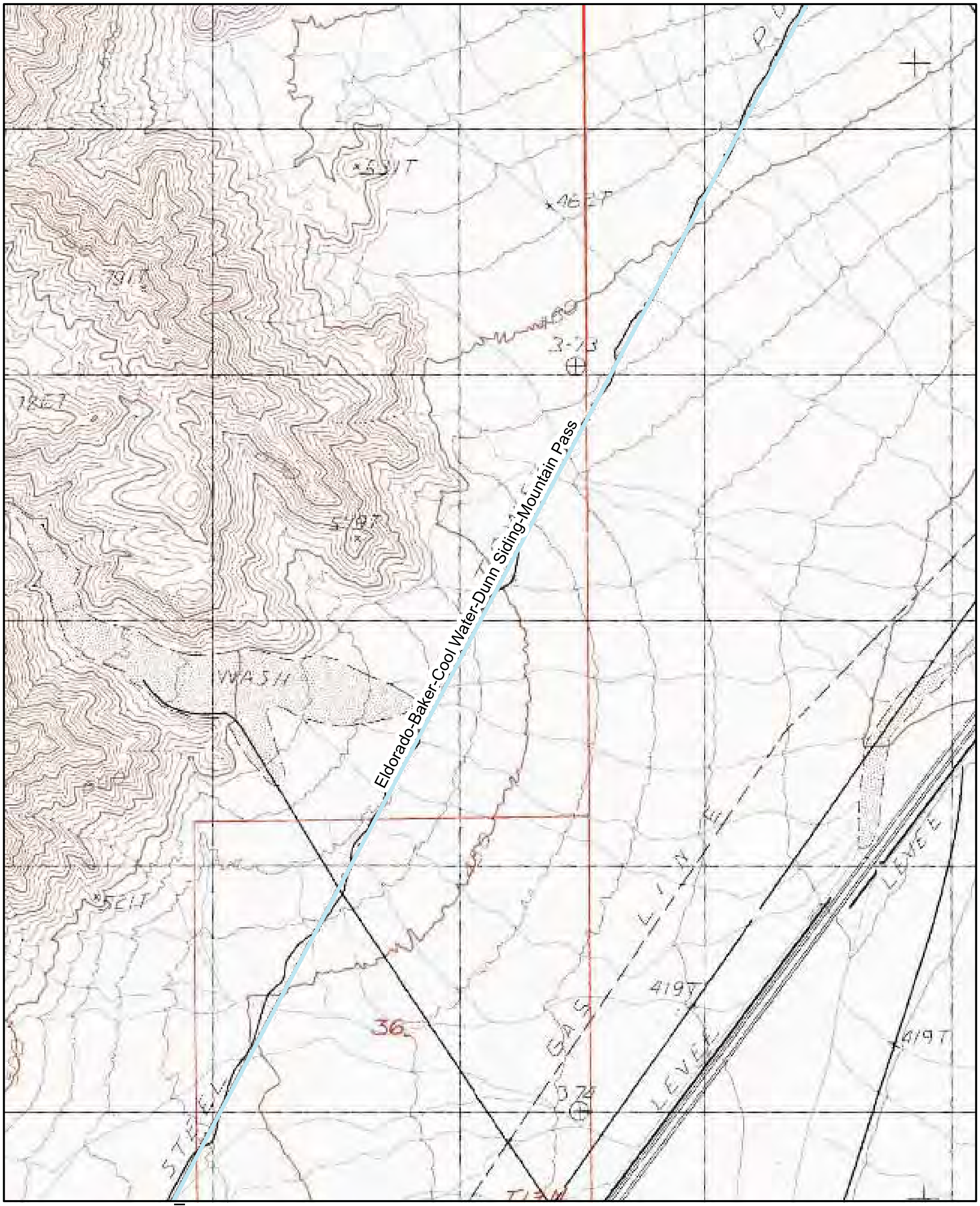

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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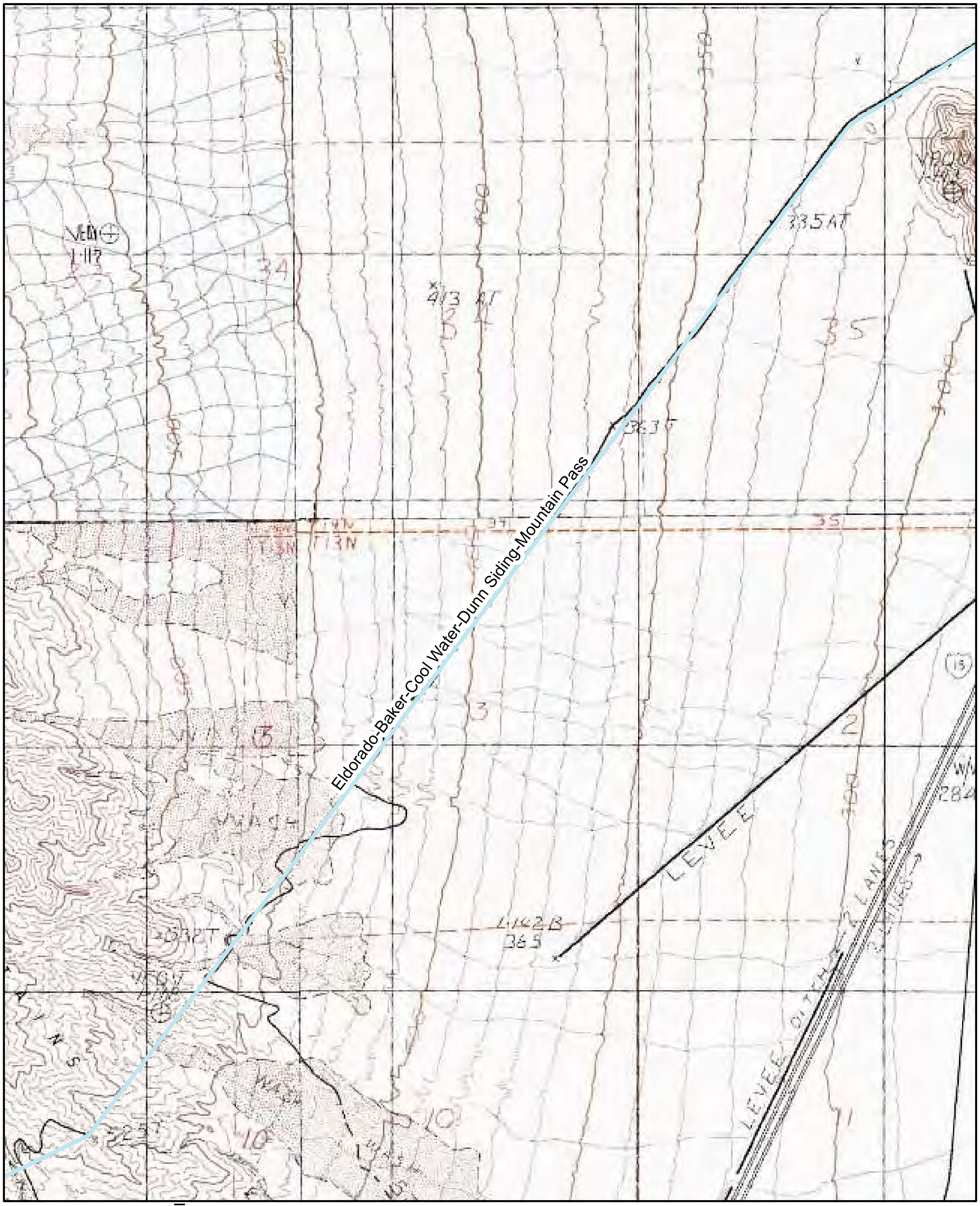
*Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

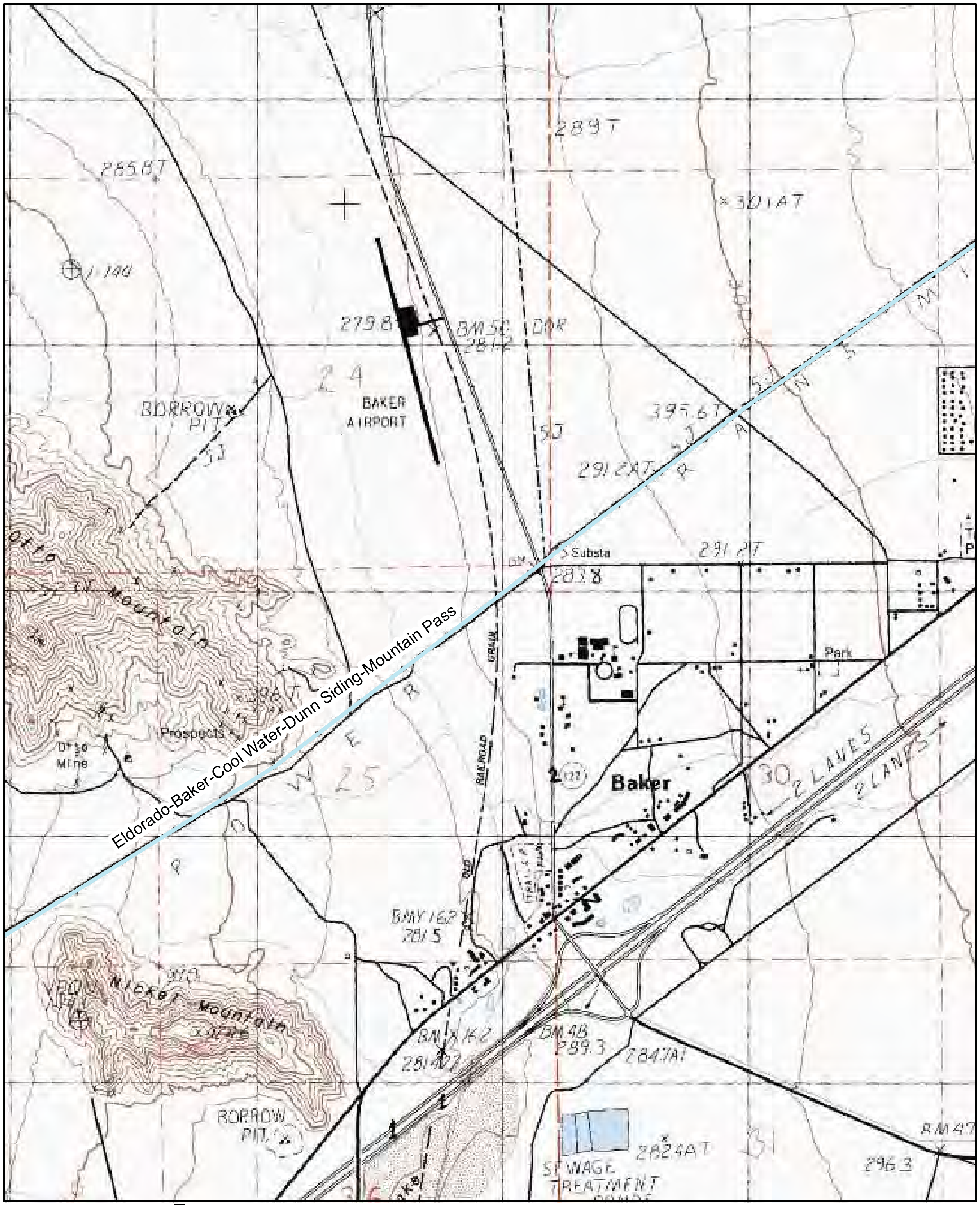
Trinomial: CA-SBR-10315H

Page: 60 of 86

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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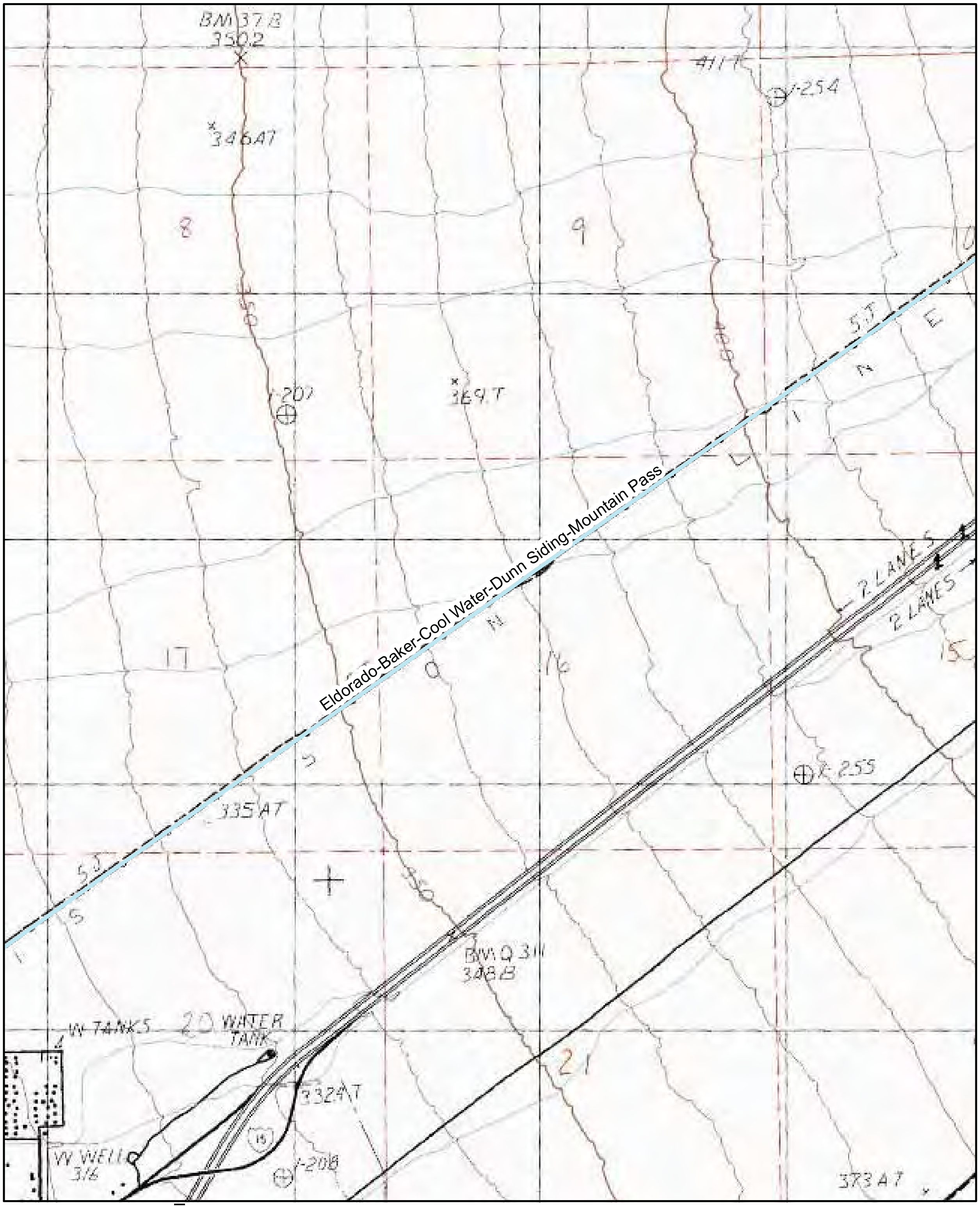


*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

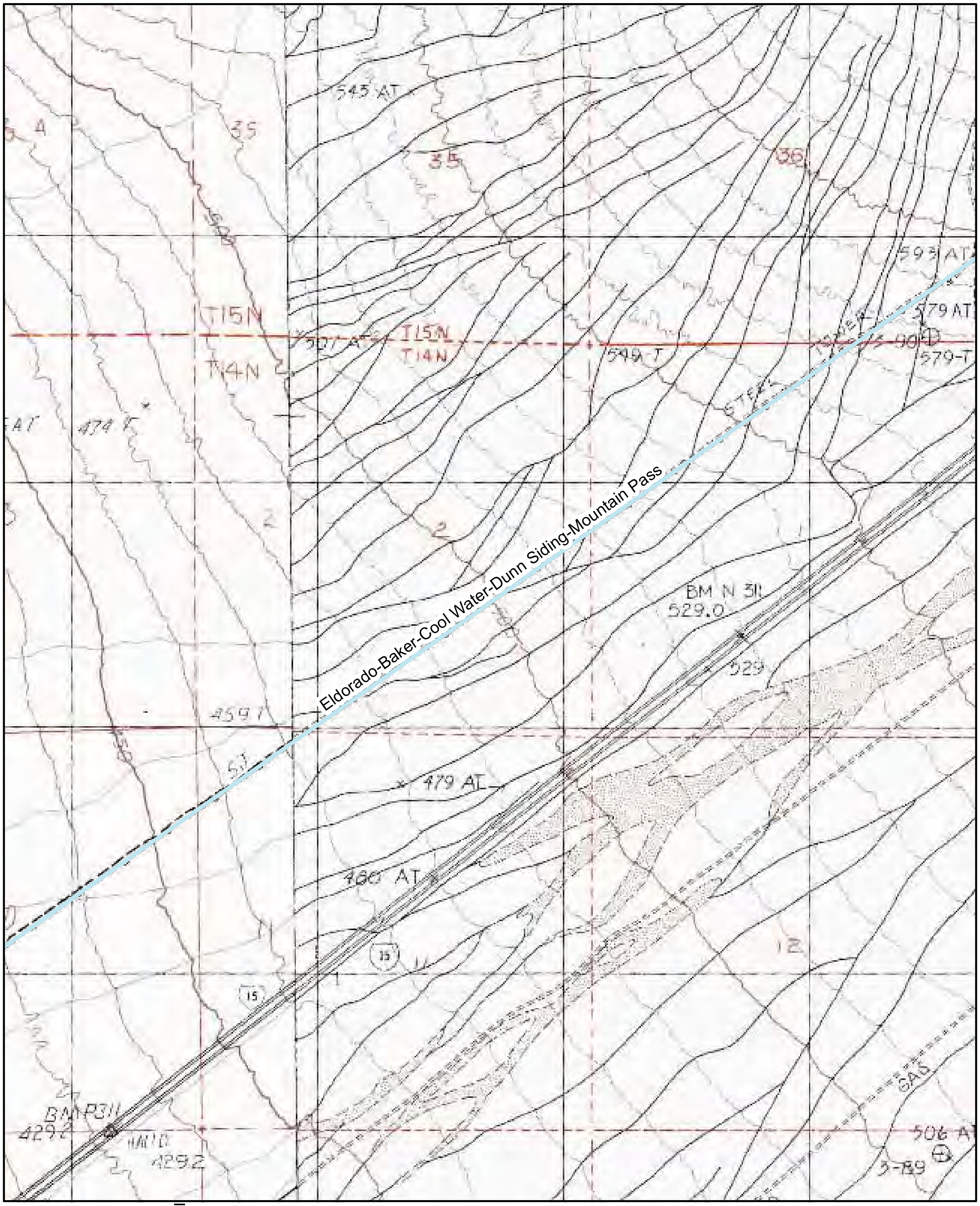
Primary # P36-010315H UPDATE
HRI#
Trinomial: CA-SBR-10315H

Page: 62 of 86

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #:** Boulder Transmission Line

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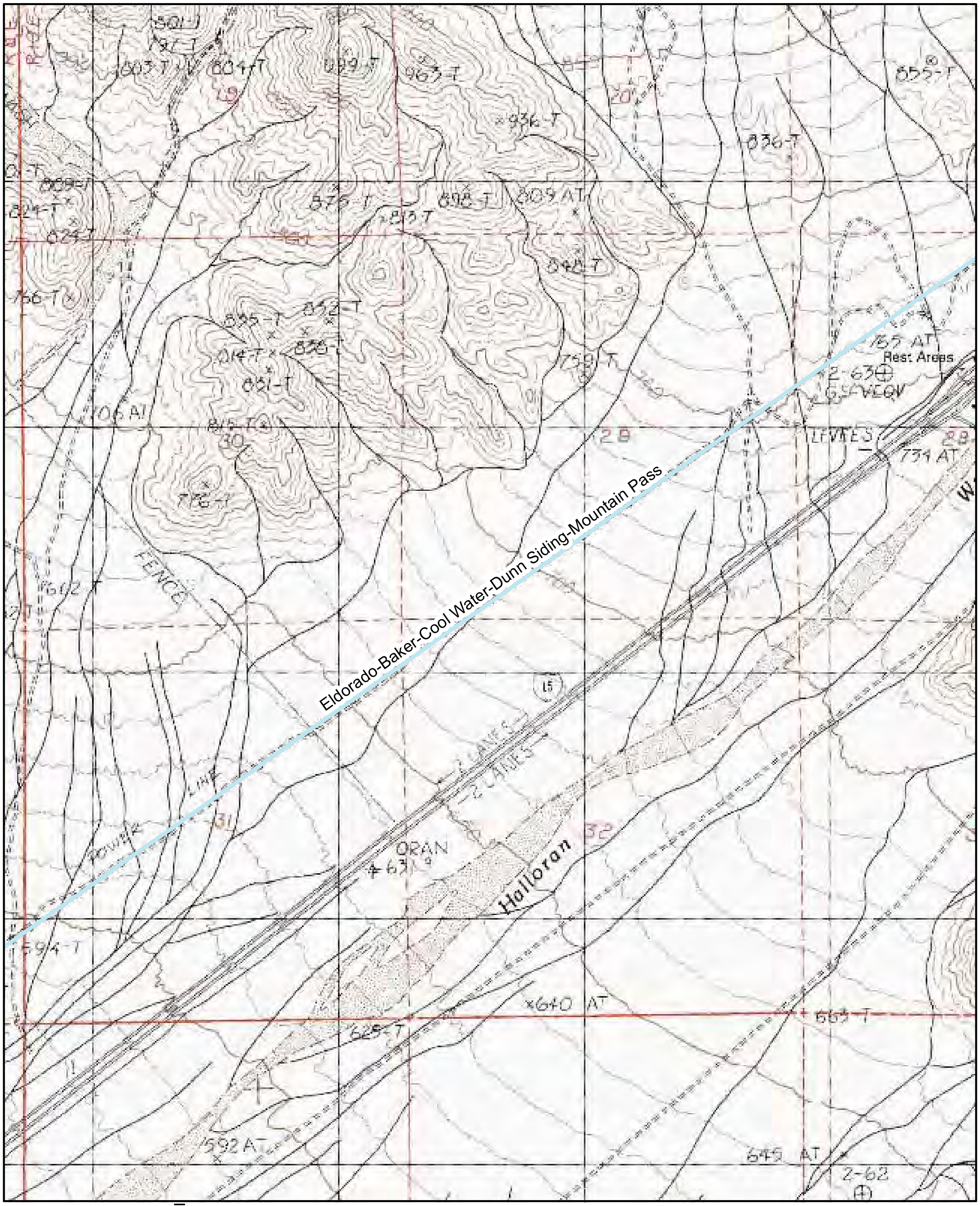

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
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LOCATION MAP

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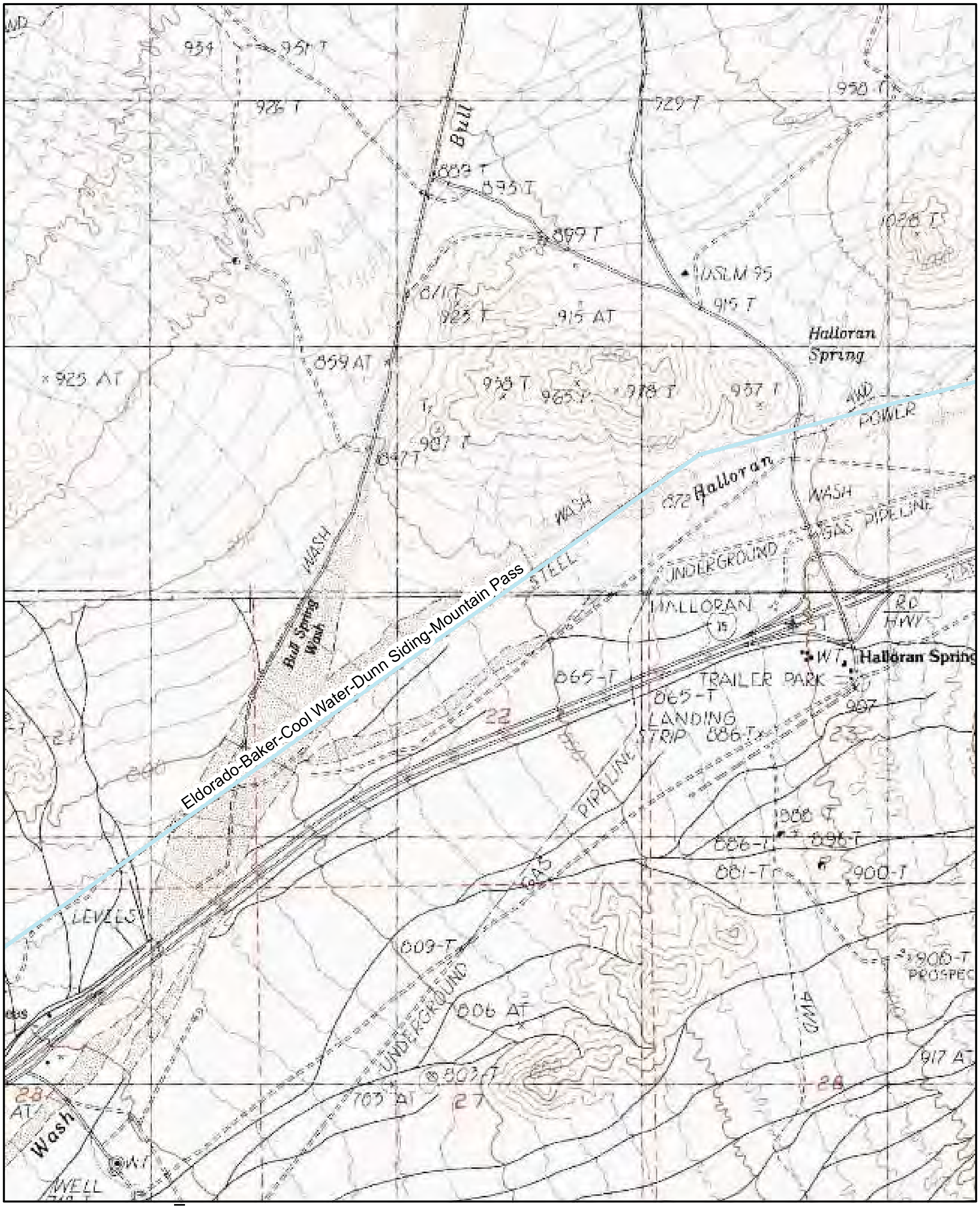

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Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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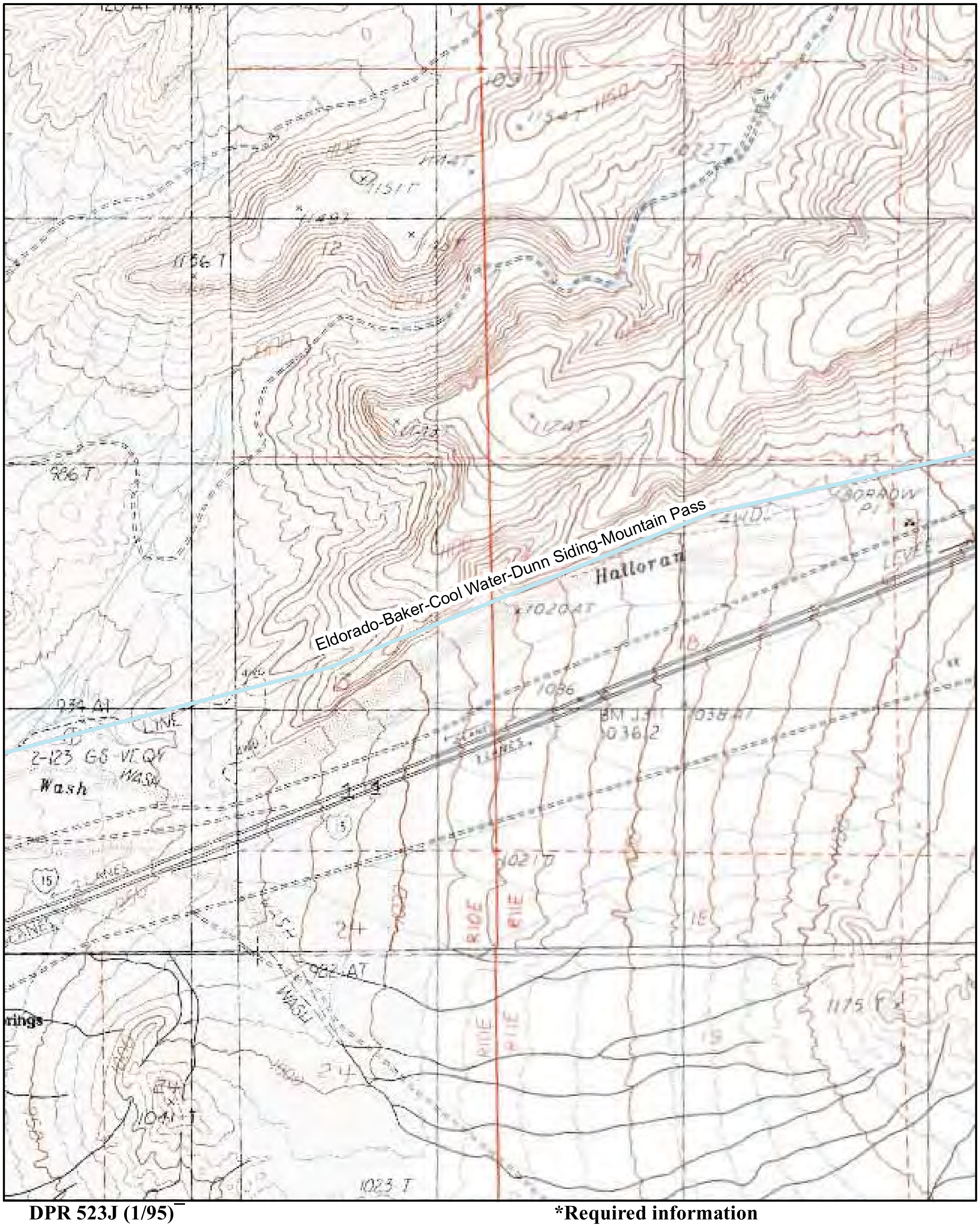
*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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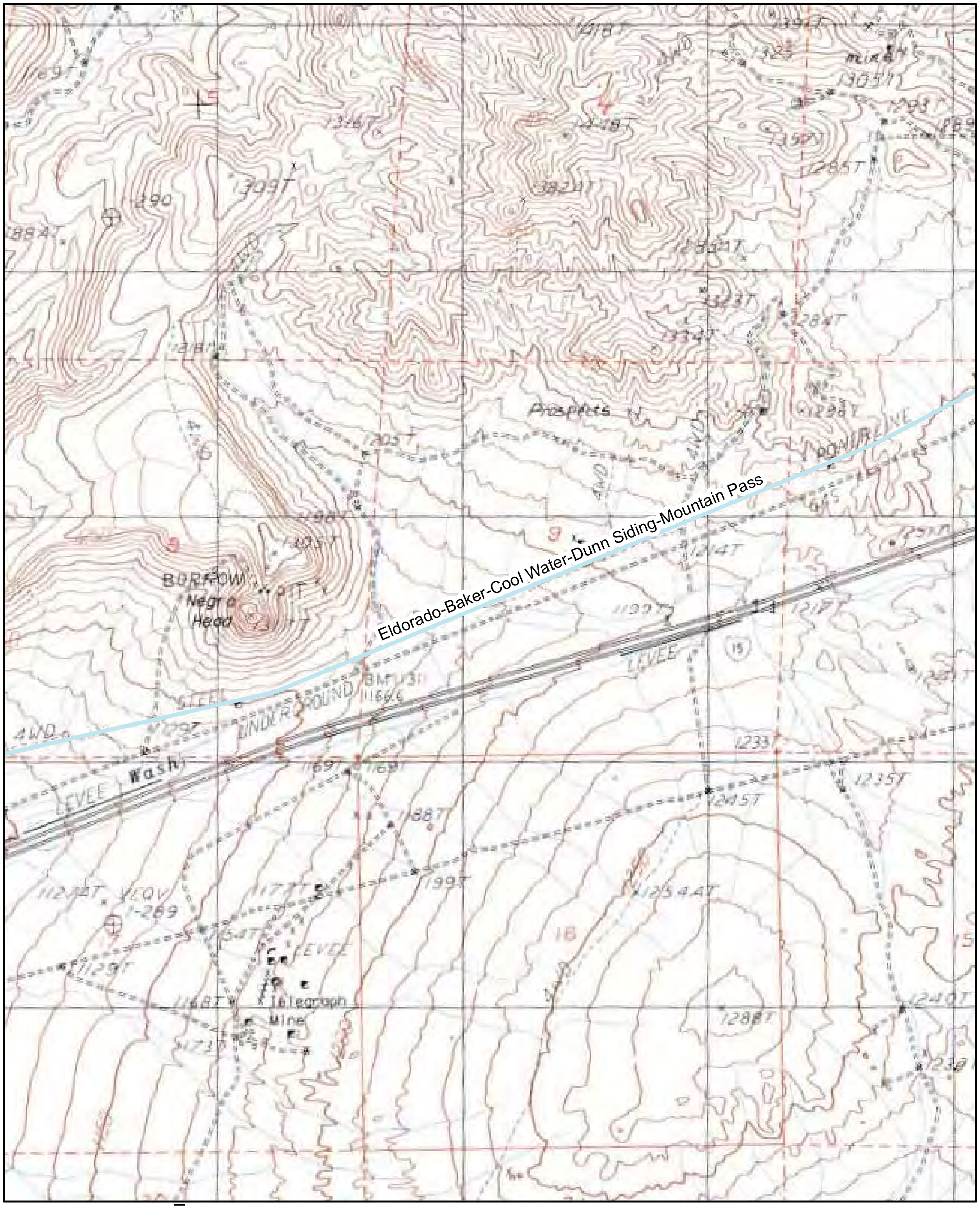

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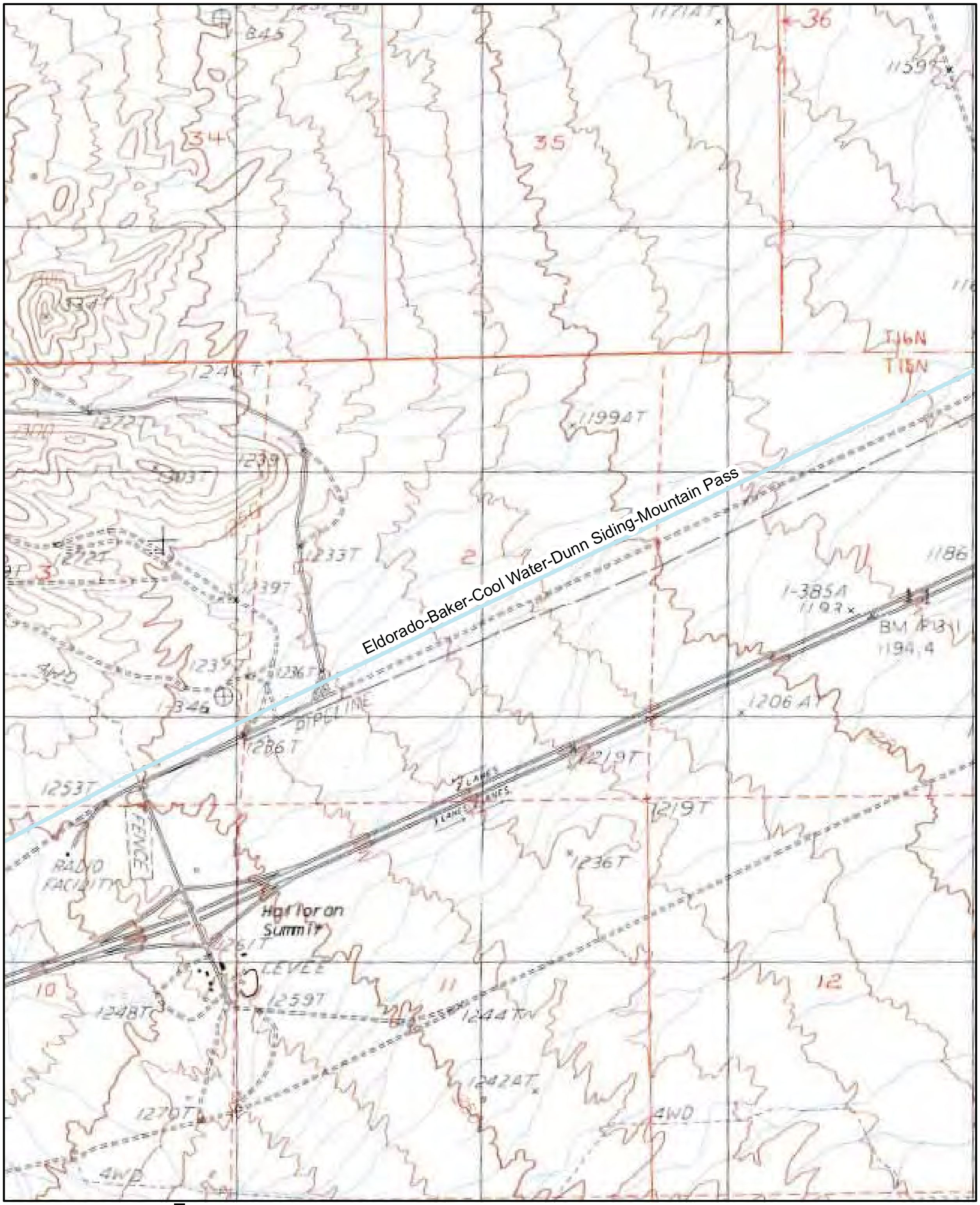

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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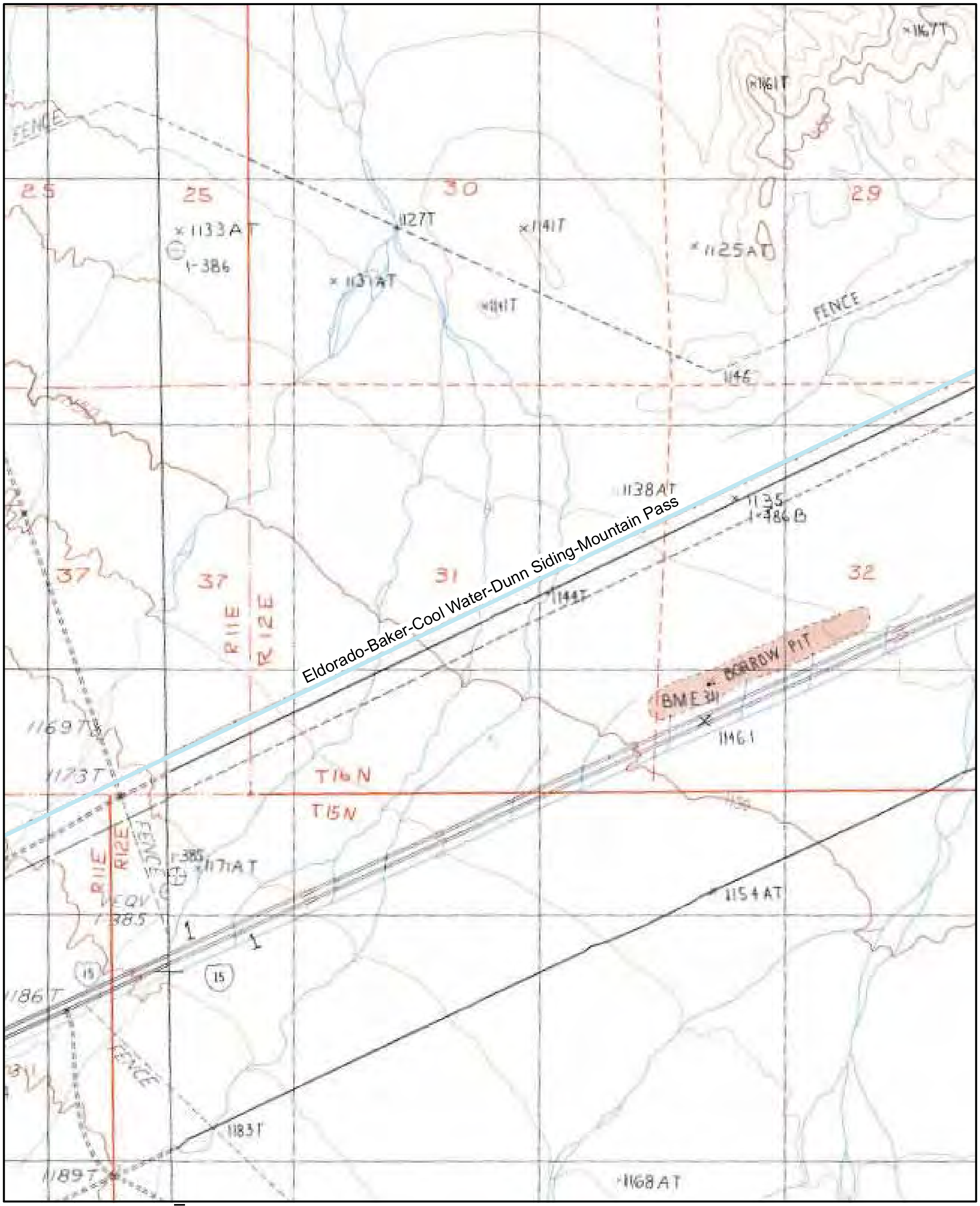

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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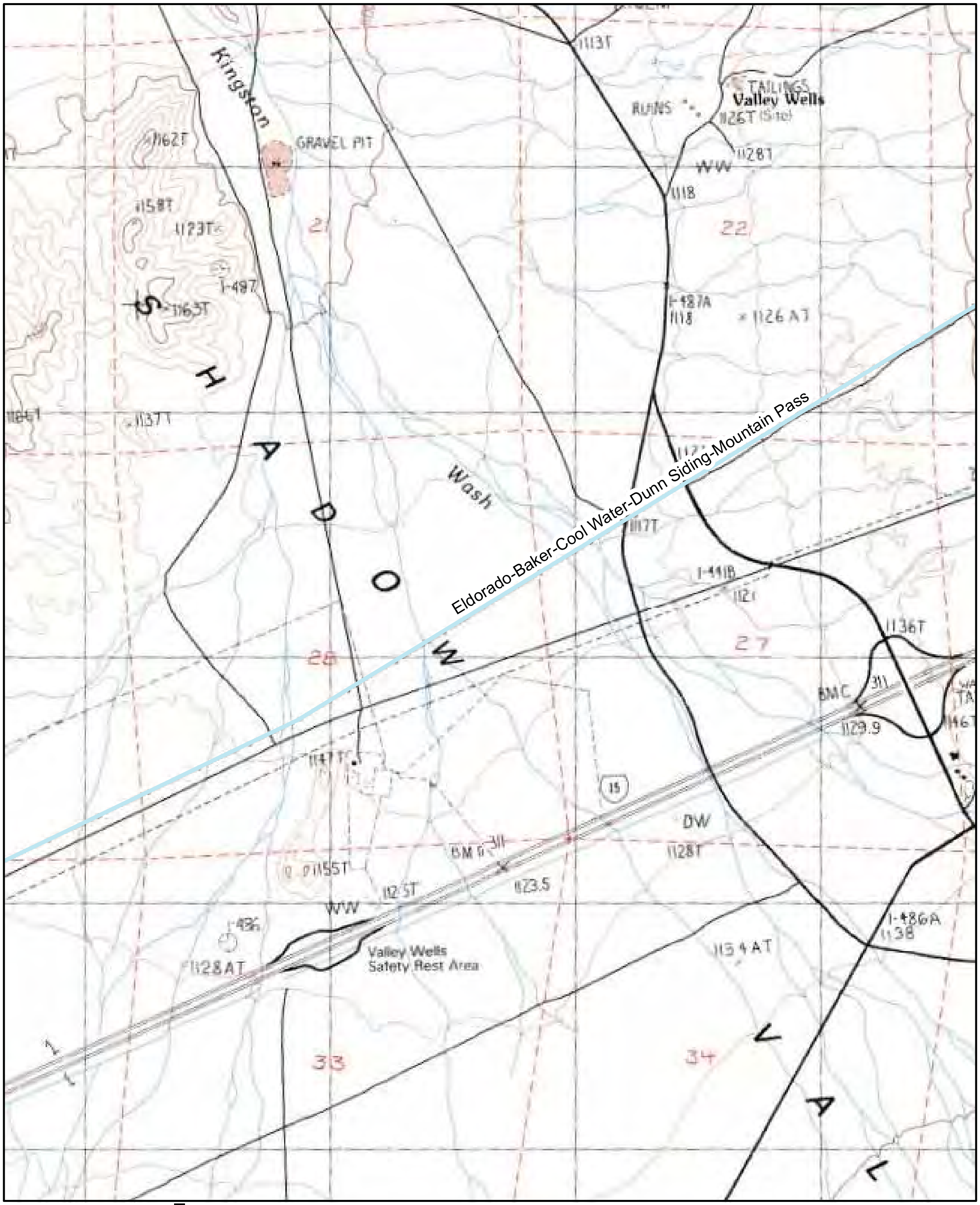
*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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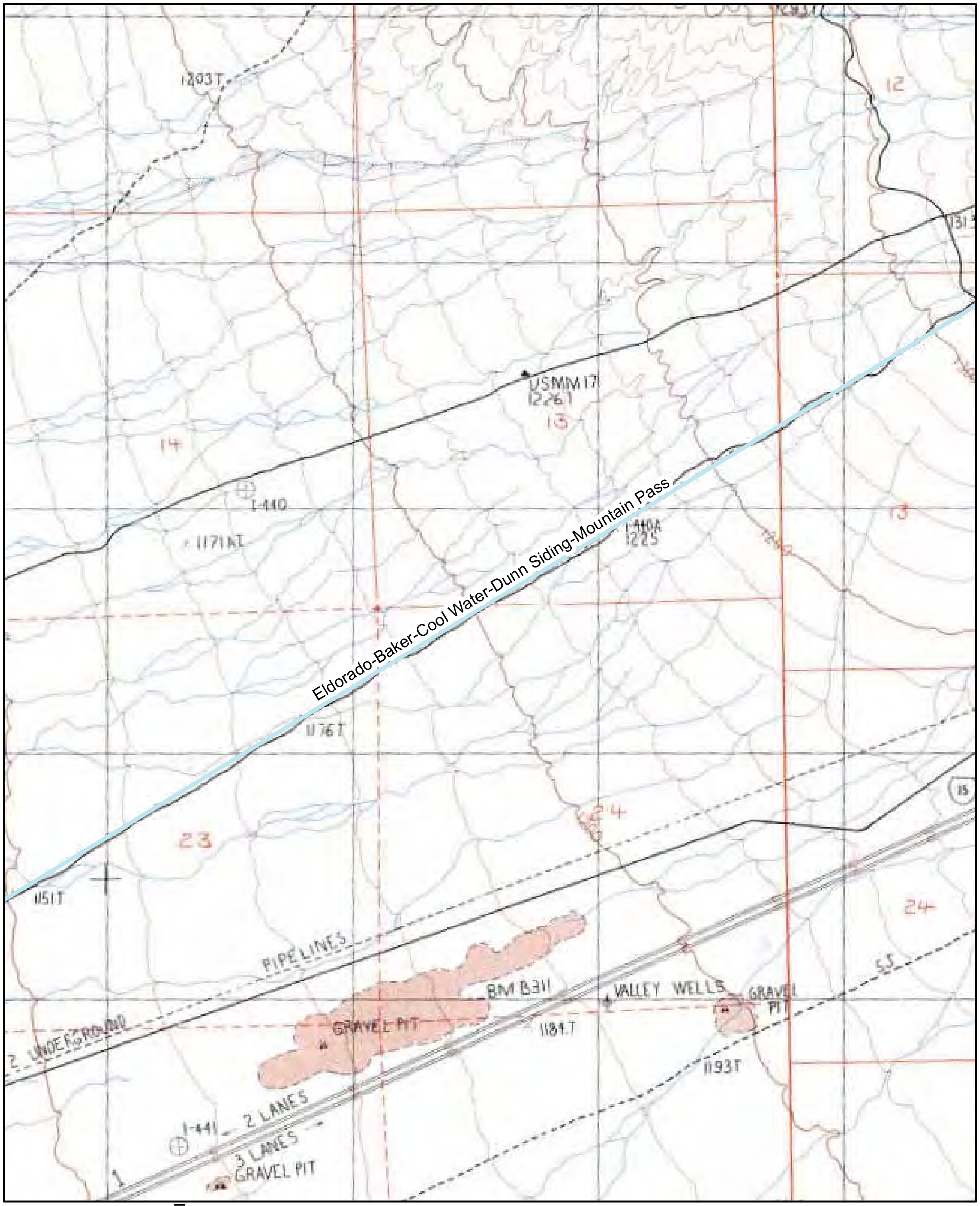
*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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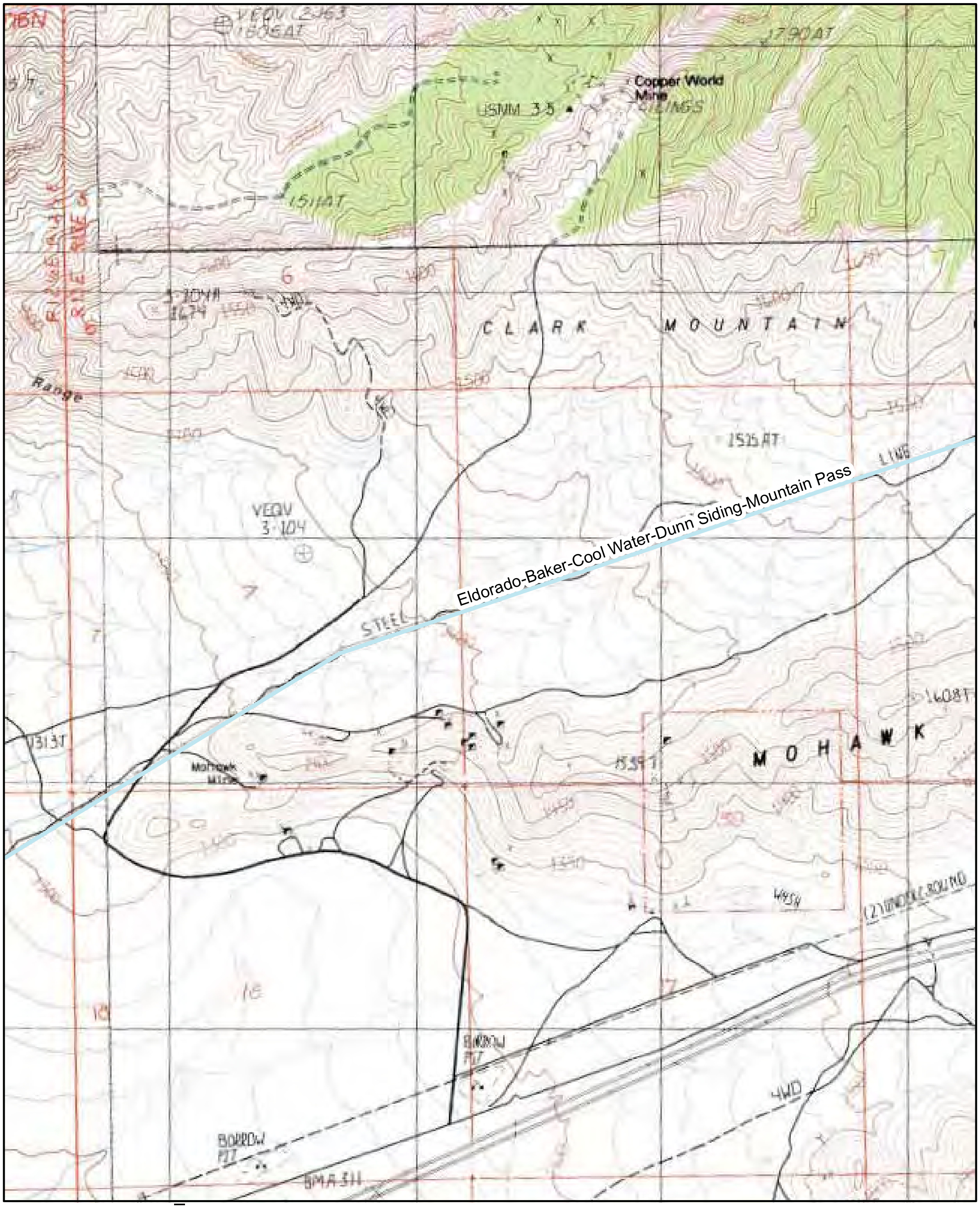

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

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LOCATION MAP

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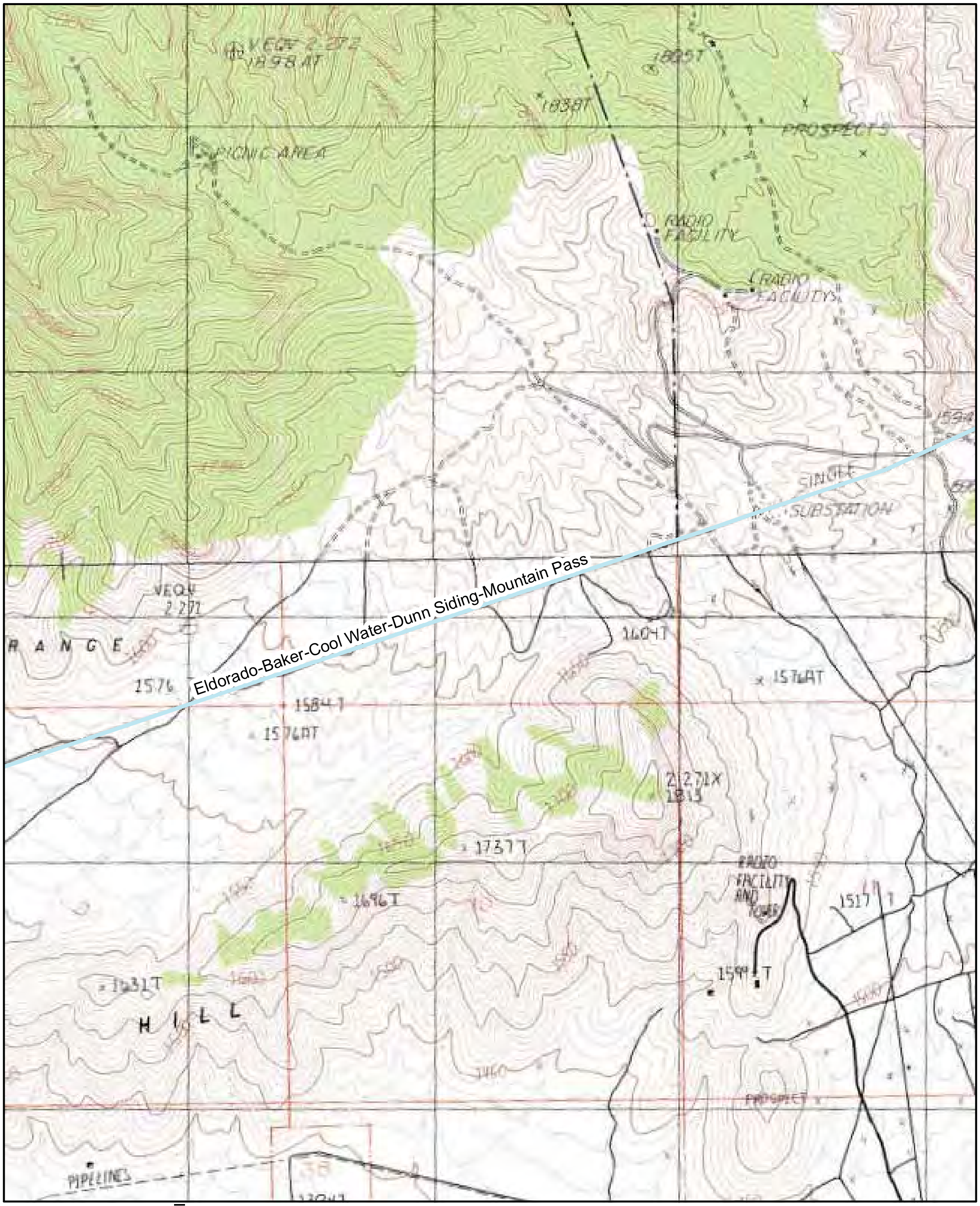

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State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

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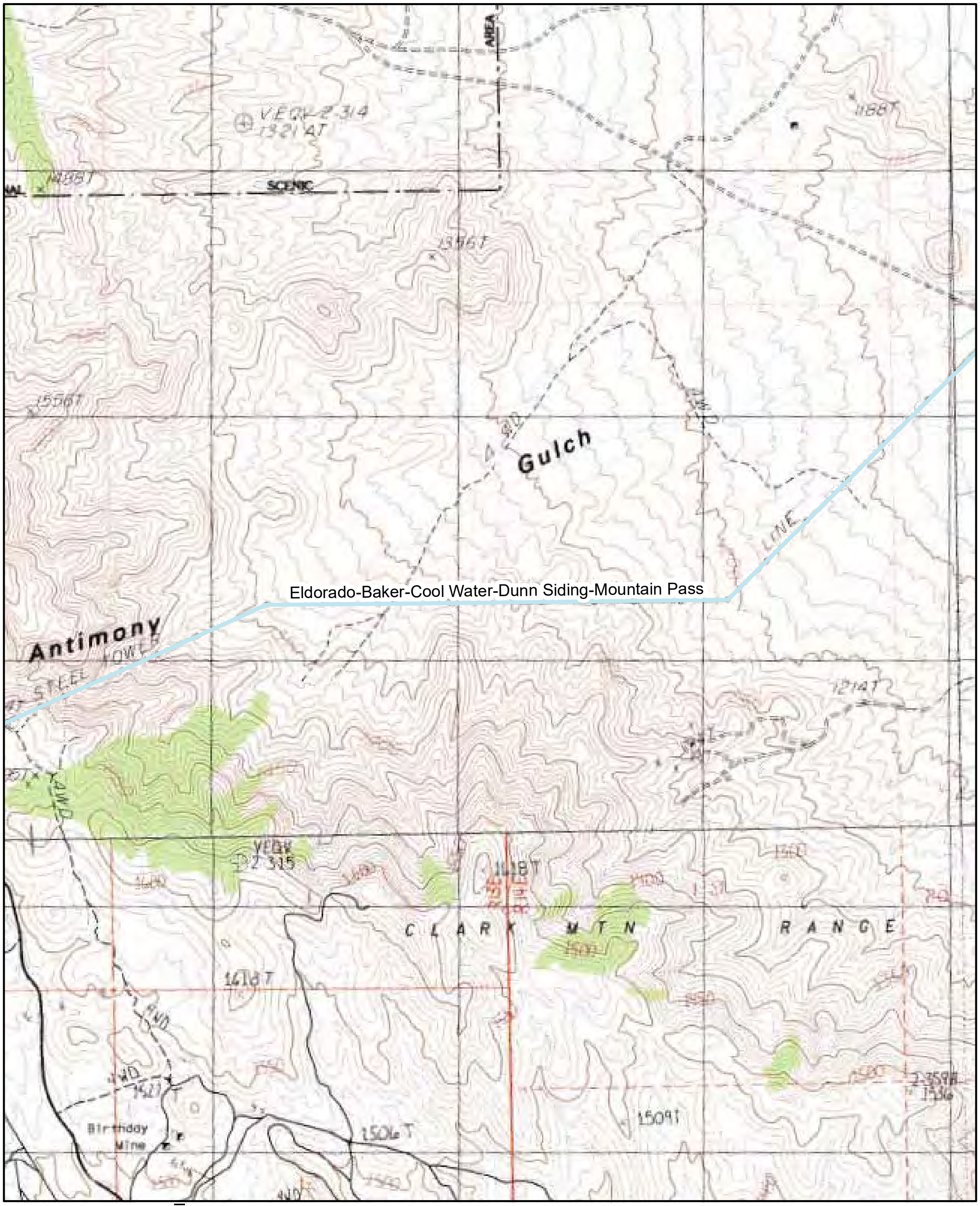

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State of California --- The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # P36-010315H UPDATE HRI#
LOCATION MAP	**Trinomial: CA-SBR-10315H**

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

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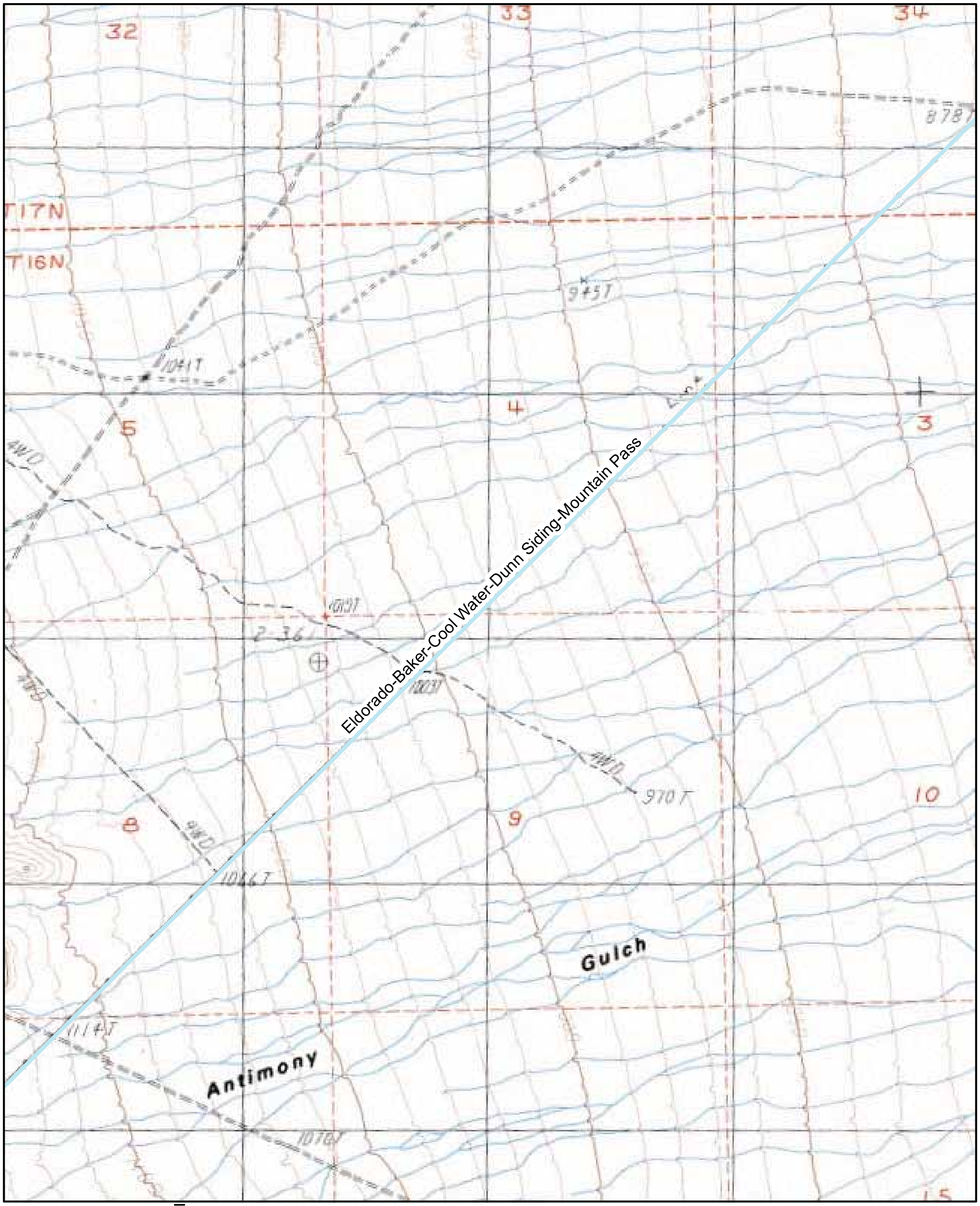

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # P36-010315H UPDATE
HRI#

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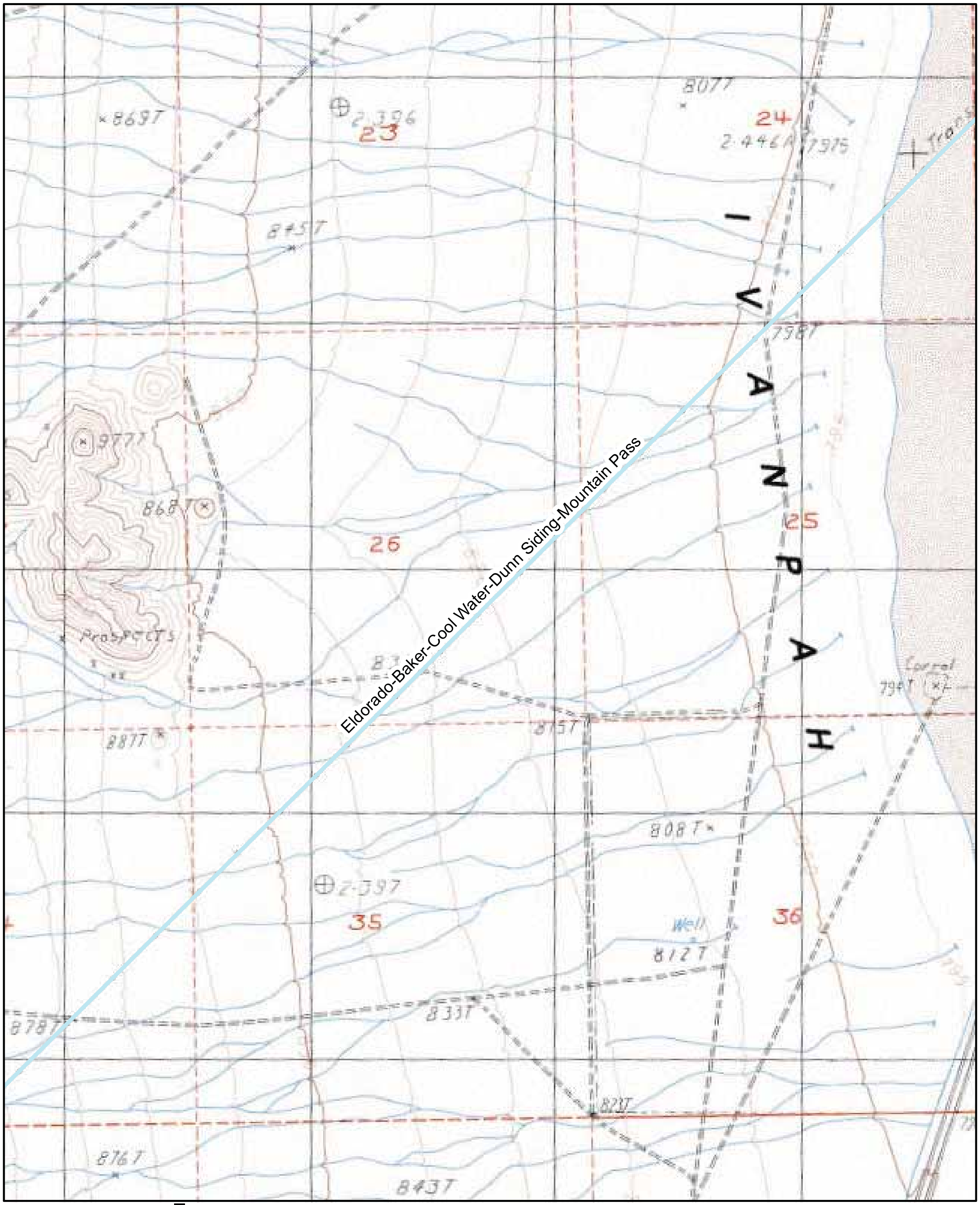

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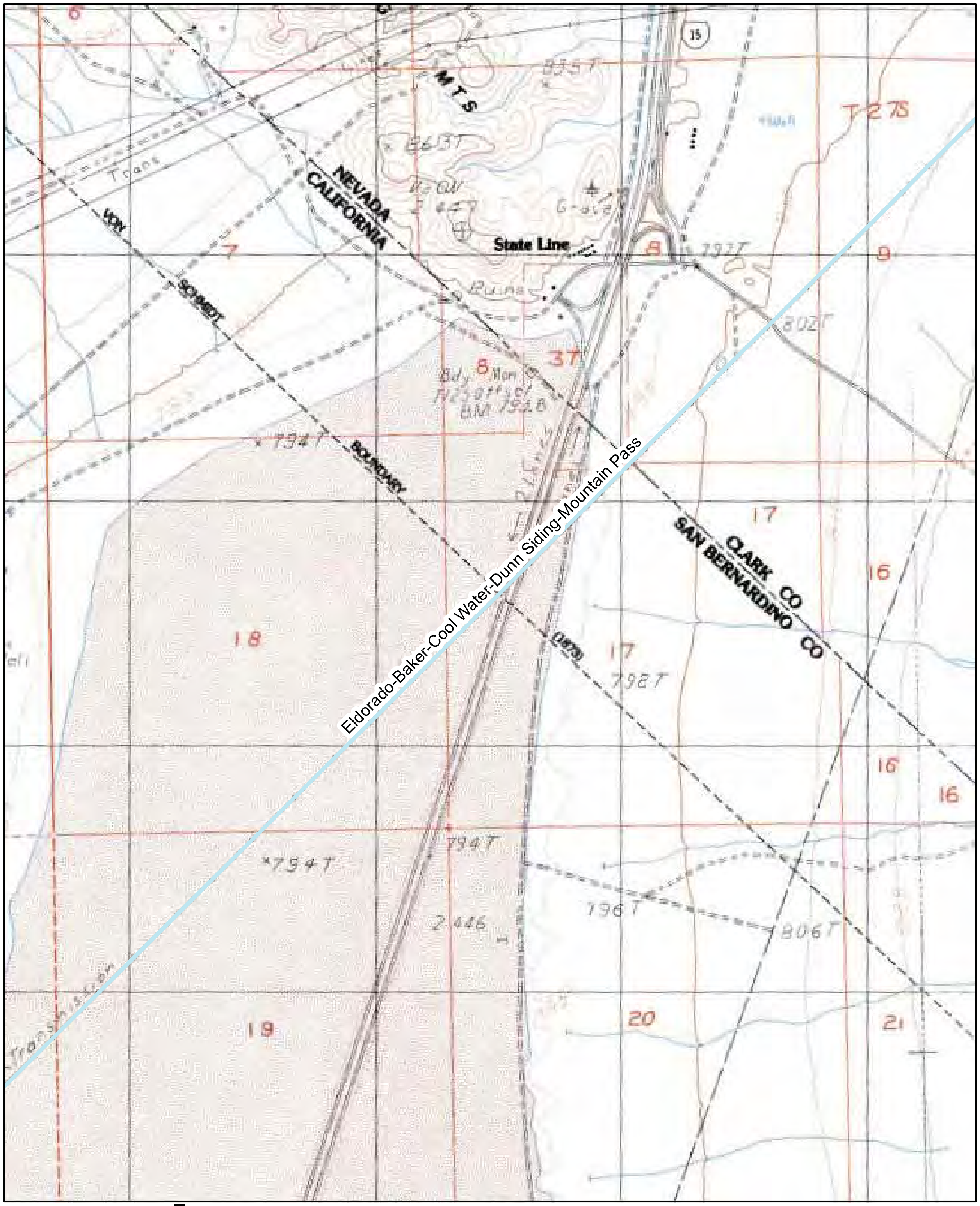
***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

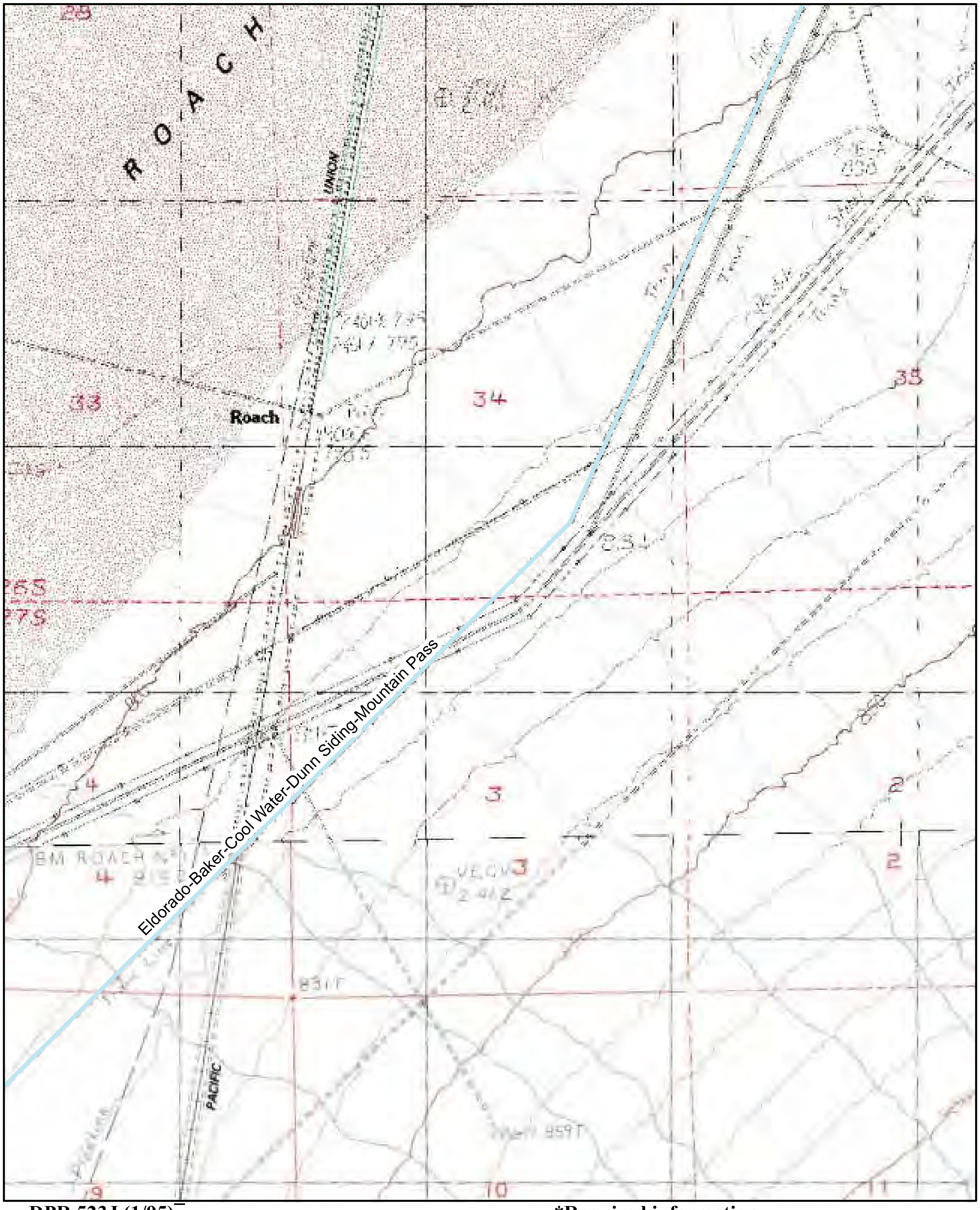
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



 *Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

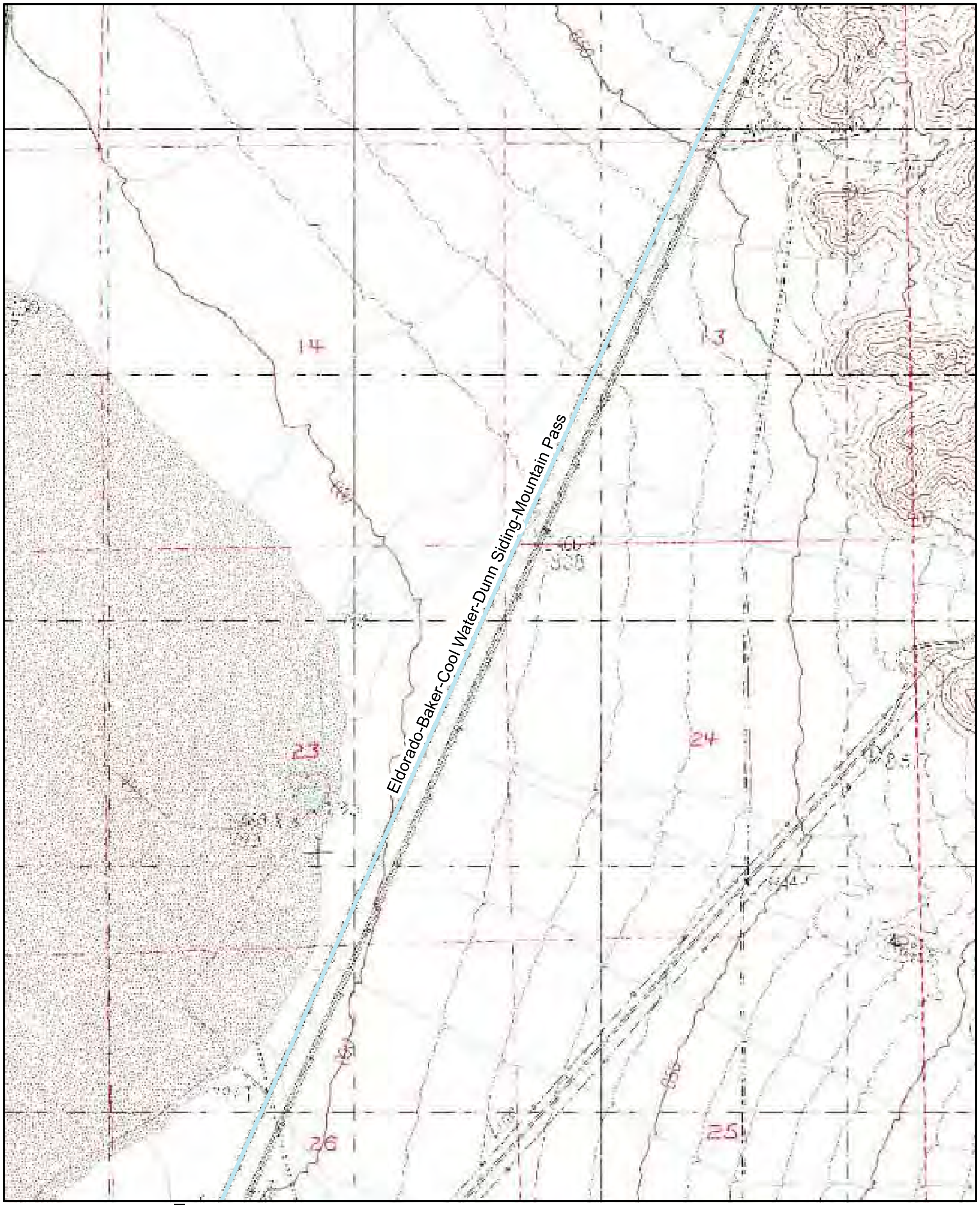
Trinomial: CA-SBR-10315H

Page: 78 of 86

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

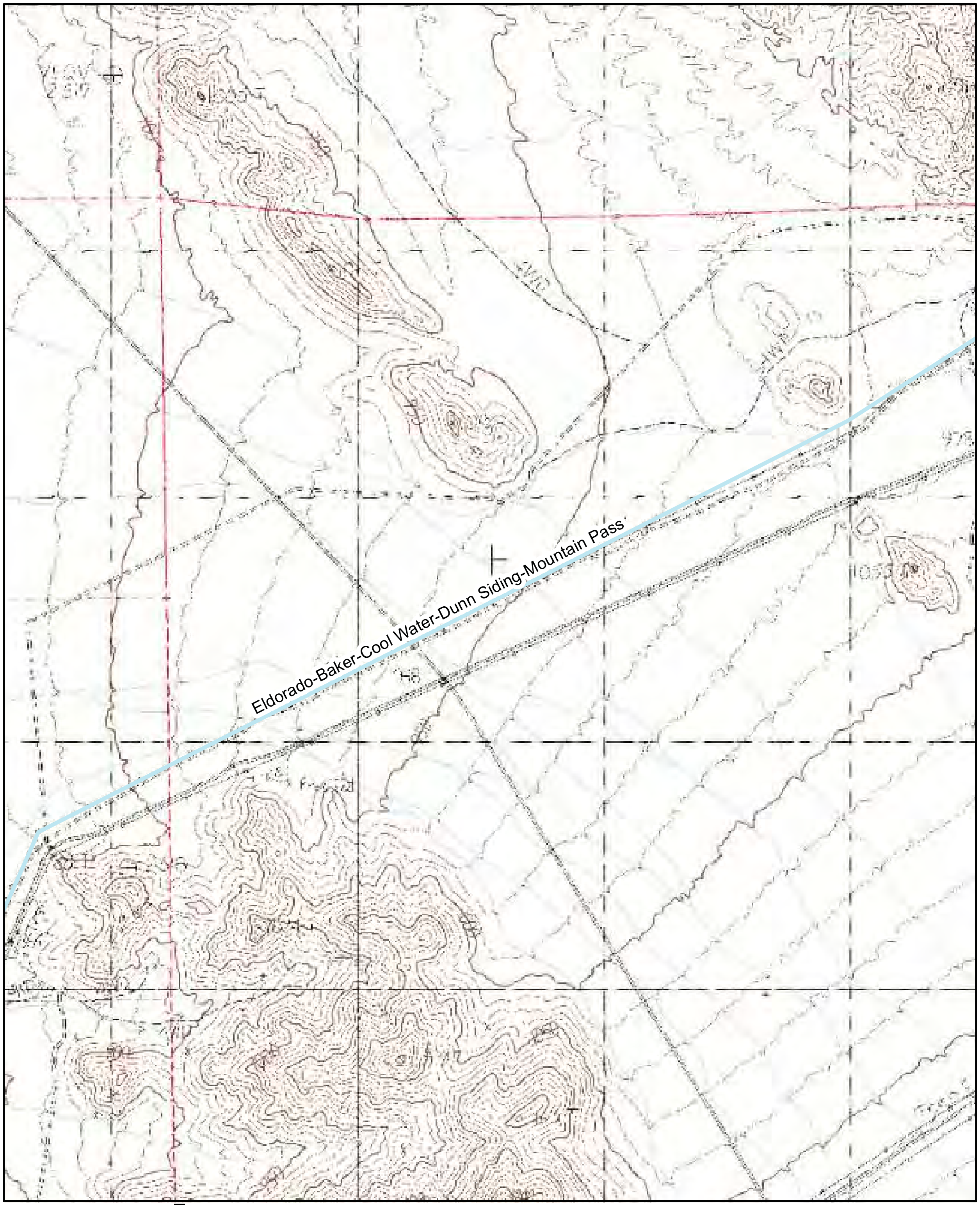
LOCATION MAP

Trinomial: CA-SBR-10315H

* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

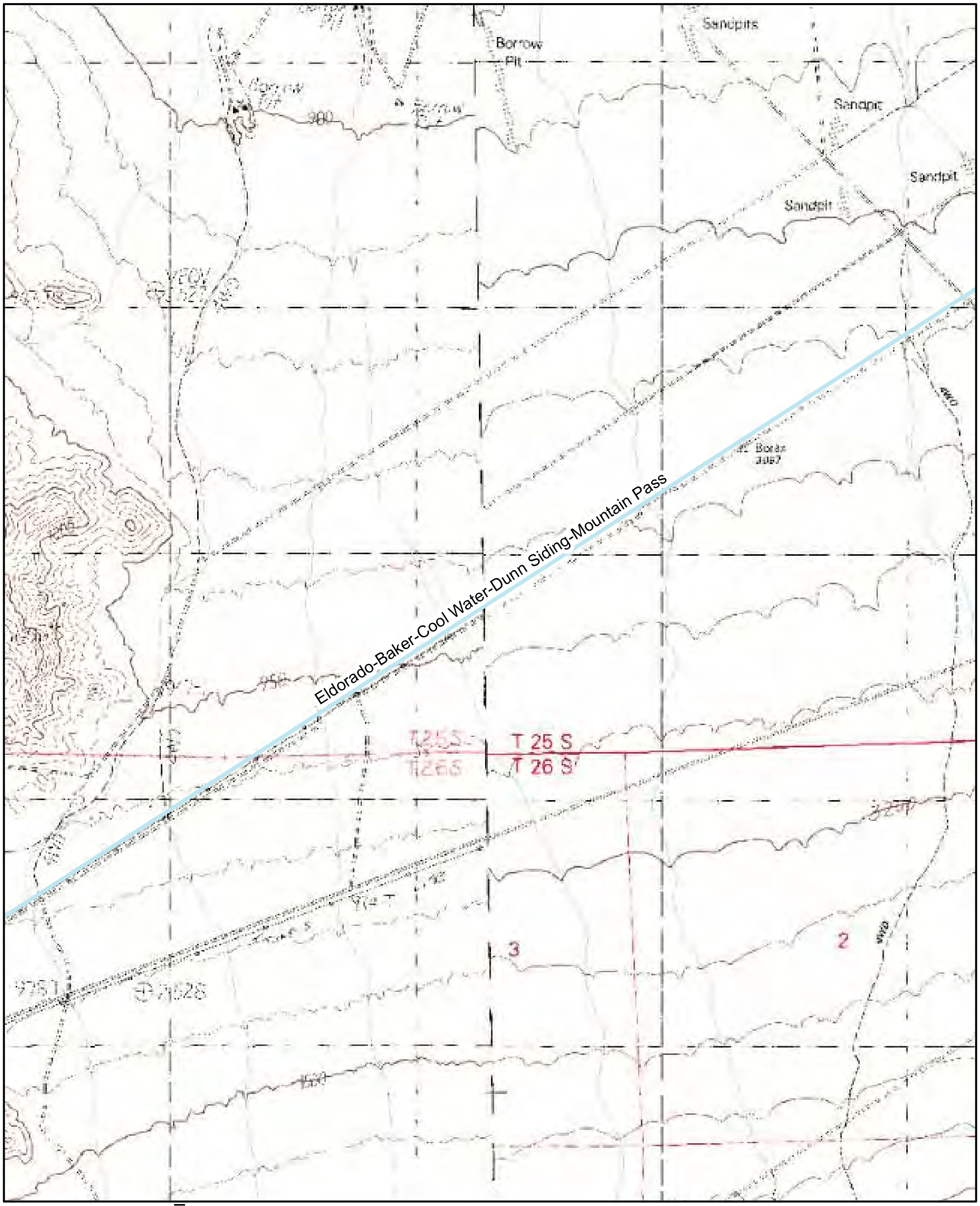
Trinomial: CA-SBR-10315H

Page: 80 of 86

* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

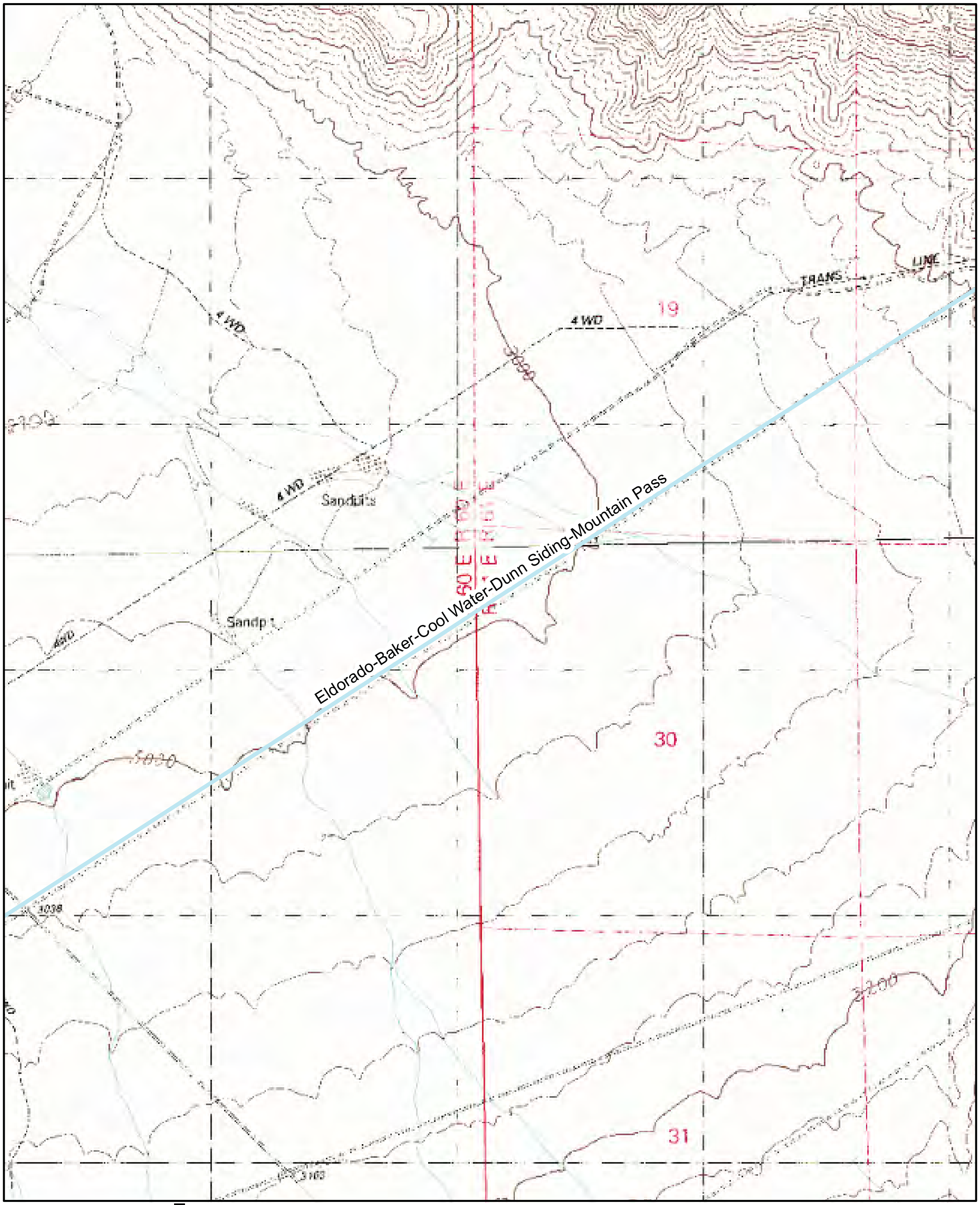
Trinomial: CA-SBR-10315H

Page: 81 of 86

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

Trinomial: CA-SBR-10315H

* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015

DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

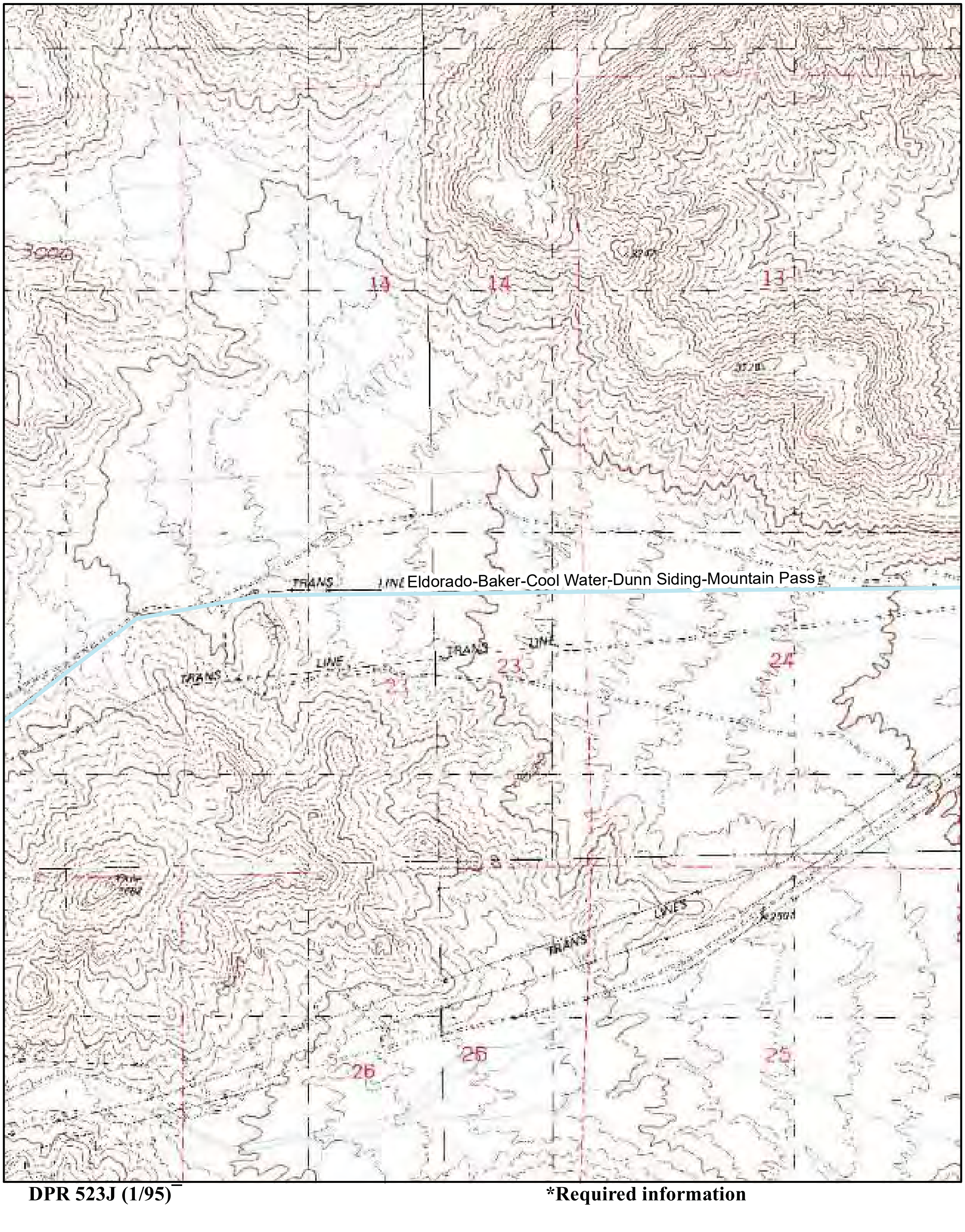
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



DPR 523J (1/95)

*Required information

State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

LOCATION MAP

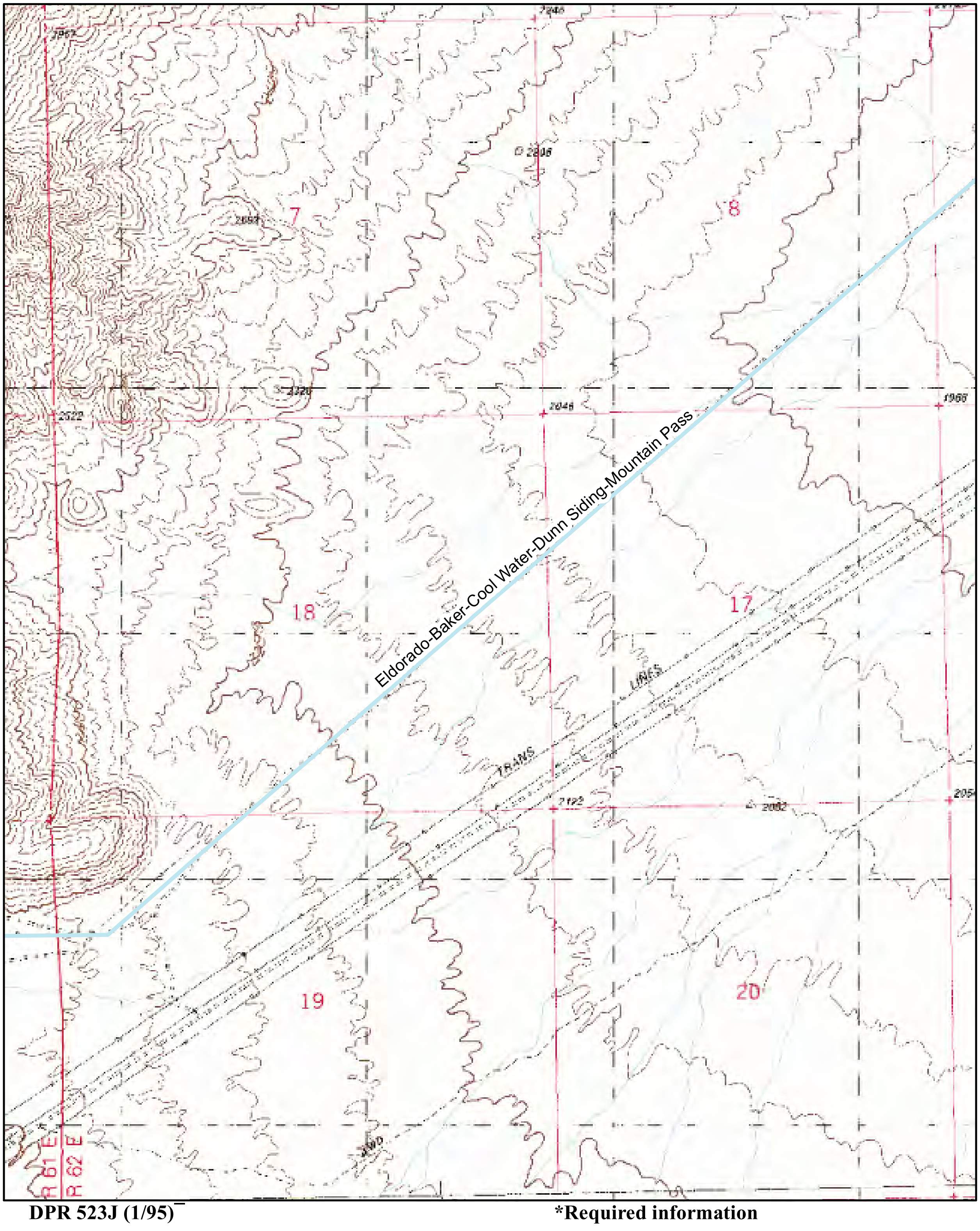
Trinomial: CA-SBR-10315H

Page: 84 of 86

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



DPR 523J (1/95)

***Required information**

Primary # P36-010315H UPDATE
HRI#

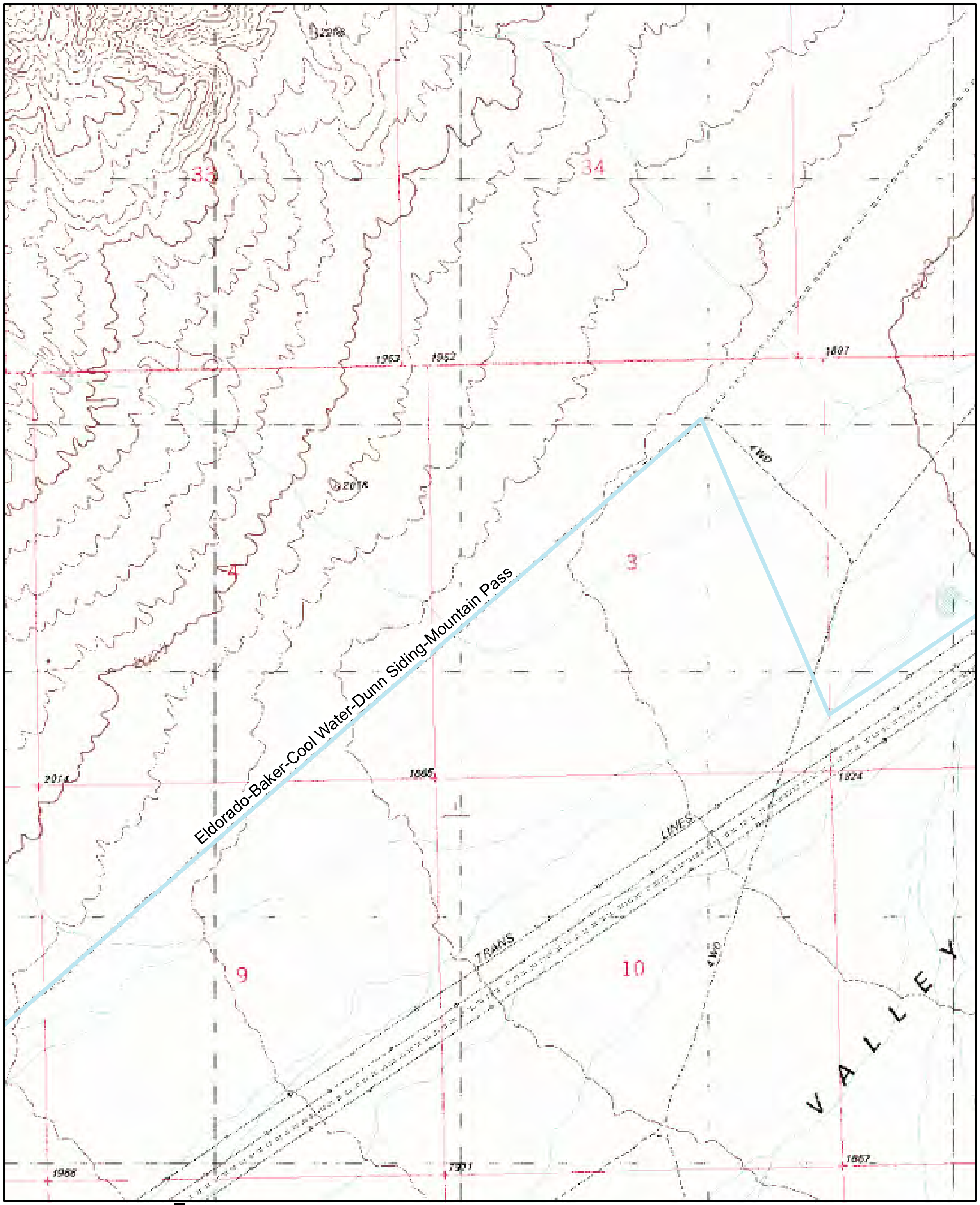
LOCATION MAP

Trinomial: CA-SBR-10315H

*** Resource Name or #: Boulder Transmission Line**

***Drawn by: Andrew Belcourt**

***Scale: 1:24,000 *Date of Map: 04/02/2015**



State of California --- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # P36-010315H UPDATE
HRI#

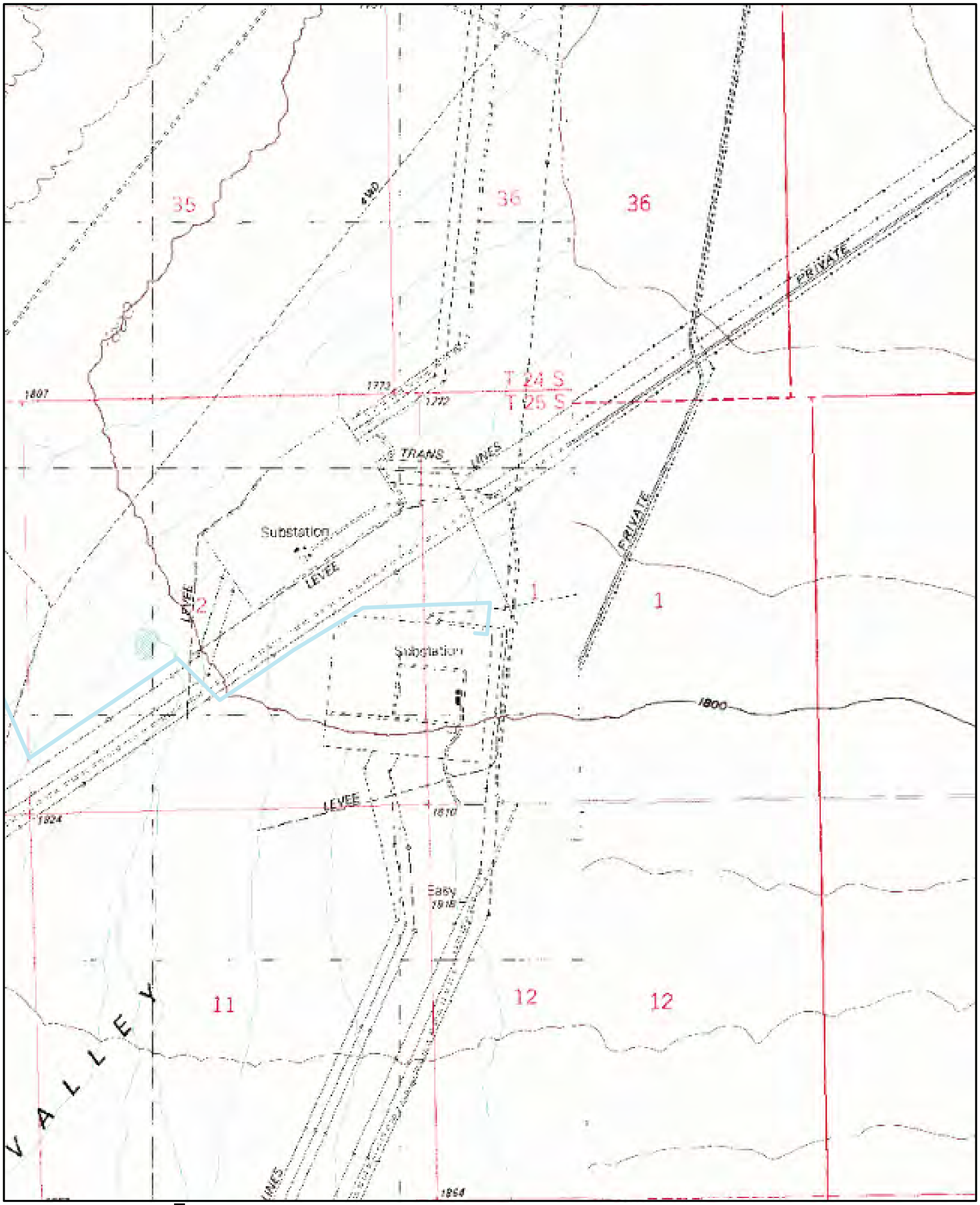
LOCATION MAP

Trinomial: CA-SBR-10315H

* Resource Name or #: Boulder Transmission Line

*Drawn by: Andrew Belcourt

*Scale: 1:24,000 *Date of Map: 04/02/2015



*Required information

1067623 5/14

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary#: P-36-010315H UPDATE
HRI #:
Trinomial: CA-SBR-~~10315H~~ UPDATE
NRHP Status Code: 2S2
Other Listings:
Review Code Reviewer Date

 ***Resource Name or #** SCE Arrowhead-Calectric-Devil Canyon-Shandin Sub-Transmission Line (Portion)

P1. Other Identifier: Boulder Dam-San Bernardino Transmission Line

***P2. Location:** ☐ Not for Publication ☑ Unrestricted

***a. County** San Bernardino County

***b. USGS 7.5' Quad:** Devore and San Bernardino North Date: 1996 **T** _; **R** _; _ **¼ of** _ **¼ of Sec** U; __**B.M.**

c. Address: n/a City: n/a Zip: n/a

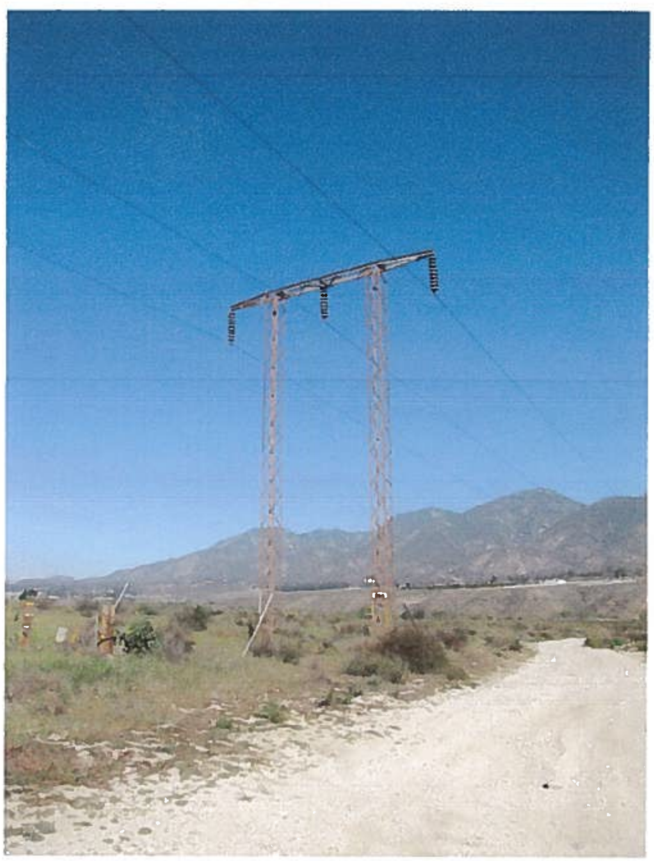
d. UTM: 465463 mE / .3782921 mN; 464934 mE / 3784060 mN; 465084 mE / 3785243 mN Zone 11 N NAD 83

e. Other Locational Data:

***P3a. Description:** The Arrowhead-Calectric-Devil Canyon-Shandin 115kV Sub-Transmission Line is a modern-day segment of the historic SCE Boulder Dam-San Bernardino Transmission Line. Recorded as ~~CA-SBR-10315H / P-36-010315H~~, the Boulder Dam-San Bernardino Transmission Line was constructed between 1931 and 1933 in order to convey electricity from the San Bernardino / Los Angeles region to Boulder City and the Boulder Dam project. Within California the Boulder Dam-San Bernardino Transmission Line is divided into six modern-day segments identified as follows: Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass; Coolwater-Gale; Gale-PS 512; Victor-Black Mountain-Support-Southcap-Southdown; Victor-Aqueduct-Phelan; and Arrowhead-Calectric-Devil Canyon-Shandin. The Arrowhead-Calectric-Devil Canyon-Shandin 115kV Sub-Transmission Line spans approximately 23-miles from Lake Arrowhead, California to San Bernardino, California. A four-mile extension spans easterly from the center of the line at the western terminus of Reservoir Street in San Bernardino, California. The line is comprised of multiple steel tower types and wood poles installed in pairs with wooden cross-bracing with a typical span of approximately 740 feet between support structures. Historic tower illustrations and representative views along the 1.5-mile survey area are included on DPR 523L forms (Continuation Sheet) in the following pages of this DPR set.

***P3b. Resource Attributes:** HP11: Engineering Structure (Transmission Line)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



***P5b. Description of Photo:** View northeasterly of Tower No. 128069, and original H Tower type installed in 1930-1931 in San Bernardino, CA.

***P6. Date Constructed/Age and Source:** ☒Historic, 1930-1931

***P7. Owner and Address:**
Southern California Edison Co.,
2244 Walnut Grove Avenue, Rosemead, CA 91770

***P8. Recorded by:**
Wendy L. Tinsley Becker, RPH, AICP, Principal
Urbana Preservation & Planning, LLC /
www.urbanapreservation.com

***P9. Date Recorded:**
February 2014

***P10. Survey Type:** Intensive Level (CEQA Historical Resource / NHPA §106 Historic Property Survey) of a 1.5-mile portion in the vicinity of Cajon Creek in San Bernardino, CA.

***P11. Report Citation:** Urbana Preservation & Planning, LLC., *CRHR / NRHP Review – 1.5-Mile Portion of the Arrowhead-Calectric-Devil Canyon-Shandin 115kV Sub-Transmission Line*, February 2014.

***Attachments:** ☐NONE ☒Location Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, OBJECT RECORD

***NRHP Status Code:** 2S2

***Resource Name or #** SCE Arrowhead-Calectric-Devil Canyon-Shandin Sub-Transmission Line (Portion)

B1. Historic Name: Southern California Edison Boulder Dam-San Bernardino Transmission Line

B2. Common Name: Arrowhead-Calectric-Devil Canyon-Shandin 115kV Sub-Transmission Line

B3. Original Use: Electric Power Conveyance System / Transmission Line

B4. Present Use: Electric Power Conveyance System / Transmission Line

***B5. Architectural Style:** N /A – Utilitarian Electrical Engineering Structures of Steel Lattice Tower Construction

***B6. Construction History:** Portions of the Arrowhead-Calectric-Devil Canyon-Shandin Line date to the 1931-1933 Boulder Dam-Los Angeles construction campaign, and others date to the contemporary period. Noted segmentation dates relative to the Arrowhead-Calectric-Devil Canyon-Shandin Line are 1950 when the Calectric Substation was put-in-service; 1968 when the Shandin Substation was put-in-service; 1972 when the Devil Canyon Substation was put-in-service; and 1973 when the Arrowhead Substation was put-in-service. The existing wood poles sited within the 1.5-mile survey area appear to have been installed in the contemporary period, however, the exact installation date is unknown.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** _____ **Original Location:** N/A

***B8. Related Features:** Other modern-day segments built as part of the Boulder Dam-San Bernardino Transmission Line, identified as Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass; Coolwater-Gale; Gale-PS 512; Victor-Black Mountain-Support-Southcap-Southdown; and Victor-Aqueduct-Phelan.

B9a. Architect: Southern California Edison Company **b. Builder:** Southern California Edison Company

***B10. Significance: Theme:** Technology, Industrialization, Boulder Dam Hoover Construction Campaign **Area:** CA & NV

Period of Significance: 1930-1937

Property Type: Engineering Structure – Electric Power Conveyance System **Applicable Criteria:** NRHP A & C

The Arrowhead-Calectric-Devil Canyon-Shandin 115kV Sub-Transmission Line is a modern-day segment of the historic SCE Boulder Dam-San Bernardino Transmission Line. Recorded as CA-SBR-10315H / P-36-010315H, the Boulder Dam-San Bernardino Transmission Line was constructed between 1931 and 1933 in order to convey electricity from the San Bernardino / Los Angeles region to Boulder City and the Boulder Dam project. The 80kV to 132kV line spans between the Mojave Desert in the vicinity of the Hoover Dam to San Bernardino, California. The Southern Sierras Power Company constructed the line, with R.H. Halpenny, Design Chief, and E.J. Waugh, Construction Engineer identified as the lead design and engineering professionals for the project. In 1937 the electrical flow was reversed to carry electricity in the opposite direction from the Hoover Dam vicinity to Los Angeles.

The Boulder Dam-San Bernardino Transmission Line was officially determined eligible for listing to the National Register of Historic Places on October 22, 1993 and is listed on the California Register of Historical Resources. Portions of the line have been documented and recorded as part of multiple historical resource survey efforts, including in 2008 as part of field investigation activities for the SCE Eldorado-Ivanpah Transmission Project and in 2012-2013 for the SCE Coolwater-Lugo Transmission Project. The line is believed to retain integrity with respect to a large majority of original tower types being extant and still in operation, representing integrity of location, design, materials, workmanship, feeling, and association. However, without a comprehensive and conclusive survey of towers at all modern-day segments, this conclusion remains unsubstantiated.

As a modern-day segment of the Boulder Dam-San Bernardino Transmission Line, the Arrowhead-Calectric-Devil Canyon-Shandin 115kV Sub-Transmission Line is eligible for listing to the National Register of Historic Places, and is listed on the California Register of Historical Resources.

B11. Additional Resource Attributes: None.

***B12. References:** Maps and Drawings on files at SCE Corporate Drawing Management; HAER NV-45.

B13. Remarks: A comprehensive survey and evaluation of the Boulder Dam-San Bernardino Transmission Line is recommended to provide a conclusive determination of the line's integrity and eligibility status.

***B14. Evaluator:** Wendy L. Tinsley Becker, RPH, AICP, Principal, Urbana Preservation & Planning, LLC / www.urbanapreservation.com

***Date of Evaluation:** February 2014

See Location Map on page 5 of 5 of this DPR set for .

Official Comments:

***P3a. Description (Continued):**

Representative Photographs of Tower Types in the 1.5-Mile Survey Area of the Arrowhead-Calectric-Devil Canyon-Shandin Sub-Transmission Line

Standard suspension replacement poles with wood cross-bracing. These poles comprise the southern portion of the 1.5-mile survey area and include No. 1891616, 1725105, 4503942, 4503939, and 4503937. These poles were installed in the contemporary period and are considered non-historic.

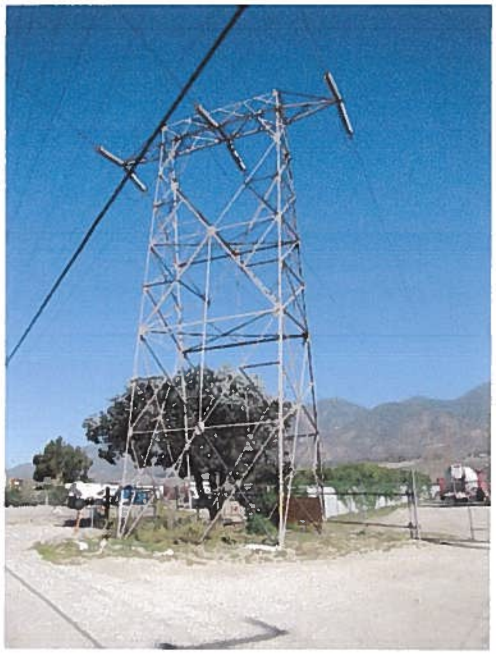
Original tower type AL or AH dating to the 1930-1931 construction campaign. Both the AL and AH types Dead End towers, with the AL type specified for line angles of 5 to 25 degrees, and AH type specified for line angles of 25 to 50 degrees. This tower, identified as No. 128064, is the only type AL or AH within the 1.5-mile survey area.

Original Type H tower that is most commonly identified as characterizing the Boulder Dam-San Bernardino Transmission Line. There are four Type H towers within the 1.5-mile survey area located at No. 128063, 128065, 128069, and 128070.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **CONTINUATION SHEET**	Primary #: P-36-010315H UPDATE HRI #: Trinomial #: CA-SBR-10315H UPDATE

 ***Resource Name or #** SCE Arrowhead-Calectric-Devil Canyon-Shandin Sub-Transmission Line (Portion)
***Recorded by:** Wendy L. Tinsley Becker, RPH, AICP, Principal, Urbana Preservation & Planning, LLC / www.urbanapreservation.com
*Date: February 2014 ☒ Continuation ☐ Update

***P3a. Description (Continued):**



Original Type AHS tower located at No. 128067. One additional dead end AHS Tower type, at 128066, is within the 1.5-mile survey area.

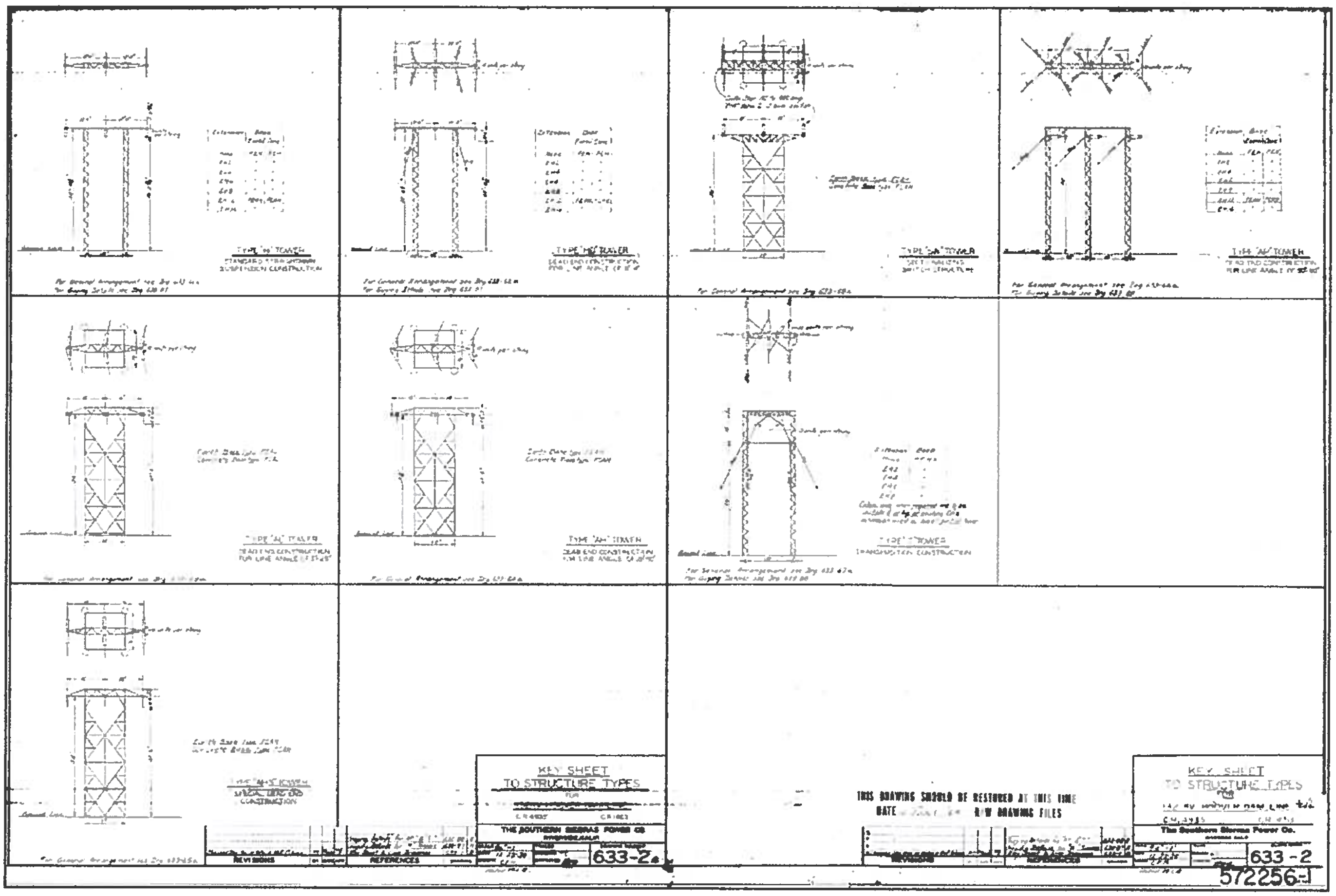
Original Type AHS tower but with suspension insulator (rather than dead end) configuration. This tower, located at No. 128068, is the only one of its type and configuration within the 1.5-mile survey area.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #: P-36-010315H UPDATE
HRI #:
Trinomial #: CA-SBR-10315H UPDATE

 *Resource Name or # SCE Arrowhead-Calectric-Devil Canyon-Shandin Sub-Transmission Line (Portion)
*Recorded by: Wendy L. Tinsley Becker, RPH, AICP, Principal, Urbana Preservation & Planning, LLC / www.urbanapreservation.com
*Date: February 2014 ☒ Continuation ☐ Update

***P3a. Description (Continued):**



Original Tower Illustrations, circa 1930. SCE Drawing No. 572256-1.

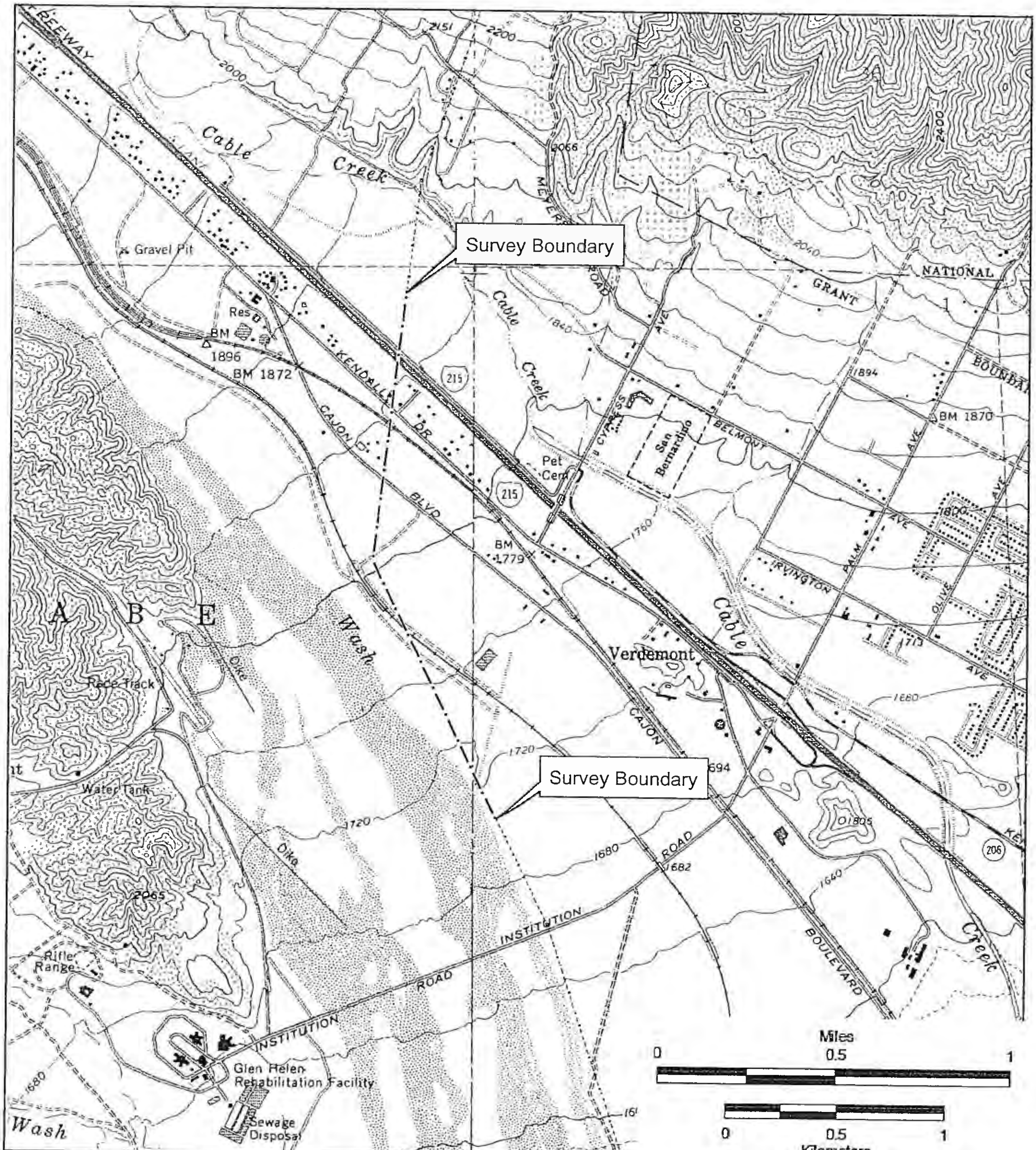
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #: P-36-010315H UPDATE
HRI #:
Trinomial #: CA-SBR-10315H UPDATE

 *NRHP Status Code: 2S2

*Resource Name or # SCE Arrowhead-Calectric-Devil Canyon-Shandin Sub-Transmission Line (Portion)

*Map Name: Devore Quadrangle and San Bernardino North *Scale: 1:24,000 *Date of Map: 1996 (both)



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-010315 (UPDATE)
HRI #
Trinomial CA-SBR-10315H (UPDATE)
NRHP Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** Hoover Dam to San Bernardino Transmission Line (UPDATE)

P1. Other Identifier: Southern Sierras Power Company/Nevada-California Power Company Electrical Transmission Line

***P2. Location:** ☑ **Not for Publication** ☐ **Unrestricted** ***a. County:** San Bernardino

***USGS Quad(s):** Daggett (1971), Minneola (1971)
Sec. 21, T9N R1E SBB&M

c. Address:

d. UTM (NAD 83): Zone 11 ; 510793 mE 3856583 mN (End)
Zone 11 ; 511505 mE 3857025 mN (Begin)

e. Other Locational Data:
This linear resource travels northeast and southwest of the PG&E Line 300 A pipeline near the town of Daggett. From Daggett, travel south on Daggett-Yermo Road to Interstate 40, turn left (east), and travel for about 0.6 miles before reaching the transmission line.

***P3a. Description:**
This update describes a previously undocumented segment of the Hoover Dam to San Bernardino Transmission Line, which was encountered within the right-of-way of PG&E gas line 300 A and surveyed within a quarter mile of the pipeline corridor. The segment is an active line that appears to have retained its original form and design. Five 12 oz. church-key-opened beverage cans (1935-1960's), four nondescript sanitary cans, and one green glass fragment were observed alongside the line. Modern debris was also observed.

References:

Rosenthal, Jeffrey
1990 How Old is that Dump?: A Field Guide to Dating Beer Cans. Not published.

***P3b. Resource Attributes:** AH16(Other historic)

***P4. Resources Present:** ☐ Building ☑ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (isolates, etc.)

***P5. Photo or Drawing:** None

***P6. Date Constructed/Age & Sources:** ☑ Historic ☐ Prehistoric ☐ Both
1930's

***P7. Owner and Address:** Bureau of Land Management, Private

***P8. Recorded by:** C. Higgins and T. Lucas, Far Western, 2727 Del Rio Place Suite A, Davis CA 95618

***P9. Date Recorded:** 4/24/2013

***P10. Survey Type:** Intensive

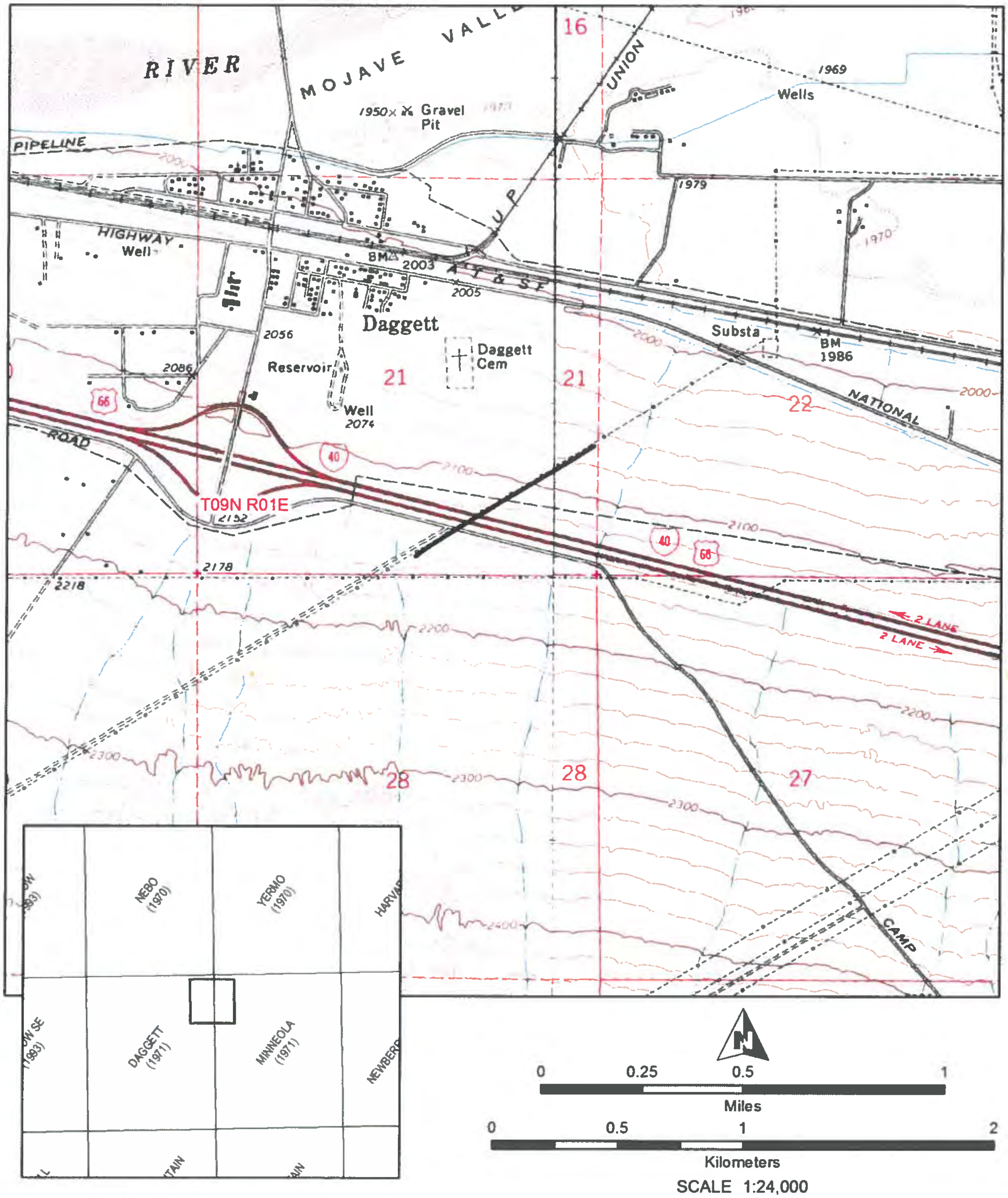
***P11. Citation:** Higgins, Courtney, Rebecca Kellawan, Daron Duke and Thomas Lucas (2013) Cultural Resource Inventory of Approximately 5,300 Acres for PG&E Pipelines 300 A and B, San Bernardino and Kern Counties, California. And Kern Counties, California

***Attachments:** ☐ None ☑ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other:

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-010315 (UPDATE)
HRI #
Trinomial CA-SBR-10315H (UPDATE)

***Resource Name or #:** Hoover Dam to San Bernardino Transmission Line (UPDATE)



darla 7/23/2013 12 44 52 PM

Update

State of California — The Resources Agency **DEPARTMENT OF PARKS AND RECREATION** **CONTINUATION SHEET**	**Primary #** 36-010315 -10 **HRI#** **Trinomial** CA-SBR-10315H

Page 1 **of** 1 ***Resource Name or #:** Edison Company Boulder Dam-San Bernardino Electrical Transmission Line

***Recorded by:** N. Lawson, P. Reid, CH2M HILL ***Date:** December 17, 2012 ☐ Continuation ☒ Update

P-36-10315. (Boulder Dam-San Bernardino Electrical Transmission Line). This site was recorded in 1988 as a three-cable transmission line supported by a series of twin-tower H-frame supports. The transmission line was constructed in 1930 to 1931 to carry power from San Bernardino to Hoover Dam for the construction of the dam. Upon the completion of the dam, it was reversed and it carried power from the dam to San Bernardino, and it remains in use today. Because of the association with the nationally significant construction of the Hoover Dam, it was recommended eligible for inclusion in the NRHP, and the State Historic Preservation Office, and federal agency concurred.

CH2M HILL revisited this site in 2012. It is in similar condition as described on previous site forms.

USGS IVANPAH LK

State of California — The Resources Agency **DEPARTMENT OF PARKS AND RECREATION** **PRIMARY RECORD**		**Primary #** 36-10315 UPDATE **HRI #** **Trinomial** CA-SBR-10315 H **NRHP Status Code** 2S2
	Other Listings **Review Code**	**Reviewer** **Date**

 ***Resource Name or #:** 36-10315 UPDATE

P1. Other Identifier: Boulder Dam–San Bernardino 115Kv Line; San Bernardino-Boulder Dam 132Kv Line

***P2. Location:** ☒ **Not for Publication** ☐ **Unrestricted** ***a. County:** San Bernardino
and

***b. USGS 7.5' Quads:** Halloran Spring **Date:** 1983 (For township, range, and section see Continuation Sheet)
Baker **Date:** 1983 (For township, range, and section see Continuation Sheet)
Cave Mountain **Date:** 1986 (For township, range, and section see Continuation Sheet)
Yermo **Date:** 1953 (photo revised 1970)
(For township, range, and section see Continuation Sheet)

c. Address: N/A City: N/A Zip: N/A

d. UTM: Zone: 11S; (G.P.S.) NAD 83

Segment 1	**Start:** 521494mE/ 3863030mN	**End:** 521440mE/ 3863002mN
Segment 2	**Start:** 563225mE/ 3884416mN	**End:** 562878mE/ 3883548mN
Segment 3	**Start:** 593729mE/ 3911208mN	**End:** 582896mE/ 3903421mN
Segment 4	**Start:** 596533mE/ 3913193mN	**End:** 593799mE/ 3911257mN
Segment 5	**Start:** 596604mE/ 3913244mN	**End:** 596570mE/ 3913205mN

e. Other Locational Data: Elevation: 1620 ft. AMSL

To reach Segment 1 of the resource that lies within the project area, travel east on I-15 toward Las Vegas. Take Minneola Road exit and turn right onto Minneola Road. Cross over the intersection with Yermo Road and proceed ½ mile south until reaching Calico Boulevard. Turn left onto Calico Boulevard and travel .20 mile to the AT&T access road. Turn left (north) onto the access road and proceed .04 miles until reaching the segment of the transmission line.

To reach Segment 2 of the resource that lies within the project area travel east of I-15 toward Las Vegas. Exit Basin Road and travel northeast (left) over the overpass. Travel north about a ½-mile from where the paved road ends from the overpass and becomes a dirt road. After traveling the ½-mile north, turn west (left) onto the AT&T access road. Travel along the access road for approximately 2.5 miles. The segment of the resource runs northeast/southwest of the AT&T access road.

To reach Segment 3 of the resource travel east on I-15 toward Las Vegas. Exit the Baker Boulevard exit until it meets with SR-127. Turn north (left) onto SR-127 and travel for approximately .9 miles. The segment will be straight ahead and run northeast/southwest from this point.

To reach Segment 4 of the resource that lies within the project area, travel east from Baker, California toward Las Vegas. Take the Halloran Springs Road exit and turn northeast (left) and travel over the overpass. The road will change to a poorly paved road. Follow the road for approximately .25 miles until reaching the AT&T access road. Turn west (left) onto the AT&T access road. Travel along the AT&T access road for approximately 3.3 miles. The segment runs southwest from this point within the project area.

To reach Segment 5 of the resource travel to Segment 4. Travel back on the AT&T access road approximately .04 miles. The segment should lie here and is northeast and southwest of the AT&T access road.

***P3a. Description:** This resource is a single circuit electrical transmission line that was first recorded by N. Neuenschwander and J. Miller of Peak & Associates, Inc. on June 23, 1988. Neuenschwander and Miller note the resource as being a historic transmission line (Victor Black Mt. Gale Pole 435, two towers with cross bar, three lines) ca. 1930-1931.

T. Brock of Archaeo. Advis. Grp. updated the site record on October 2, 1989 and described the resource as the Boulder Dam-San Bernardino 115KV line or the San Bernardino-Boulder Dam 132KV line. Brock notes that the resource consists of a three-cable transmission line that is supported by a series of twin-tower H-frame supports. The resource was noted as being 225 miles in length at the time of recordation as well as being in very good condition. Brock also notes that the original character of the resource is indicated by signs bearing the name of the company that originally built it which is the Southern Sierras Power Company.

On August 31, 2006 R. Hatheway of Hatheway Associates revisited a portion of the resource and updated the site record. Hatheway describes the resource as the Southern Sierras Power Company/Nevada-California Power Electrical Transmission Line, the Nevada-California Electric Corporation, the Southern California Edison Electrical Transmission Line, and the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line. Hatheway notes that the resource consists of an electrical transmission line with associated towers, insulators, and an access road. The resource was constructed in 1930 and 1931 and the original line carried power to Boulder City/Boulder Dam to facilitate construction. Hatheway also mentions that since 1937, power has been carried from the dam to Los Angeles. Lastly, Hatheway notes in the updated record that this resource is listed on the National Register of Historic Places and the California Register of Historic Places. The towers were fabricated at another location and erected on site. The towers were described as being simply designed, standing on two nearly square tower legs and present a short and compact rectangular structure.

The resource was updated again in October 2008 by J. Sander and J. Auck of Chambers Group, Inc. Sander and Auck note that the resource appears unchanged since it was determined eligible for the NRHP in 1993.

Lastly, a 2.8 mile portion of the resource was updated by S. Pappas and R. Cunningham of ECORP on November 16, 2009. During Pappas and Cunningham's recordation, the resource was observed as starting at Highway 247 toward the northeast.

Pappas and Cunningham note that the transmission line and towers appeared to be in good condition without any visible damages or loss of integrity.

Five portions of this overhead electrical transmission line pass through the AT&T Fiber Optics Replacement Project's area of potential effect (APE), within a distance of nearly 11 miles stretching between Halloran Summit and Daggett Ridge. During the re-visit by Chambers Group archaeologists on November 21, 2012, start and stop points for five segments of the alignment observed within the Project's APE were recorded and are listed in the locational data for this record. The condition of these segments of this resource is very good as the segments are maintained and currently in active service. Some metal towers appear to have been replaced by H-frame towers constructed of wooden utility poles with a wooden crossbar near the top to support the three electrical lines.

***P3b. Resource Attributes:** HP11. Engineering Structure: Electrical Transmission Line
***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview from the northeast
Photo 326 (11/21/2012)

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both

***P7. Owner and Address:**
Los Angeles Department of Water and Power
PO Box 5111
Los Angeles, CA

Bureau of Land Management
Barstow Field Office
2601 Barstow Road
Barstow, CA 92311
and
Needles Field Office
1303 South Hwy 95
Needles, CA 92363

Nine Private Owners (see Continuation Sheet)

***P8. Recorded by:** C. Bodmer and B. Bartram
Chambers Group, Inc
5 Hutton Centre Drive, Suite 750
Santa Ana, CA 92707

***P9. Date Recorded:** 11/21/2012

***P10. Survey Type:** Class III Intensive level pedestrian survey

***P11. Report Citation:**
Chambers Group, Inc.
2013 *A Class III Cultural Resources Inventory: AT&T Fiber Optic Cable Maintenance Project, Halloran Summit Road to Slash X Ranch Segment, San Bernardino County, California.*

***Attachments:** ☐NONE ☒ Location Map ☐Sketch Map ☒Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☒Photograph Record ☐ Other (List):

LINEAR FEATURE RECORD

 *__Resource Name or #:__ 36-10315 UPDATE

L1. Historic and/or Common Name: the Southern Sierras Power Company/Nevada-California Power Electrical Transmission Line, the Nevada-California Electric Corporation, the Southern California Edison Electrical Transmission Line, and the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**

b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map)

UTM: Zone: 11S;

	Seg. 1	East end: 521494mE/3863030mN	West end: 521440mE/3863002mN
	Seg. 2	East end: 563225mE/3884416mN	West end: 562878mE/3883548mN
	Seg. 3	East end: 593729mE/3911208mN	West end: 582896mE/3903421mN
	Seg. 4	East end: 596533mE/3913193mN	West end: 593799mE/3911257mN
	Seg. 5	East end: 596604mE/3913244mN	West end: 596570mE/3913205mN (G.P.S.) NAD 83

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
This resource consists of a three cable transmission line that is supported by a series of twin-tower H-frame supports along with associated towers, insulators, and an access road. This alignment traverses 225 miles in length generally trending southwest to northeast. The towers have a simple design standing on two nearly square tower legs which creates a short and compact rectangular structure. The resource was constructed in 1930 and 1931 and the original line carried power to Boulder City/Boulder Dam to facilitate construction. Since 1937, power has been carried from the Hoover Dam to Los Angeles.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

a. Top Width: Structures not measured
b. Bottom Width: 40 ft.
c. Height or Depth: Structures not measured
d. Length of Segment:
Seg. 1 - 161 ft.
Seg. 2 - 3,169 ft.
Seg. 3 - 43,772 ft.
Seg. 4 - 10,991 ft.
Seg. 5 - 141 ft.
(Surveyed a total of 58,234 ft. = 11 miles)

L4e. Sketch of Cross-Section (include scale) **Facing:**
Structures not measured.

L5. Associated Resources: Hoover/Boulder Dam

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The segments we observed of this resource were situated in an alluvial fan terrace of quaternary alluvium. Vegetation on site consists of creosote bush community. There is a slight slope of 0-1 degrees and open desert exposure.

L7. Integrity Considerations: Some metal towers appear to have been replaced by H-frame towers constructed of wooden utility poles with a wooden crossbar near the top to support the three electrical lines. A very small portion of this resource appears to have been altered at the time and within the limits of our investigation, therefore this resource should retain its original integrity as the overall structures observed are in good condition and are obviously maintained and currently in active service.

L8b. Description of Photo, Map, or Drawing (View, scale, etc.)
Photo log: 36-10315_11-21-2012, Photo #328, Overview facing SW

L9. Remarks: This resource was evaluated as Eligible for the NRHP in 1993.

L10. Form Prepared by: (Name, affiliation, and address)
A. Freeberg
5 Hutton Centre Dr., Suite 750
Santa Ana Ca 92707

L11. Date: Jan 15, 2013

***Required information**

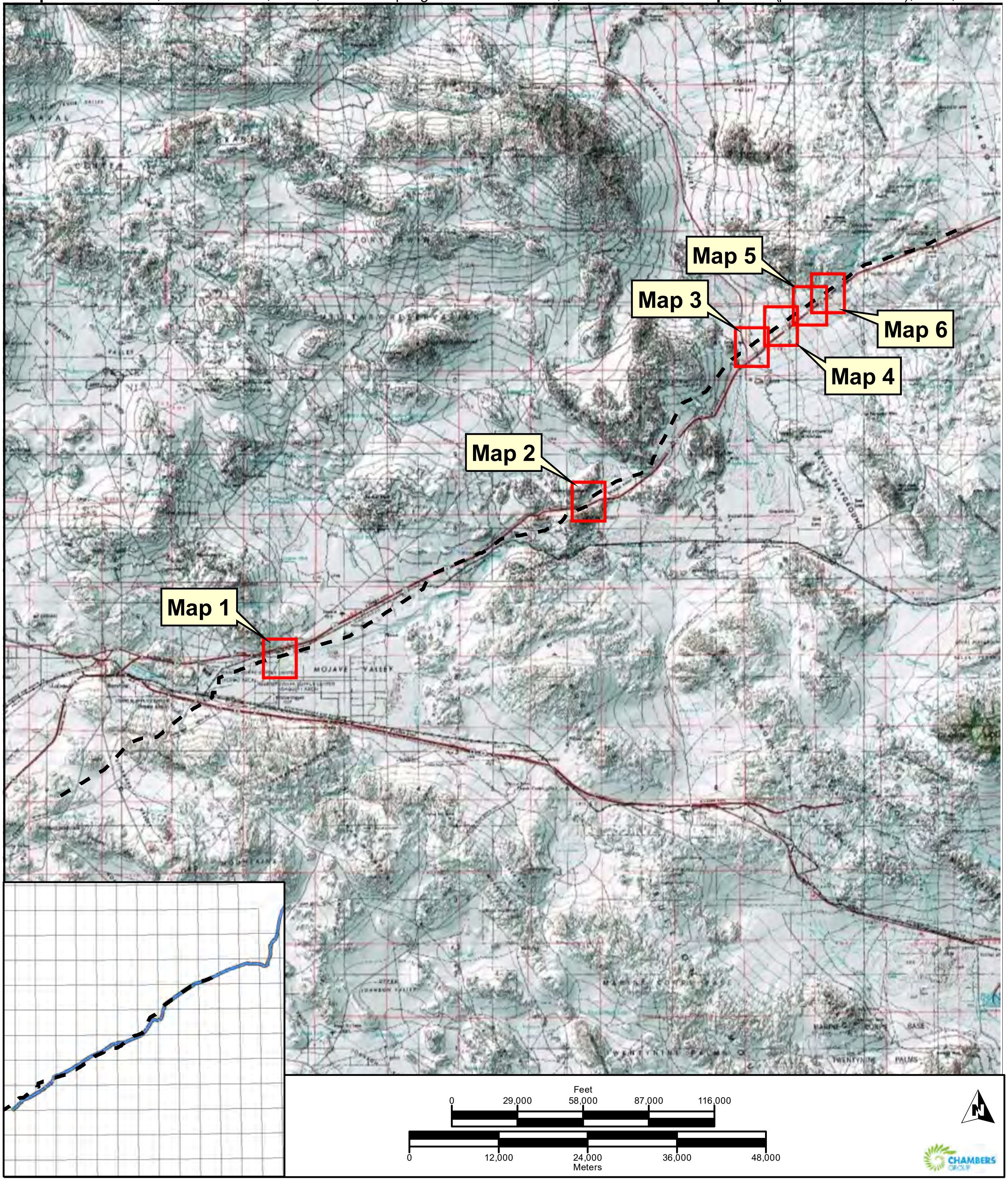
Primary # 36-010315
HRI#

LOCATION MAP

Trinomial CA-SBR-10315H

*Resource Name or #:

***Map Name:** Yermo, Cave Mountain, Baker, Halloran Spring ***Scale:** 1:725,000 ***Date of Map:** 1953 (photorevised 1970), 1986, 1983



*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # 36-010315
HRI#

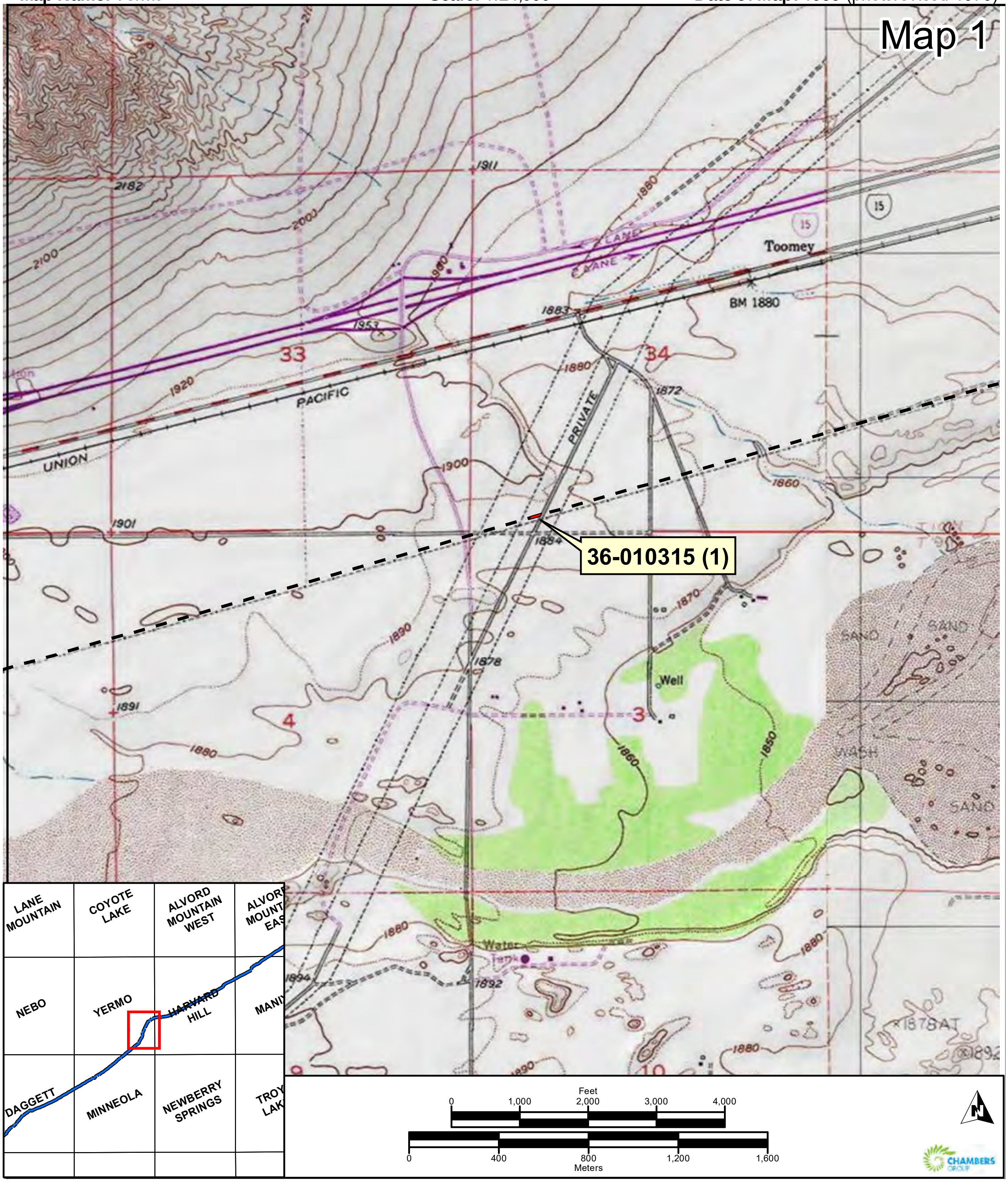
LOCATION MAP

Trinomial CA-SBR-10315H

Page 5 of 15

*Resource Name or #:

***Map Name:** Yermo ***Scale:** 1:24,000 ***Date of Map:** 1953 (photorevised 1970)



DPR 523J (1/95)

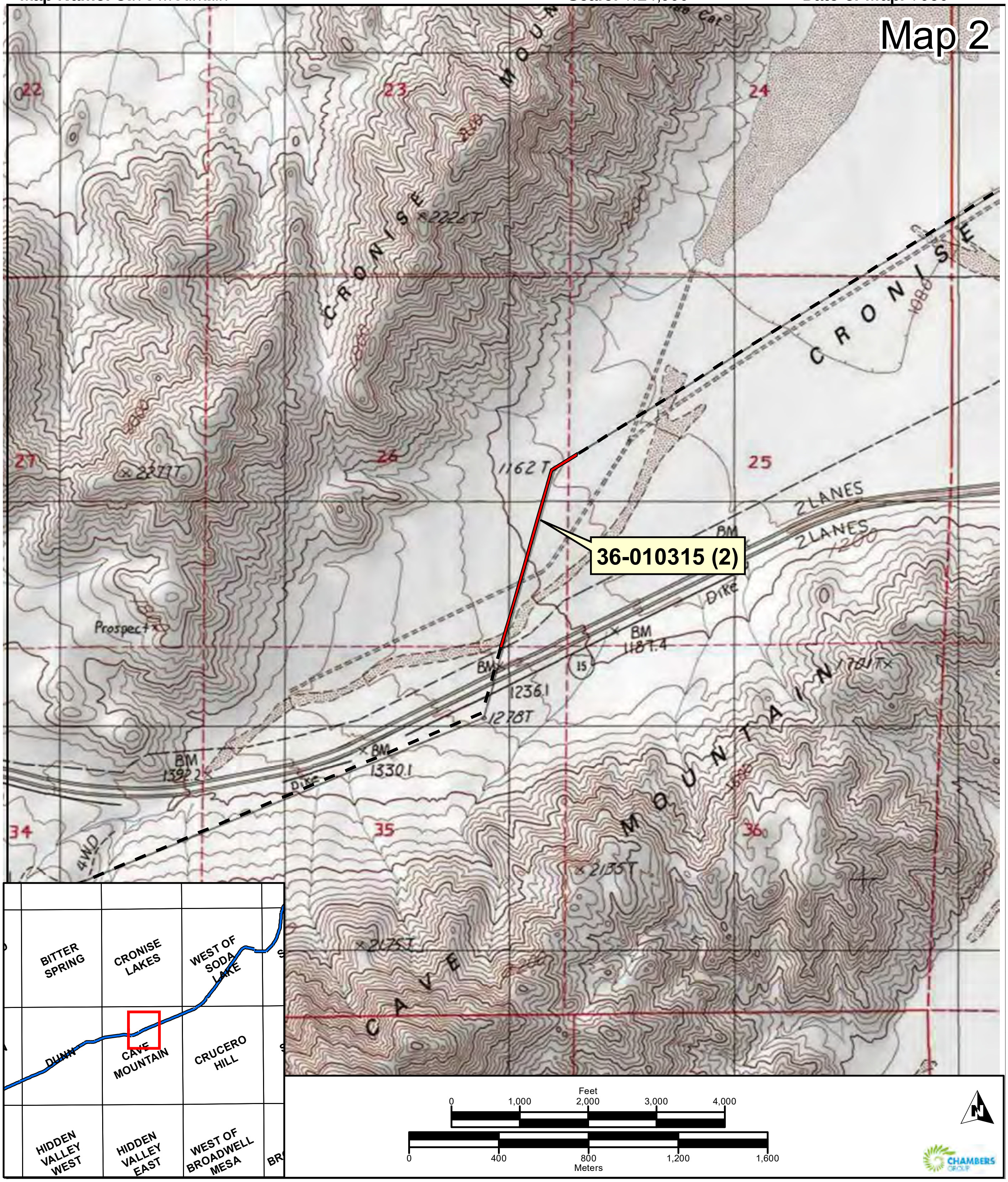
*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 36-010315
HRI#
Trinomial CA-SBR-10315H

*Resource Name or #:

*Map Name: Cave Mountain | *Scale: 1:24,000 | *Date of Map: 1986

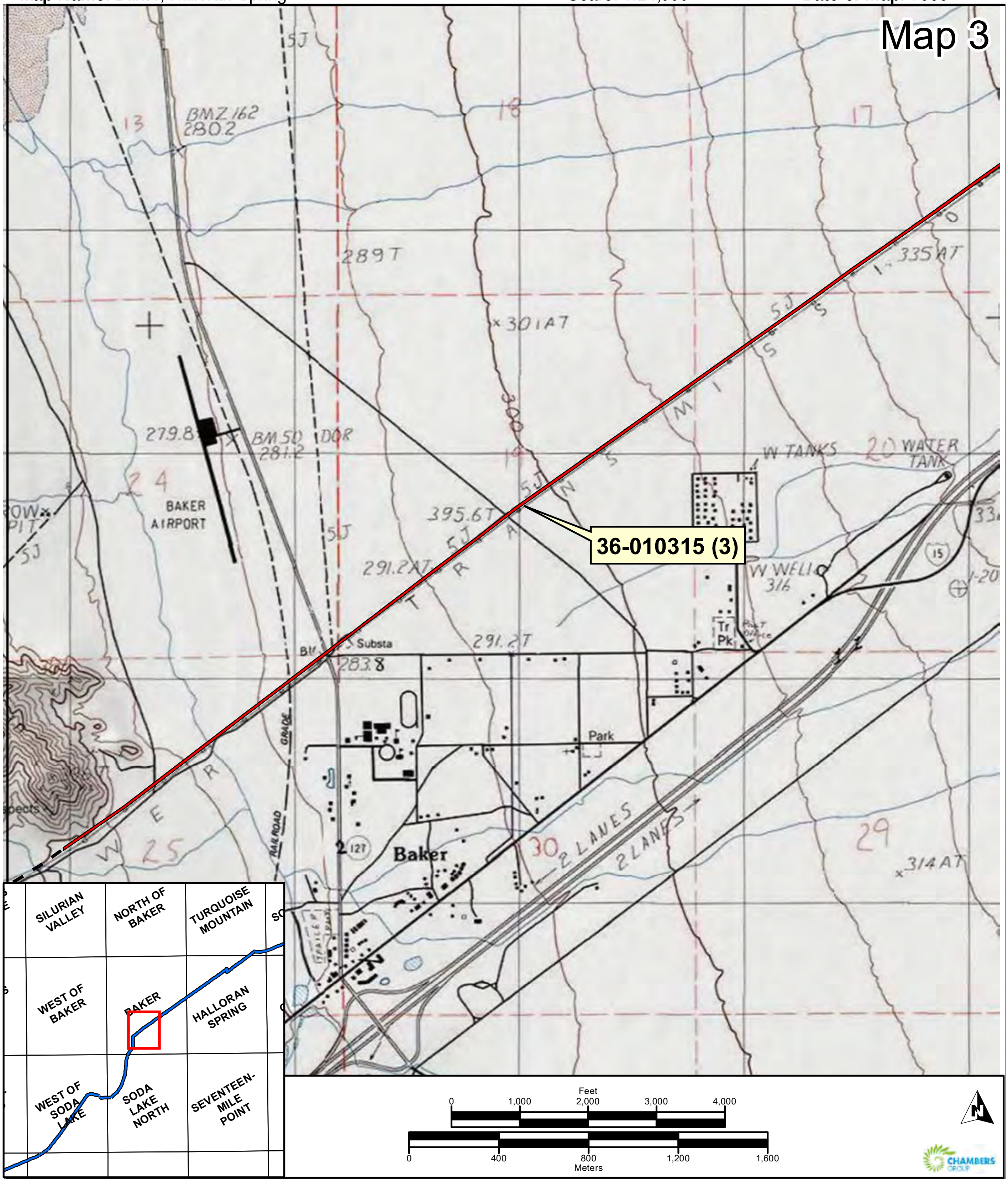


State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 36-010315
HRI#
Trinomial CA-SBR-10315H

Page 7 **of** 15 ***Resource Name or #:**

***Map Name:** Baker, Halloran Spring ***Scale:** 1:24,000 ***Date of Map:** 1983



DPR 523J (1/95) *Required information

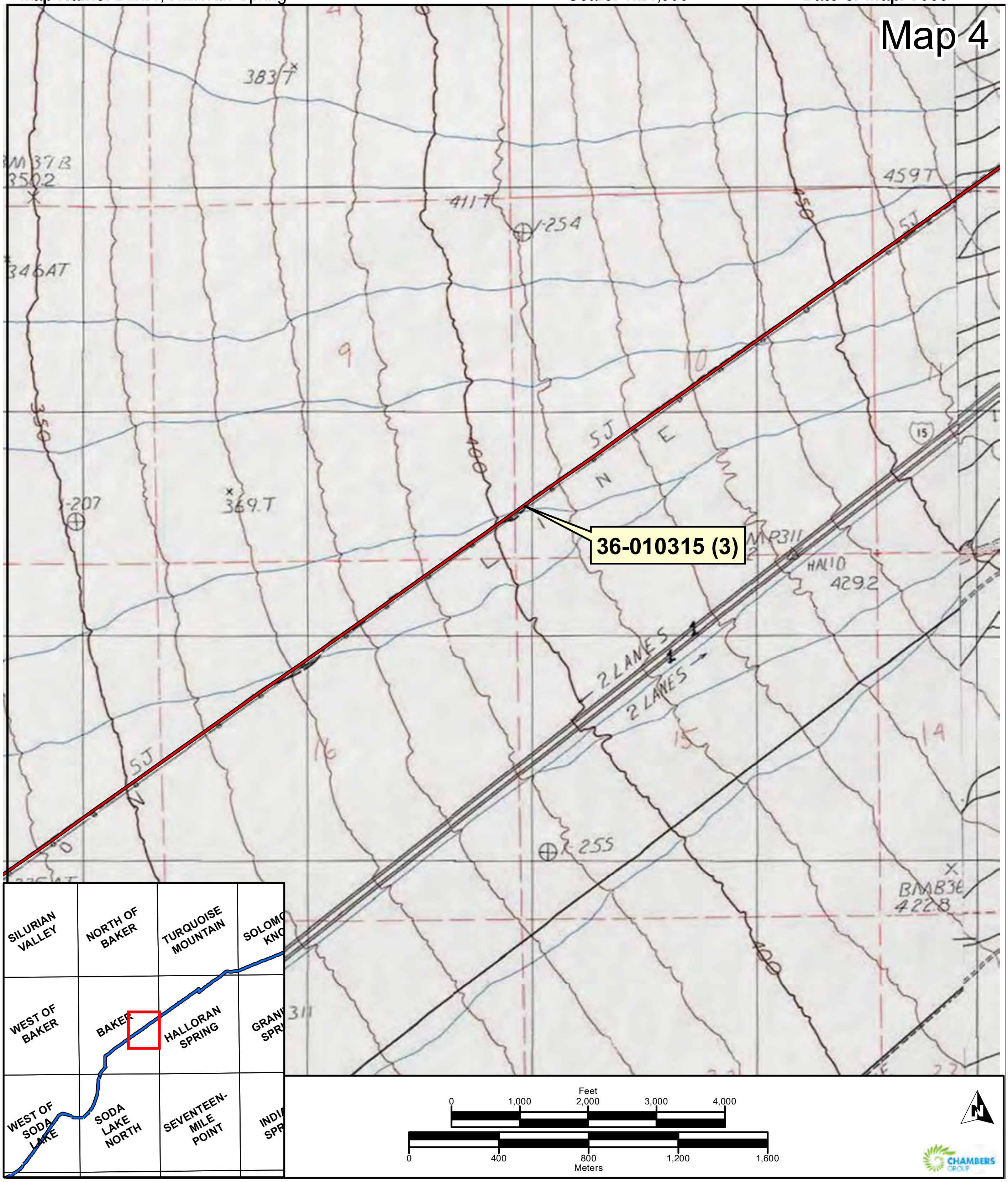
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
Primary # 36-010315
HRI#

LOCATION MAP

Trinomial CA-SBR-10315H

***Resource Name or #:**

***Map Name:** Baker, Halloran Spring
***Scale:** 1:24,000
***Date of Map:** 1983

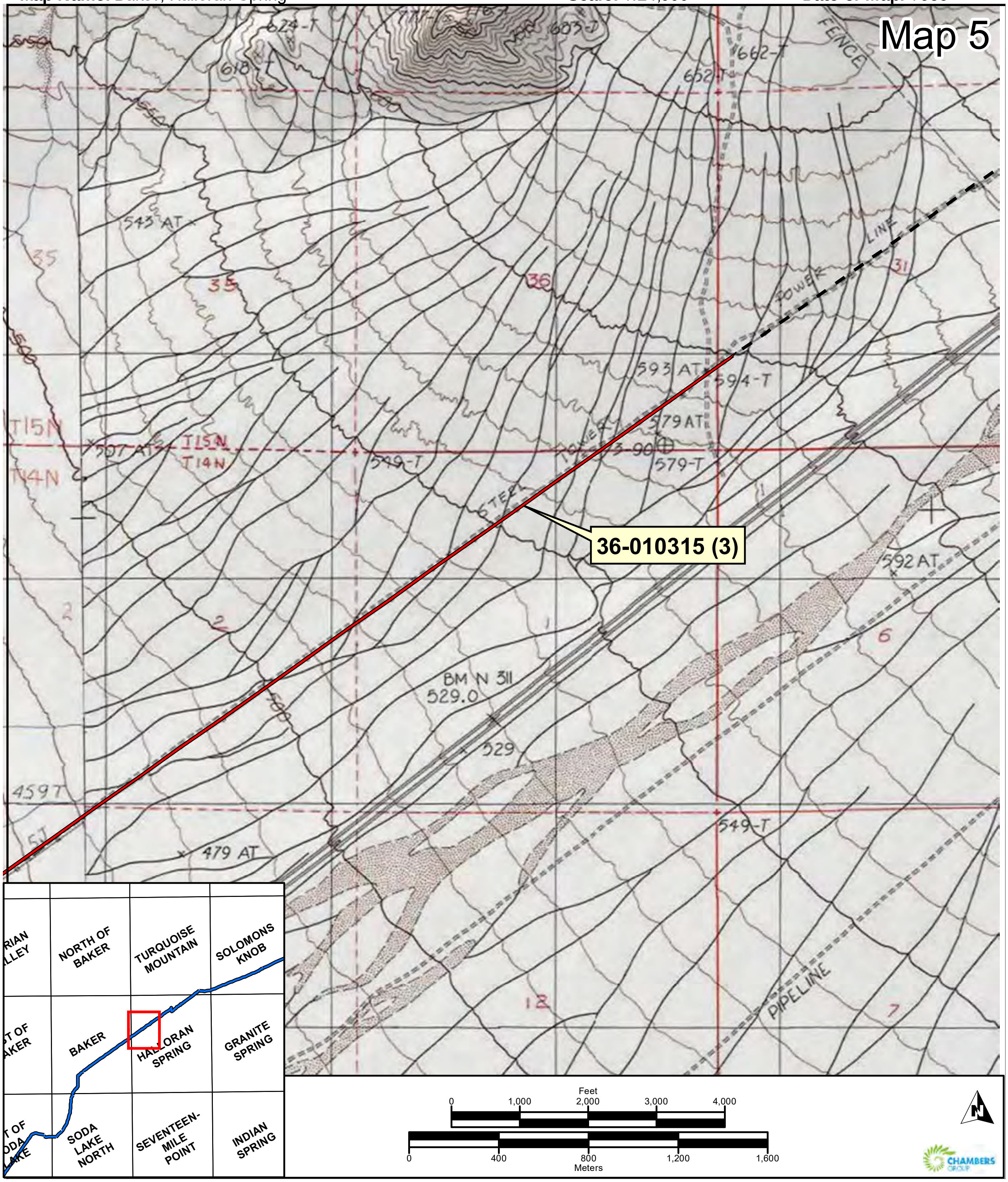


State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 36-010315
HRI#
Trinomial CA-SBR-10315H

***Resource Name or #:**

***Map Name:** Baker, Halloran Spring ***Scale:** 1:24,000 ***Date of Map:** 1983



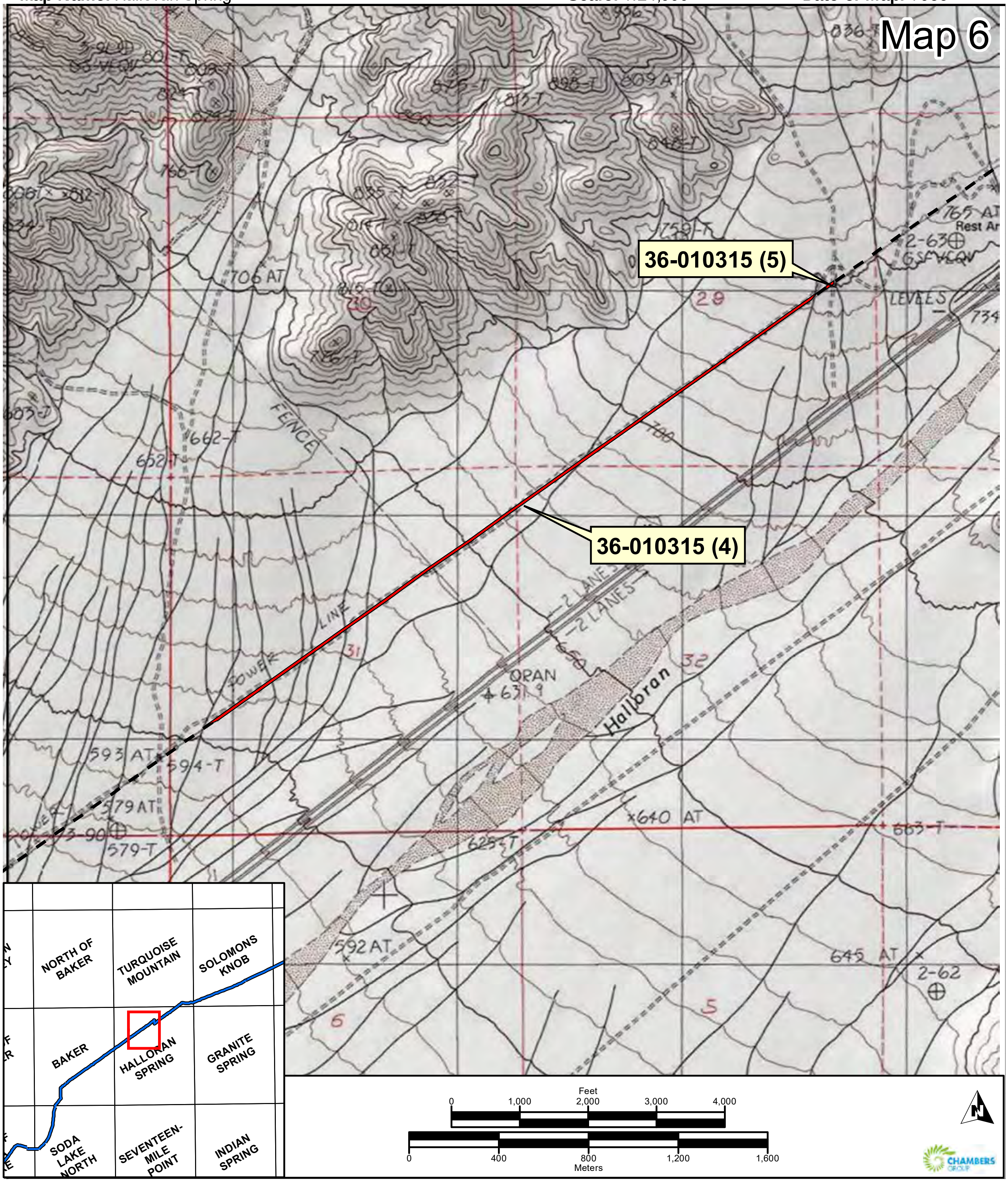
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 36-010315
HRI#
Trinomial CA-SBR-10315H

***Resource Name or #:**

***Map Name:** Halloran Spring ***Scale:** 1:24,000 ***Date of Map:** 1983



Primary # 36-10315 UPDATE
Trinomial CA-SBR-10315

PHOTOGRAPH RECORD

 ***Resource Name or #:** 36-10315 UPDATE **Year:** 2012

Camera Format: Digital
Film Type: Digital

Photo Log: 36-10315_11-21-2012
Negatives Kept at: Chambers Group, Inc. Santa Ana, CA 92707

Mo.	Day	Exp./Frame	Subject/Description	View Toward
11	21	325	Photo roll ID	Plan
11	21	326	Overview of 1930's transmission tower and line taken from ATT marker	Northeast
11	21	327	ID plate on transmission tower (east) leg, "The Southern Sierras Company"	Northeast
11	21	328	Overview of transmission tower #936	Southwest
11	21	329	Overview of historic transmission towers and line with #744-MKP-ADL tower to the east	Northeast
11	21	330	Overview of historic transmission tower #936	Southwest
11	21	331	Overview of transmission tower and line, taken from Field Road exit	Southwest
11	21	332	Overview takes at ATT marker #7043 and intersection of BLM route CL 8830 E/W and BLM CL 8834 N/S	South

***Resource Name or #:** 36-10315 UPDATE

***Recorded by:** Chambers Group, Inc. ***Date:** 11/21/2012 ☒ Continuation ☐ Update

ID plate on transmission tower (Photo 327)

Overview of transmission tower facing SW (Photo 328)

Overview of historic transmission towers and line facing northeast (Photo 329)

Overview of the transmission line taken from the ATT service Rd. (Photo 330)

***Recorded by:** Chambers Group, Inc. ***Date:** 11/21/2012 ☒ Continuation ☐ Update

***Pb2. Continued**

Quadrangle	Township	Range	Section	Aliquot
Halloran Springs	14N	9E	16	E$^1/_2$ & SW$^1/_4$ of NW$^1/_4$
				NW$^1/_4$ of SW$^1/_4$
				SE$^1/_4$
			17	SE$^1/_4$ of SW$^1/_4$
				W$^1/_2$ & NE$^1/_4$ of NW$^1/_4$
			20	S$^1/_2$ of NE$^1/_4$
			19	NW $^1/_4$ of SE$^1/_4$
				Lot 1 & 2 of SW$^1/_4$
				SE$^1/_4$ of SE$^1/_4$
	14N	8E	24	W$^1/_4$ & SW$^1/_4$ of NE$^1/_4$
			25	SE$^1/_4$ of NW$^1/_4$
				NE$^1/_4$ of SW$^1/_4$
				N$^1/_2$ of SE$^1/_4$
	15N	10E	29	E$^1/_2$ & SE$^1/_4$ of SW$^1/_4$
				NW$^1/_4$ of NW$^1/_4$
			32	E$^1/_2$ & SW$^1/_4$ of NE$^1/_4$
			31	Lot 1 of NW$^1/_4$
				Lot 1 & 2 of SE$^1/_4$
				SE$^1/_4$ of NE$^1/_4$
			29	NE$^1/_4$ of SE$^1/_4$
Baker	15N	9E	31	Lot 2 of SW$^1/_4$
	15N	10E	36	S$^1/_2$ of SE$^1/_4$
	14N	9E	1	Lot 2 of NE$^1/_4$
				Lot 1 & 2 of NW$^1/_4$
			2	Lot 1 of NE$^1/_4$
				W$^1/_2$ & NE$^1/_4$ of SE$^1/_4$
				SE$^1/_4$ of SW$^1/_4$
			11	N$^1/_2$ of NW$^1/_4$
			10	E$^1/_2$ & SW$^1/_4$ of NE$^1/_4$
				NW$^1/_4$ of SE$^1/_4$
				N$^1/_2$ & W$^1/_2$ of SW$^1/_4$
			9	SE$^1/_4$ of SE$^1/_4$
			16	N$^1/_2$ of NE$^1/_4$
Cave Mountain	12N	6E	26	SE$^1/_4$ of NE$^1/_4$
				E$^1/_2$ of SE$^1/_4$
Yermo	10N	2E	34	SW$^1/_4$ of SW$^1/_4$

CONTINUATION SHEET

***Recorded by:** Chambers Group, Inc. ***Date:** 11/21/2012 ☒ Continuation ☐ Update

*P7. Continued

Private Land Owners
BEWSHER, BETHANY M.
2708 WOODED ACRES DR
WACO TX 76710

BEWSHER, DIANE M.
2708 WOODED ACRES DR
WACO TX 76710

GOHN, LINDA J.
4882 PARK AVE
CYPRESS CA 90630

MC KEN, PATRICIA V.
10236 CLARK WOOLDRIGE CT
LAS VEGAS NV 89129

AUJLA, GURVINDER S.
1600 E FOOTHILL BLVD
IRWINDALE CA 91702

LA FON, LEVA TR.
P O BOX 406
EARP CA

STEIN, JESSICA R.
732 N LAKE AVE #202
PASADENA CA 91104

WAAS, NATHAN C.
732 N LAKE AVE #202
PASADENA CA 91104

WAAS, AMBER L.
732 N LAKE AVE #202
PASADENA CA 91104

Historic Information: A total of 15 historic land patents were found in the BLM General Land Office records for legal land descriptions which the linear alignment passes through. The patent types were filed under the authority of Indemnity Selections (44 Stat. 1022), Homestead Entry Original (12 Stat. 392), Sale-Small Tract (52 Stat. 609), Sale-Public Lands-FLPMA (90 Stat. 2743), California Enabling Act (10 Stat. 244). All patents found are listed in the tables here:

T10N R2E						
Section	**Patent Type**	**Date**	**Patentee**	**Issue Date**	**Aliquot**	**Document #**
34	Indemnity Selections	01/21/1927	State Of California	11/24/1925	SW¼	CACAAA 004314

T14N R8E						
Section	**Patent Type**	**Date**	**Patentee**	**Issue Date**	**Aliquot**	**Document #**
25	Sale-Small Tract	06/01/1938	Anderson, Wilma M.	03/20/1957	N½SE¼SE¼NE¼	1169493
25	Sale-Small Tract	06/01/1938	Carson, Jack	05/05/1960	S½SE¼NE¼NE¼	1208240
25	Sale-Small Tract	06/01/1938	Cyrus, Lindsay Johnson	10/29/1959	NE¼NE¼SE¼NE¼	1201151
25	Sale-Small Tract	06/01/1938	Fisher, Lester Henry	06/01/1938	NW¼NE¼SE¼NE¼	1226696
25	Sale-Public Lands-FLPMA	10/21/1976	Jibilian, Albert	04/20/1989	SW¼NE¼SE¼NE¼	CACA 017719
25	Sale-Public Lands-FLPMA	10/21/1976	Johnson, Marlene E., Richard A. Johnson, and Ronald H. Johnson	05/02/1989	S½NE¼NE¼NE¼, N½SE¼NE¼NE¼	CACA 017715
25	Sale-Public Lands-FLPMA	10/21/1976	Johnson, Marlene E., Richard A. Johnson, and Ronald H. Johnson	05/05/1989	NW¼NE¼NE¼	CACA 017716
25	Sale-Small Tract	06/01/1938	Lafon, Leva	05/02/1962	N½SW¼NE¼NE¼	1226690
25	Sale-Small Tract	06/01/1938	Lisle, John Q.	03/14/1960	S½SE¼SE¼NE¼	1206554
25	Sale-Small Tract	06/01/1938	Muller, Charles Otho	02/15/1961	N½NE¼NE¼NE¼	1217301
25	Sale-Small Tract	06/01/1938	Rampton, Ralph W.	11/18/1959	SE¼NE¼SE¼NE¼	1201955
25	Homestead EntryOriginal	05/20/1862	Williams, Robert Y.	03/29/1917	NE¼SE¼, SE¼SE¼, W½SE¼	574305

T14N R9E						
Section	**Patent Type**	**Date**	**Patentee**	**Issue Date**	**Aliquot**	**Document #**
16	California Enabling Act	03/03/1853	State of California	09/08/1856	N½, N½SW¼, SW¼SW¼, NW¼SE¼, SE¼SW¼, NE¼SE¼, SW¼SE¼, SE¼SE¼	CACAAA 000001 XU

T15N R10E						
Section	**Patent Type**	**Date**	**Patentee**	**Issue Date**	**Aliquot**	**Document #**
29	Indemnity Selections	01/21/1927	State of California	06/22/1956	SE¼SE¼	CACAAA 072655 01

References:

U.S. Department of Interior
2010 "Bureau of Land Management: General Land Office Records." http://www.glorecords.blm.gov/search/default.aspx. Accessed June 8, 2012.

Update 7/12

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-010315
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** SRI-451 (UPDATE)

P1. Other Identifier: SRI-451

***P2. Location:** ☑ Not for Publication ☐ Unrestricted ***a. County:** San Bernardino

***b. USGS Quad:** 7.5' BAKER (2009); T 14N R 8E, NE¼ of NE¼ of Sec. 25; SBBM

c. Address:

d. UTM: Zone 11; 584143 mE/ 3904128 mN NAD27 GPS

e. Other Locational Data:
The electrical lines cross Highway 127 at postmile 0.9, north of Baker and on Highway 247 south of Barstow at postmile 70.4.

***P3a. Description:**
This is an update for previously recorded site P-36-010315, a set of transmission lines. The two segments recorded here cross Highways 127 and 247. A historic access road parallels the transmission line where it crosses Highway 247. The current observations update, but do not differ substantially from, previous site records. The current project only examines the first 15 meters from the edge of pavement corresponding to the Caltrans right-of-way. The site continues beyond the right-of-way, but these portions were not recorded. The right-of-way extends 15 m from the edge of the pavement of the highway.

***P3b. Resource Attributes:** HP 11 Engineering structure; AH7 Historical-period road, HP37 Historical-period road

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☑ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

***P5b. Description of Photo:**
Facing E; 3/2/2011; Silver Lane

***P6. Date Constructed/Age & Sources:**
☑ Historic ☐ Prehistoric ☐ Both

***P7. Owner and Address:**
GOVERNMENT PROPERTY,
ADDRESS UNKNOWN

***P8. Recorded by:**
Justin Lev-Tov, S. Kremkau

***P9. Date Recorded:** 7/25/2011

***P10. Survey Type:**
Reconnaissance survey of highway right-of-way

***P11. Citation:** Report forthcoming

***Attachments:** ☐ None ☑ Location Map ☑ Sketch Map ☑ Continuation Sheet ☐ Building, Structure, and Object Record ☑ Archaeological Record ☐ District Record ☑ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☑ Photograph Record ☐ Other:

***Resource Name or #:** SRI-451 (UPDATE)

***A1. Dimensions: a. Length** 89 m (N/S) **x b. Width** 46 m (E/W)

Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☑ GPS ☐ Other:

Method of Determination: ☐ Artifacts ☑ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☑ Other: The current project only examines the first 15 meters from the edge of ...

Reliability of determination: ☑ High ☐ Medium ☐ Low

Explain: The high voltage electric lines are distinct due to their aboveground towers and wires.

Limitations: ☐ Restricted access ☐ Paved/built over ☑ Site limits incompletely defined ☐ Disturbances ☐ Vegetation ☐ Other:

A2. Depth: None ☑ None ☐ Unknown **Method of determination:** None

***A3. Human Remains:** ☐ Present ☑ Absent ☐ Possible ☐ Unknown

***A4. Features:**

This site is a set of transmission lines (Feature 9485), which are composed of three single wires. The towers are Y-shaped, but appear substantially shorter than modern Y-shaped transmission poles. These electrical lines were previously recorded as part of P-36-010315. The towers which suspend the electrical lines are not within the right-of-way. North of Feature 9485 is another set of power lines is composed of two single wires, and three sets of three wires clamped together. These wires exhibit highly visible 'floats' to identify the wires to aircraft. This northern transmission line is not historic, rather, it was constructed in the early 1990s, as extrapolated from site record P-36-010315, found during a survey for these power lines' planned construction. The towers which suspend the electrical lines are not within the right-of-way. Both sets of power lines are suspended over Highway 127. Silver Lane is located on both sides of Highway 127. Silver Lane is a largely unimproved, single-track dirt road. The road may have been improved with gravel at one time. The road is oriented roughly northeast-southwest and is distinct from surrounding desert by the lack of vegetation, its linear shape, and the compressed ground surface. Silver Lane does not appear to be historical.

On Highway 247, the site consists of a single transmission line (a continuation of Feature 9485), featuring three cables and associated H-frame steel supports and a graded, single lane dirt access road (Feature 4785). Only the overhead cables pass through the Caltrans right-of-way, the nearest steel supports are approximately 75 m east and west of Highway 247. The road, Bureau of Land Management road 7381, is well maintained and is currently used as both a service road for the lines and as an OHV recreational trail. The road is marked with several Bureau of Land Management signs.

***A5. Cultural Constituents:**

No artifacts were observed.

***A6. Were Specimens Collected?** ☑ No ☐ Yes

***A7. Site Condition** ☐ Good ☑ Fair ☐ Poor

The electrical wires appear to be in good conistion, although portions may have been replaced over the years. The existing site record for P-36-010315 suggests that the lines have changed very little since construction. At either end of the lines, the generating and switching stations have either been torn down and replaced or taken off line.

A small substation is visible from the project area attached to the high voltage line to the east of State Highway 127. The substation appears to be much newer than the transmission line, but no investigation of it was performed since it is outside the right-of-way. Overall, within the right-of-way the transmission line appears unaltered, but outside the right-of-way the line seems to have been slightly altered as seen from the project area.

***A8. Nearest Water:** A seasonal wash is located approximately 650 meters west of the site along Highway 127. On ...

***A9. Elevation:** 284 m amsl

A10. Environmental Setting:

One segment recorded here, along Highway 127, is within the Mojave Desert, just north of Baker. The topography is generally flat, and bordered by several mountain ranges in the distance. Vegetation is a mix of creosote and other drought-tolerant brush. The other segment, along Highway 247, is located in a creosote scrub community, with abundant creosote bushes, along with small grasses and plants. The site is located in the valley bottom, in flat terrain.

A11. Historical Information:

According to previous site records, the power lines were built in 1930 to 1931 to supply power to Boulder City, for construction on the Hoover Dam and have carried power to Los Angeles from the dam since 1937. The lines are still in use.

***A12. Age:** ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ☑ 1914-1945 ☑ Post-1945 ☐ Undetermined

The existing site record for P-36-010315, the southern set of electrical lines, specifies that they were built between 1930 and 1931 to supply Los Angeles with electrical power from Boulder (Hoover) Dam. The lines originally supplied the dam construction site with power and then, upon completion of the dam, the power was reversed, sending electricity to Los Angeles. The transmission line was required to be built within 8 months; however, the line was completed in slightly less time than that, with construction advancing at a rate of greater than a mile per day over very difficult terrain. This site appears on the 1956 Baker 15-minute USGS topographic quad.

A13. Interpretations:
None

A14. Remarks:
The current observations update, but do not differ substantially from, previous site records.

A15. References:
None

A16. Photographs: See photograph record
Original Media/Negatives Kept At: 21 W. Stuart Ave, Redlands, CA 92373

***A17. Form Prepared By:** Justin Lev-Tov, S. Kremkau **Date:** 7/25/2011
Affiliation and Address: Statistical Research, Inc., 21 W. Stuart Ave, Redlands, CA 92373

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # P-36-010315
HRI #
Trinomial

 ***Resource Name or #:** SRI-451 (UPDATE)

L1. Historic and/or Common Name: BLM road 7381
L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** Feature 4785
L2b. Location of Point or Segment:
Zone 11; 584118 mE/ 3904141 mN NAD27 GPS
Zone 11; 584135 mE/ 3904098 mN NAD27 GPS
Zone 11; 584138 mE/ 3904089 mN NAD27 GPS
Zone 11; 584150 mE/ 3904164 mN NAD27 GPS
Zone 11; 584167 mE/ 3904122 mN NAD27 GPS

L3. Description:
Feature 4785 road, Bureau of Land Management road 7381, is well maintained and is currently used as both a service road for the lines and as an OHV recreational trail along Highway 247. The road is marked with several Bureau of Land Management signs.

L4. Dimensions:
a. **Top Width:** 4.00 m
b. **Bottom Width:** N/A
c. **Height or Depth:** None
d. **Length of Segment:** 45.00 m

L5. Associated Resources:
None

L4e. Sketch of Cross-Section: **Facing:**

L6. Setting:
The segment along Highway 247 is located in a creosote scrub community, with abundant creosote bushes, along with small grasses and plants. The site is located in the valley bottom, in flat terrain.

L7. Integrity Considerations:
None

L8b. Description of Photo, Map, or Drawing
See sketch map

L9. Remarks:
The current observations update, but do not differ substantially from, previous site records.

L10. Form Prepared By:
Justin Lev-Tov, S. Kremkau

L11. Date: 7/25/2011

LINEAR FEATURE RECORD

Primary # P-36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-451 (UPDATE)

L1. Historic and/or Common Name: None

L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** Feature 9485

L2b. Location of Point or Segment:

Zone 11; 584118 mE/ 3904141 mN NAD27 GPS
Zone 11; 584135 mE/ 3904098 mN NAD27 GPS
Zone 11; 584138 mE/ 3904089 mN NAD27 GPS
Zone 11; 584150 mE/ 3904164 mN NAD27 GPS
Zone 11; 584167 mE/ 3904122 mN NAD27 GPS

L3. Description:

This site is a set of transmission lines (Feature 9485), which are composed of three single wires. The towers are Y-shaped, but appear substantially shorter than modern Y-shaped transmission poles. These electrical lines were previously recorded as part of P-36-010315. The towers which suspend the electrical lines are not within the right-of-way. North of Feature 9485 is another set of power lines is composed of two single wires, and three sets of three wires clamped together. These wires exhibit highly visible 'floats' to identify the wires to aircraft. This northern transmission line is not historic, rather, it was constructed in the early 1990s, as extrapolated from site record P-36-010315, found during a survey for these power ...

L4. Dimensions:

a. **Top Width:** 12.00 m
b. **Bottom Width:** N/A
c. **Height or Depth:** 50.00 m
d. **Length of Segment:** 39.00 m

L5. Associated Resources:

None

L4e. Sketch of Cross-Section: **Facing:**

L6. Setting:

One segment recorded here, along Highway 127, is within the Mojave Desert, just north of Baker. The topography is generally flat, and bordered by several mountain ranges in the distance. Vegetation is a mix of creosote and other drought-tolerant brush. The other segment, along Highway 247, is located in a creosote scrub community, with ...

L7. Integrity Considerations:

The electrical wires appear to be in good conistion, although portions may have been replaced over the years.

L8b. Description of Photo, Map, or Drawing

See sketch map

L9. Remarks:

The current observations update, but do not differ substantially from, previous site records.

L10. Form Prepared By:

Justin Lev-Tov, S. Kremkau

L11. Date: 7/25/2011

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary # P-36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-451 (UPDATE)

Camera Format:
Lens Size:
Film Type and Speed: Digital
Negatives Kept At: 21 W. Stuart Ave, Redlands, CA 92373

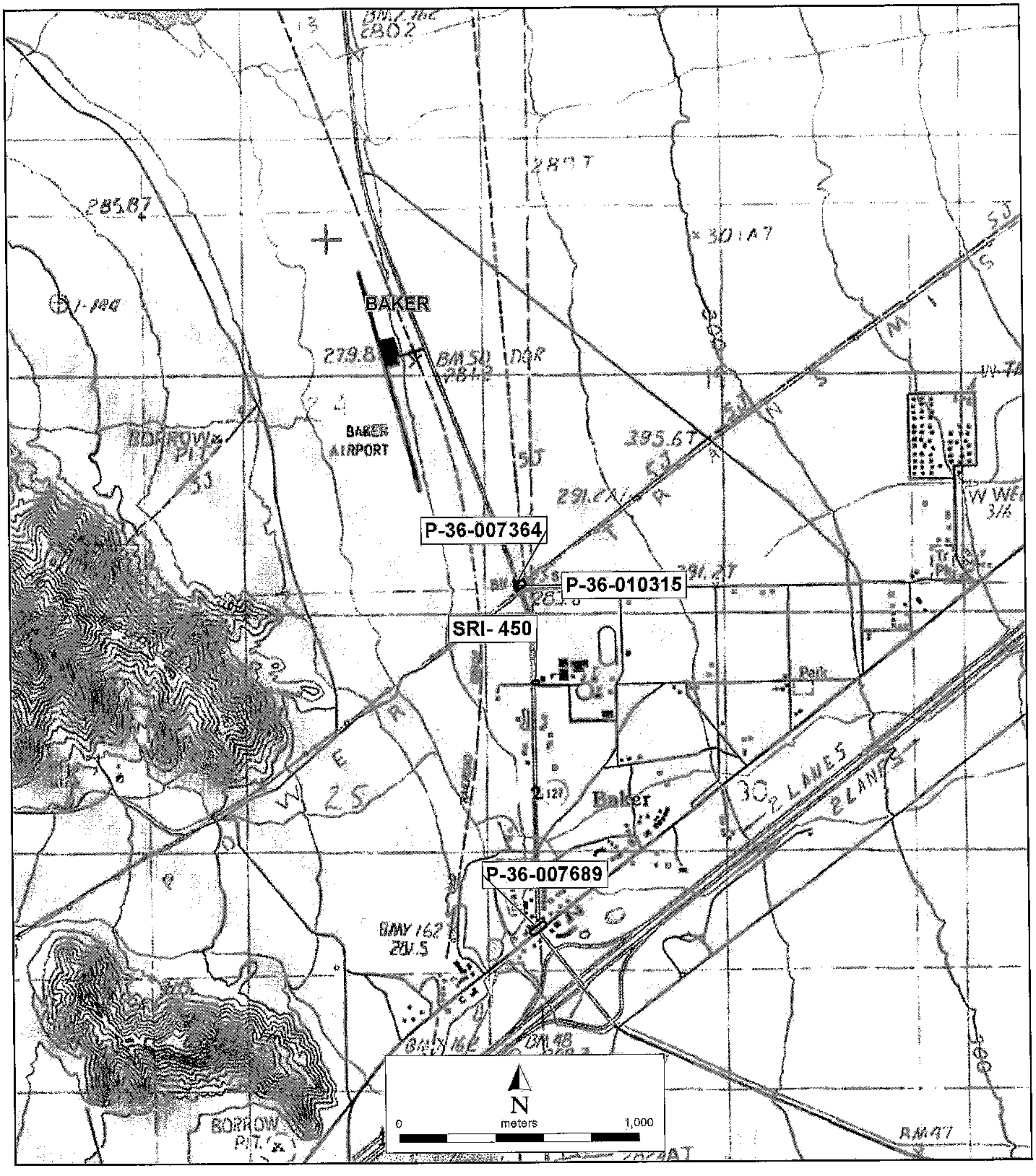
Date	Time	Exp/ Frame	Subject/Description	View Toward	Accession #
3/2/2011		2727	west side of Silver Lane	W	
4/4/2011		56	powerline and rd	E	
3/2/2011		2726	Silver Lane	E	
4/4/2011		55	powerline and rd	W	

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-010315
HRI #
Trinomial

*Resource Name or #: SRI-451 (UPDATE)

*Map Name: 7.5' BAKER USGS Topographic Quad Scale: 1:24,000 *Year: 2009



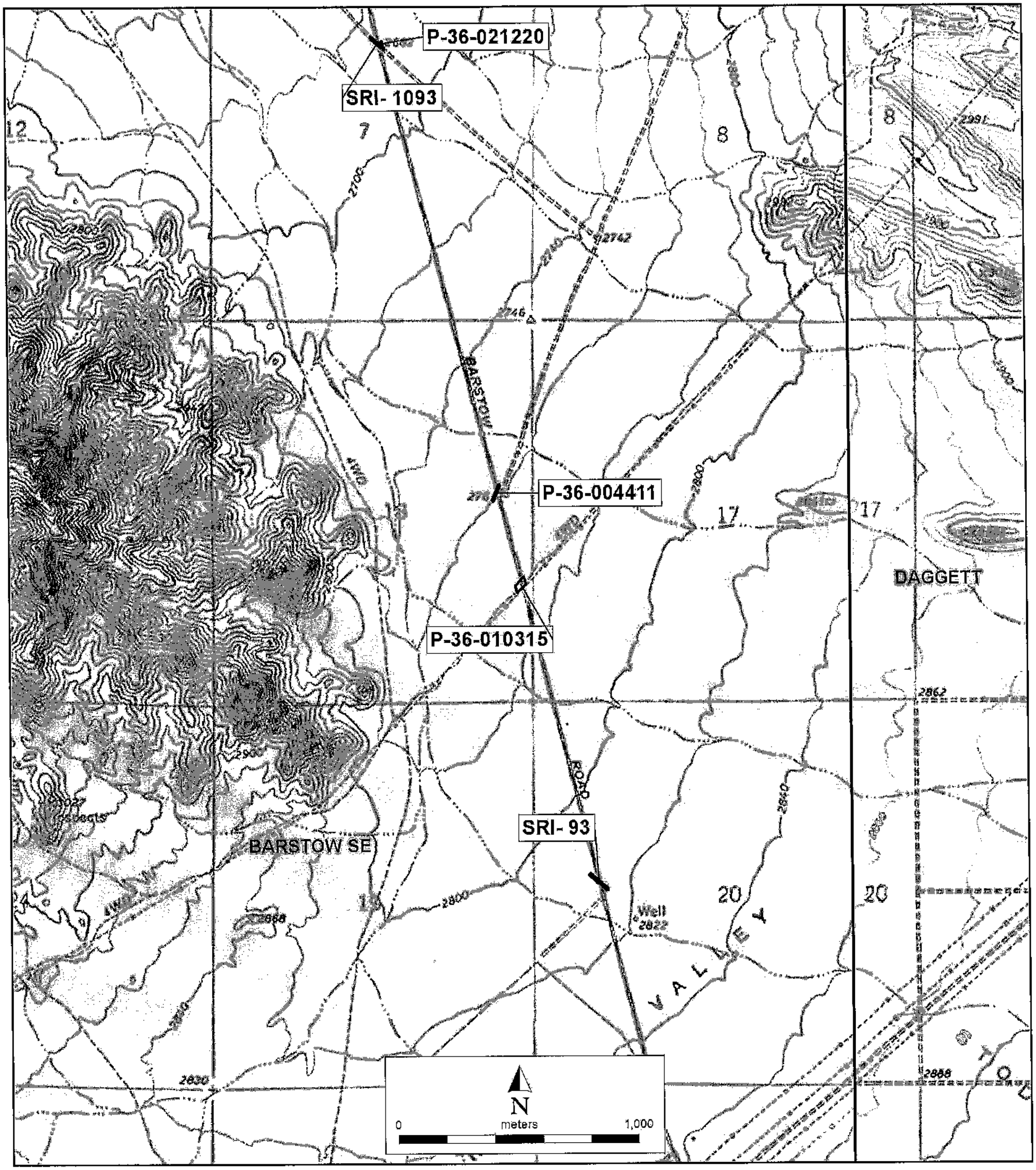
 *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-451 (UPDATE)

***Map Name:** 7.5' Barstow SE USGS Topographic Quad Scale: 1:24,000 ***Year:** 2009



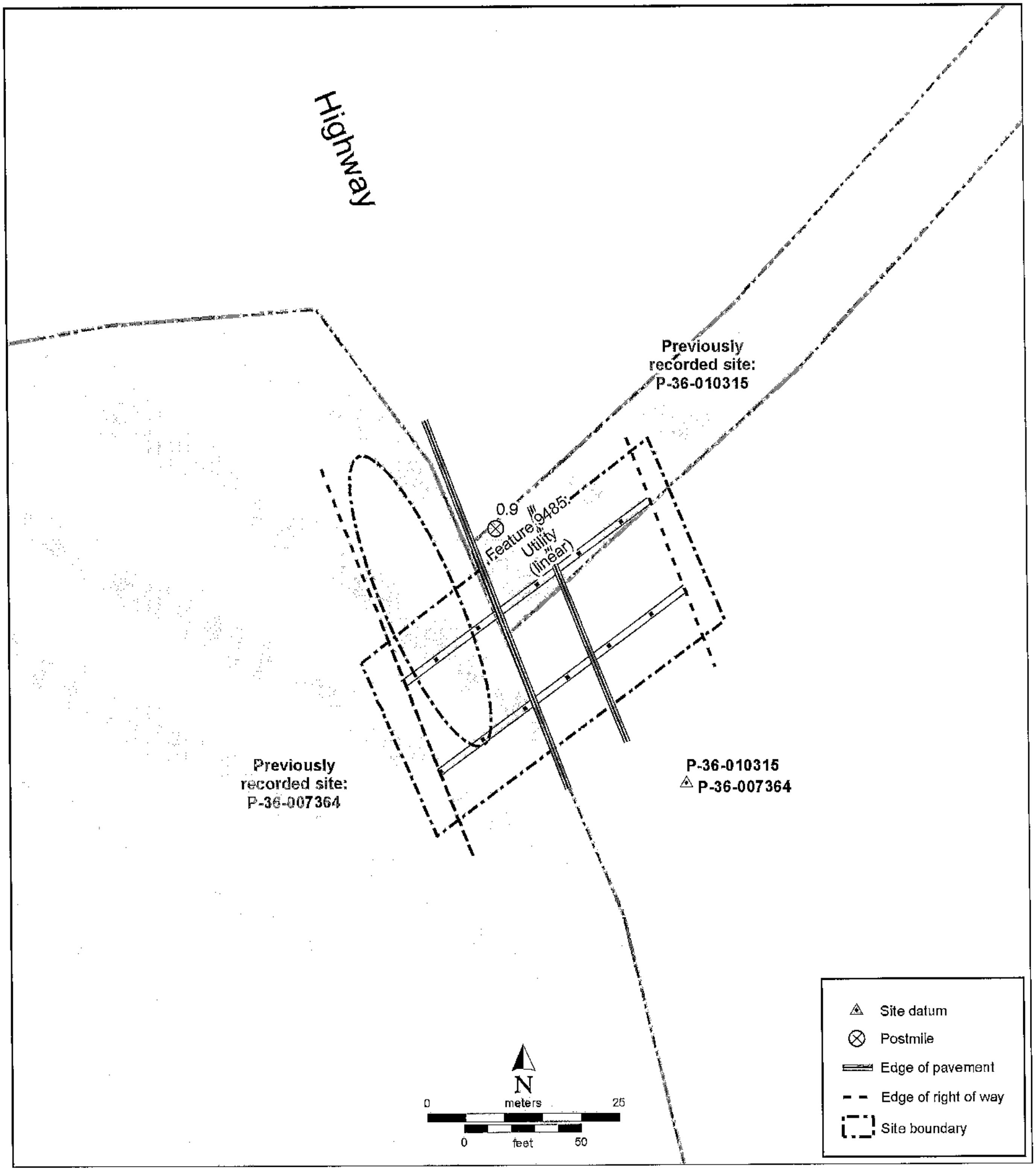
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-451 (UPDATE)

***Drawn By:** Justin Lev-Tov, S. Kremkau

***Date:** 07/25/2011



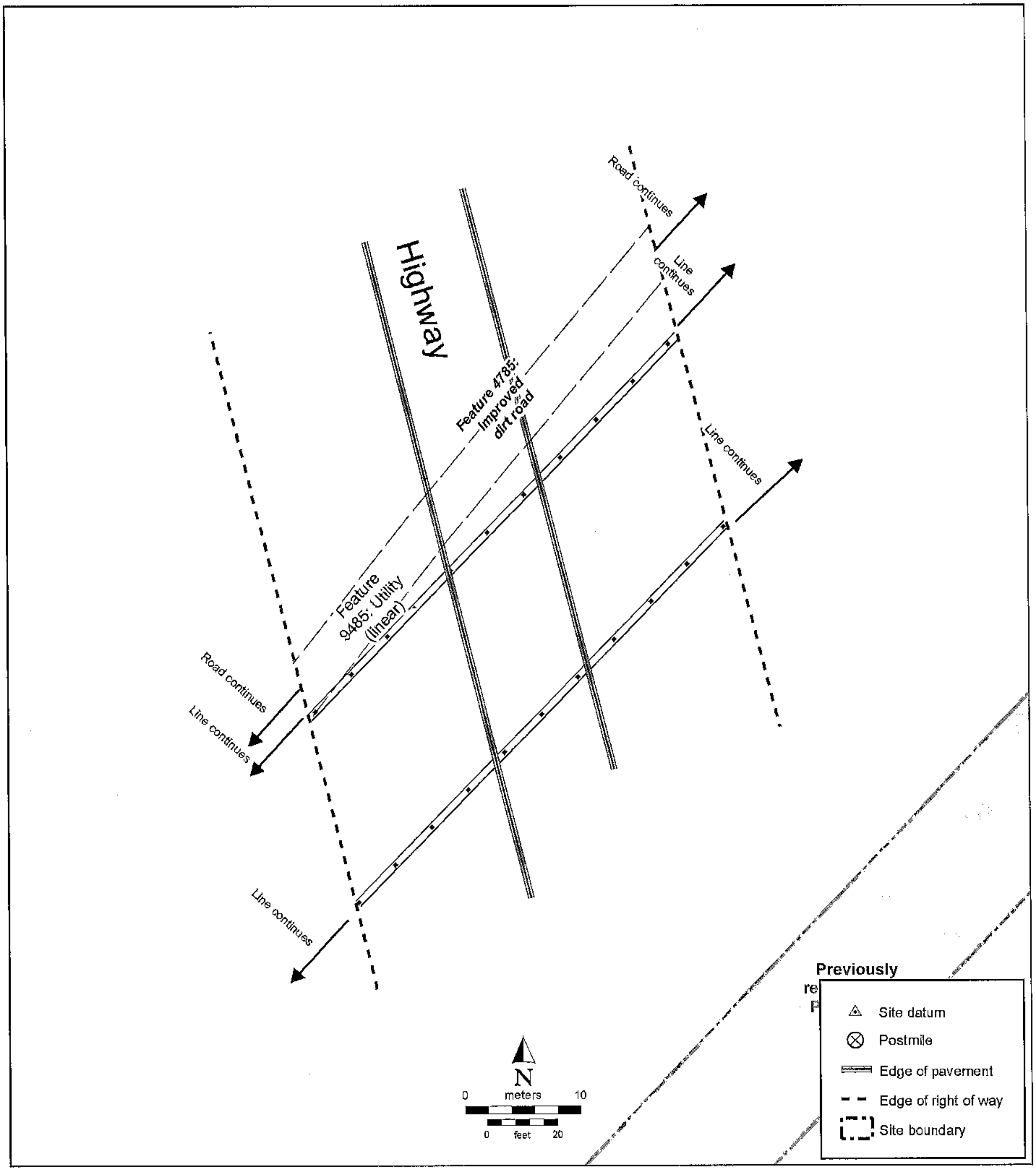
*Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-010315
HRI #
Trinomial

 *Resource Name or #: SRI-451 (UPDATE)

*Drawn By: Patrick Stanton *Date: 07/25/2011



***Resource Name or #:** SRI-451 (UPDATE)

***Recorded By:** Justin Lev-Tov, S. Kremkau ***Date:** 7/25/2011 ☑ Continuation ☐ Update

P2b. Legal description
T 14N R 8E; SE¼ of SE¼ of Sec 24; SBBM
T 14N R 9E; NW¼ of NW¼ of Sec 30; SBBM
T 14N R 9E; SW¼ of SW¼ of Sec 19; SBBM

P2d. UTM
Zone 11; 584135 mE/ 3904098 mN NAD27 GPS
Zone 11; 584138 mE/ 3904089 mN NAD27 GPS
Zone 11; 584150 mE/ 3904164 mN NAD27 GPS
Zone 11; 584167 mE/ 3904122 mN NAD27 GPS
Zone 11; 584173 mE/ 3904104 mN NAD27 GPS

P4. Resources Present
[X] Other (linear)

P7. Owner and Address

MC KEN, PATRICIA V
10236 CLARK WOOLDRIGE CT
LAS VEGAS NV 89129

A1. Method of determination
pavement corresponding to the Caltrans right-of-way.

A8. Nearest water
Highway 247, numerous seasonal washes thread through the landscape in the vicinity of the site.

L3. Description
lines' planned construction. The towers which suspend the electrical lines are not within the right-of-way. Both sets of power lines are suspended over Highway 127. Silver Lane is located on both sides of Highway 127. Silver Lane is a largely unimproved, single-track dirt road. The road may have been improved with gravel at one time. The road is oriented roughly northeast-southwest and is distinct from surrounding desert by the lack of vegetation, its linear shape, and the compressed ground surface. Silver Lane does not appear to be historical.
On Highway 247, the site consists of a single transmission line (a continuation of Feature 9485), featuring three cables and associated H-frame steel supports and a graded, single lane dirt access road (Feature 4785). Only the overhead cables pass through the Caltrans right-of-way, the nearest steel supports are approximately 75 m east and west of Highway 247.

L6. Setting
abundant creosote bushes, along with small grasses and plants. The site is located in the valley bottom, in flat terrain.

Update 8/12

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ~~P-36-010316~~ 36-010315
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** SRI-5115

P1. Other Identifier: SRI-5115
***P2. Location:** ☑ Not for Publication ☐ Unrestricted ***a. County:** San Bernardino
***b. USGS Quad:** 7.5' SILVERWOOD LAKE (2009); T 2N R 5W, SE¼ of SE¼ of Sec. 1; SBBM
c. Address:
d. UTM: Zone 11; 468913 mE/ 3794715 mN NAD27 GPS
e. Other Locational Data:
The site crosses Highway 173 at postmile 1.3 and Highway 138 between postmiles 27.2 and 27.3, north of Crestline.

***P3a. Description:**
This is an update for site P-36-010316, the 115 kV Arrowhead Calelectric Devil Canyon Shandin transmission line.The current project examines only the first 15 meters from the edge of pavement of the highway, which represents the Caltrans right-of-way. The site continues beyond the right-of-way, but these portions were not recorded. Two segments of the line were recorded here, crossing Highways 138 and 173. The segments of the transmission line within the right-of-way are in good condition, and generally match descriptions for other segments of the line.
The site boundary location depicted by the SBAIC for the site where is crosses Highway 173 is incorrect. The SBAIC shows the site running southwest to southeast in a broad, sweeping arc. In our observations, however, the entire alignment within the right-of-way is oriented north/south. The utility poles within the right-of-way are labeled with placards, indicating they are part of this transmission line.

***P3b. Resource Attributes:** AH16 Other-utility line; HP39 Other-utility line
***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☑ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

***P5b. Description of Photo:**
Facing N; 4/27/2011; Transmission line and power poles

***P6. Date Constructed/Age & Sources:**
☑ Historic ☐ Prehistoric ☐ Both

***P7. Owner and Address:**
SAN BERNARDINO NATIONAL FOREST, 602 S. TIPPECANOE AVE. SAN BERNARDINO, CA

***P8. Recorded by:**
S. Kremkau and Joshua Trampier

***P9. Date Recorded:** 5/11/2011
***P10. Survey Type:**
Reconnaissance survey of highway right-of-way

***P11. Citation:** Report forthcoming

***Attachments:** ☐ None ☑ Location Map ☑ Sketch Map ☑ Continuation Sheet ☐ Building, Structure, and Object Record ☑ Archaeological Record ☐ District Record ☑ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☑ Photograph Record ☐ Other:

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHAEOLOGICAL SITE RECORD

Primary # P-36-0~~10316~~ 24380 36-010315
Trinomial

***Resource Name or #:** SRI-5115

***A1. Dimensions: a. Length** 3484 m (NE/S **x b. Width** 42 m (NW/SE)

Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☑ GPS ☐ Other:

Method of Determination: ☐ Artifacts ☑ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☑ Other: The site boundary is determined in part by the right-of-way established ...

Reliability of determination: ☑ High ☐ Medium ☐ Low

Explain: The transmission line is clearly distinguishable from surrounding vegetation and topography.

Limitations: ☑ Restricted access ☐ Paved/built over ☑ Site limits incompletely defined ☐ Disturbances ☐ Vegetation ☐ Other:

A2. Depth: None ☑ None ☐ Unknown **Method of determination:** There is little to no potential for ...

***A3. Human Remains:** ☐ Present ☑ Absent ☐ Possible ☐ Unknown

***A4. Features:**

The site consists of two sectiongs of a 115 kV transmission line (Feature 6177) that crosses Highway 173 and Highway 138. The line consists of three strung cables supported by steel latice T-frame towers. Within the right-of-way, on the south side of Highway 173, the line intersects a smaller utility line that runs east/west. Each of the three main lines are supported by individual wooden power poles (Feature 6178, Feature 6179, and Feature 6185) at the intersection, and a line from each pole connects to the smaller utility line. The poles are labled with placards that read "Arrowhead Calelectric Devil Canyon Shandin 115 kV." Each pole is approximately 70 feet tall (21.5 m). Three other wooden poles, one inside and two outside the right-of-way, hold transformers and the lines that connect the main transmission line to the smaller utility line. The age of the smaller utility line is unknown.

A two-track dirt road runs parallel to the highway north of the transmission lines, but then turns south and parallels the lines for a short distance. The road is likely an old service road for the transmission line. A rusted metal fence marks the right-of-way north of Highway 173. The fence ends just 8 m from the edge of the pavement. There are no towers in the Caltrans right-of-way on the north side of Highway 173.

Feature 6177 also crosses Highway 138, south of where it crosses Highway 173. No poles or towers are located within the right-of-way here, so all observations and mapping are limited to what can be estimated from the ground. The transmission line as it exists today consists of three, 115 kV transmission wires strung between steel pylons measuring about 80 feet high. Three transmission wires are suspended from insulating coils hung from the top of the pylon; these coils are about 4 feet high. Relative to the body of the pylon, these three coils are located on the two outer edges and the center of it. The thickness of the transmission wires is unknown, perhaps 1 inch thick. The three transmission wires are evenly spaced and span a distance of 32 feet. Within the right-of-way, the length of the line recorded on the northeast and southwest sides of Highway 138 is approximately 78 feet.

***A5. Cultural Constituents:**

While there is some modern trash in the area, no artifacts were associated with the site.

***A6. Were Specimens Collected?** ☑ No ☐ Yes

***A7. Site Condition** ☑ Good ☐ Fair ☐ Poor

This section of the site within the right-of-way is in good condition.

***A8. Nearest Water:** A small creek flows west to east approximately 200 m northwest of the site along Highway 173, ...

***A9. Elevation:** 1073 m amsl

A10. Environmental Setting:

The segment of the line within the right-of-way on Highway 173 is at the southern side of an east/west trending ridge, at the edge of a floodplain. The vegetation includes that typical of a chapparral scrub community as well as riparian vegetation mixed with grasses. Along Highway 138, vegetation consists of mixed pine/oak woodland, and various grasses. The site is located on a slope that slopes downward at an angle of 5 degrees to the west. Soil around the site is a loosely compacted, poorly sorted, sandy gravel.

A11. Historical Information:

The line was orignally constructed in 1911-1913, but it appears that the poles within the right-of-way have been replaced relatively recently.

***A12. Age:** ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ☑ 1914-1945 ☑ Post-1945 ☐ Undetermined

The transmission line was built between 1911 and 1913.

A13. Interpretations:

None

A14. Remarks:

This is an update for site P-36-010316, the 115 kV Arrowhead Calelectric Devil Canyon Shandin transmission line.

Primary # P-36-0~~10316~~ 36-010315
Trinomial

***Resource Name or #:** SRI-5115

A15. References:
None

A16. Photographs: See photograph record

Original Media/Negatives Kept At: 21 W. Stuart Ave, Redlands, CA 92373

***A17. Form Prepared By:** S. Kremkau and Joshua Trampier **Date:** 5/11/2011

Affiliation and Address: Statistical Research, Inc., 21 W. Stuart Ave, Redlands, CA 92373

LINEAR FEATURE RECORD

Primary # P-36-~~010316~~ 36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-5115

L1. Historic and/or Common Name: None

L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** Feature 6177

L2b. Location of Point or Segment:

Zone 11; 467935 mE/ 3793198 mN NAD27 GPS
Zone 11; 467943 mE/ 3793231 mN NAD27 GPS
Zone 11; 469810 mE/ 3796099 mN NAD27 GPS

L3. Description:

The site consists of two sectiongs of a 115 kV transmission line (Feature 6177) that crosses Highway 173 and Highway 138. The line consists of three strung cables supported by steel latice T-frame towers. Within the right-of-way, on the south side of Highway 173, the line intersects a smaller utility line that runs east/west. Each of the three main lines are supported by individual wooden power poles (Feature 6178, Feature 6179, and Feature 6185) at the intersection, and a line from each pole connects to the smaller utility line. The poles are labled with placards that read "Arrowhead Calelectric Devil Canyon Shandin 115 kV." Each pole is approximately 70 feet tall (21.5 m). Three other wooden poles, one inside and two outside the ...

L4. Dimensions:

- **a. Top Width:** 9.00 m
- **b. Bottom Width:** N/A
- **c. Height or Depth:** 60.00 m
- **d. Length of Segment:** 22.00 m

L4e. Sketch of Cross-Section: **Facing:**

L5. Associated Resources:

None

L6. Setting:

The segment of the line within the right-of-way on Highway 173 is at the southern side of an east/west trending ridge, at the edge of a floodplain. The vegetation includes that typical of a chapparral scrub community as well as riparian vegetation mixed with grasses. Along Highway 138, vegetation consists of mixed pine/oak woodland, and ...

L7. Integrity Considerations:

This section of the site within the right-of-way is in good condition.

L8b. Description of Photo, Map, or Drawing

See sketch map

L9. Remarks:

This is an update for site P-36-010316, the 115 kV Arrowhead Calelectric Devil Canyon Shandin transmission line.

L10. Form Prepared By:

S. Kremkau and Joshua Trampier

L11. Date: 5/11/2011

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary # P-36-0~~10316~~ 24800 36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-5115

Camera Format:
Lens Size:
Film Type and Speed: Digital
Negatives Kept At: 21 W. Stuart Ave, Redlands, CA 92373

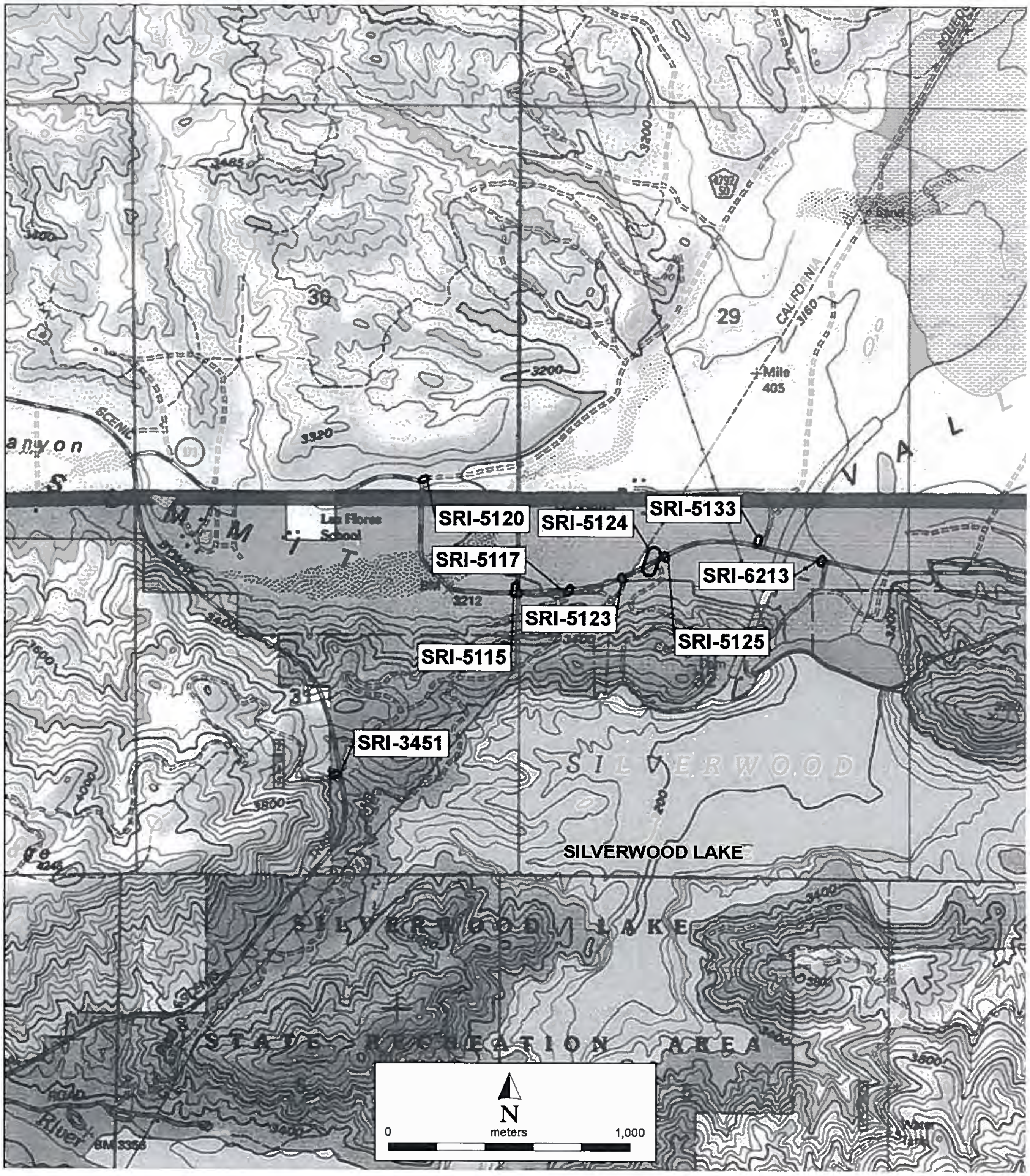
Date	Time	Exp/ Frame	Subject/Description	View Toward	Accession #
4/27/2011		3401	Transmission line and power poles	N	
4/27/2011		3402	Transmission lines	S	
5/13/2011		1115	Transmission lines	N	
5/13/2011		1116	Transmission lines	S	
5/13/2011		1117	east-west transmission line	S	
5/13/2011		1118	east-west lines	W	
5/13/2011		1119	east-west transmission lines	E	

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-~~010316~~ 24850 36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-5115

***Map Name:** 7.5' SILVERWOOD LAKE USGS Topographic Quad Scale: 1:24,000 ***Year:** 2009



*Required Information

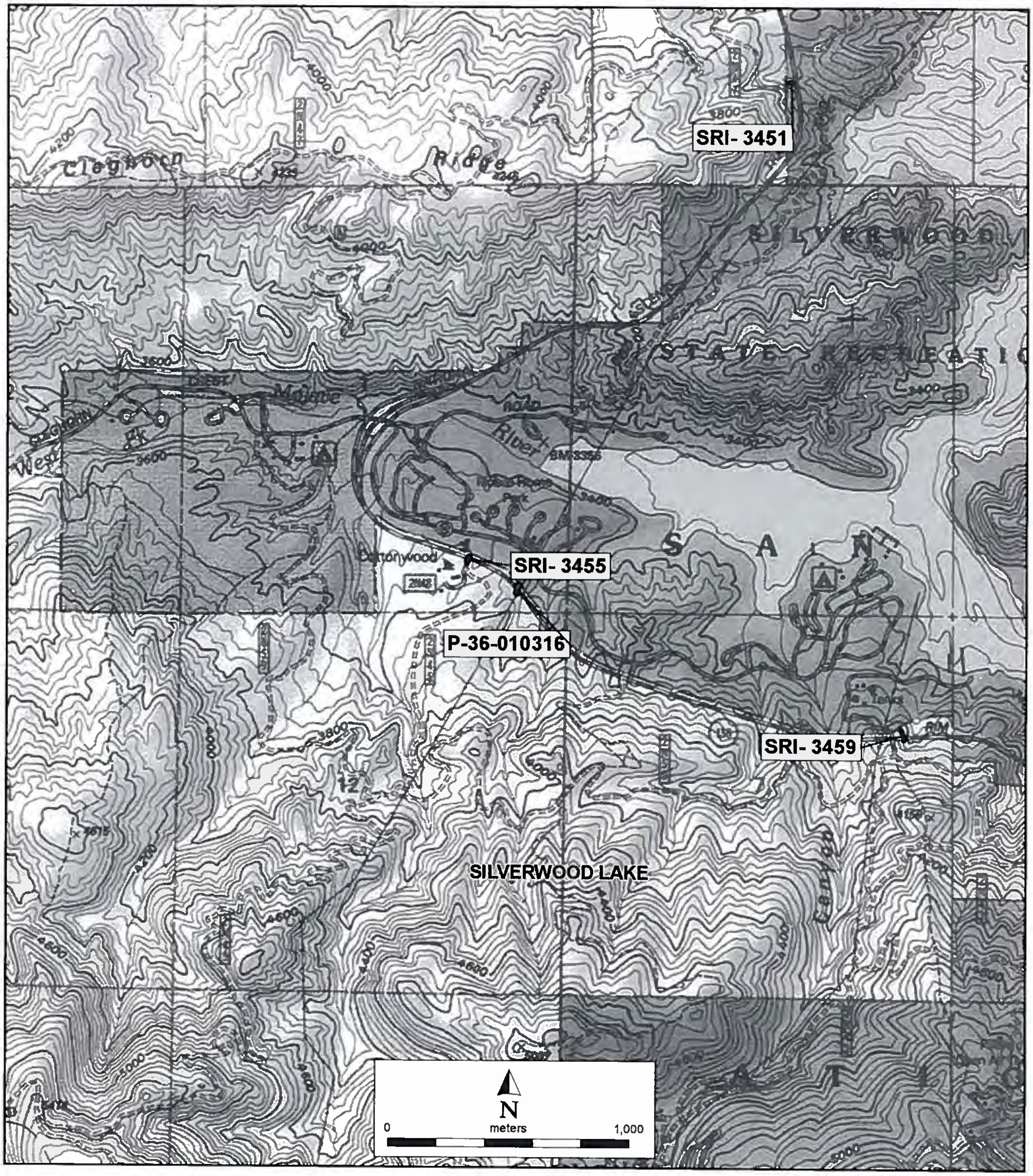
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-~~010316~~ 36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-5115

***Map Name:** 7.5' SILVERWOOD LAKE USGS Topographic Quad Scale: 1:24,000

***Year:** 2009



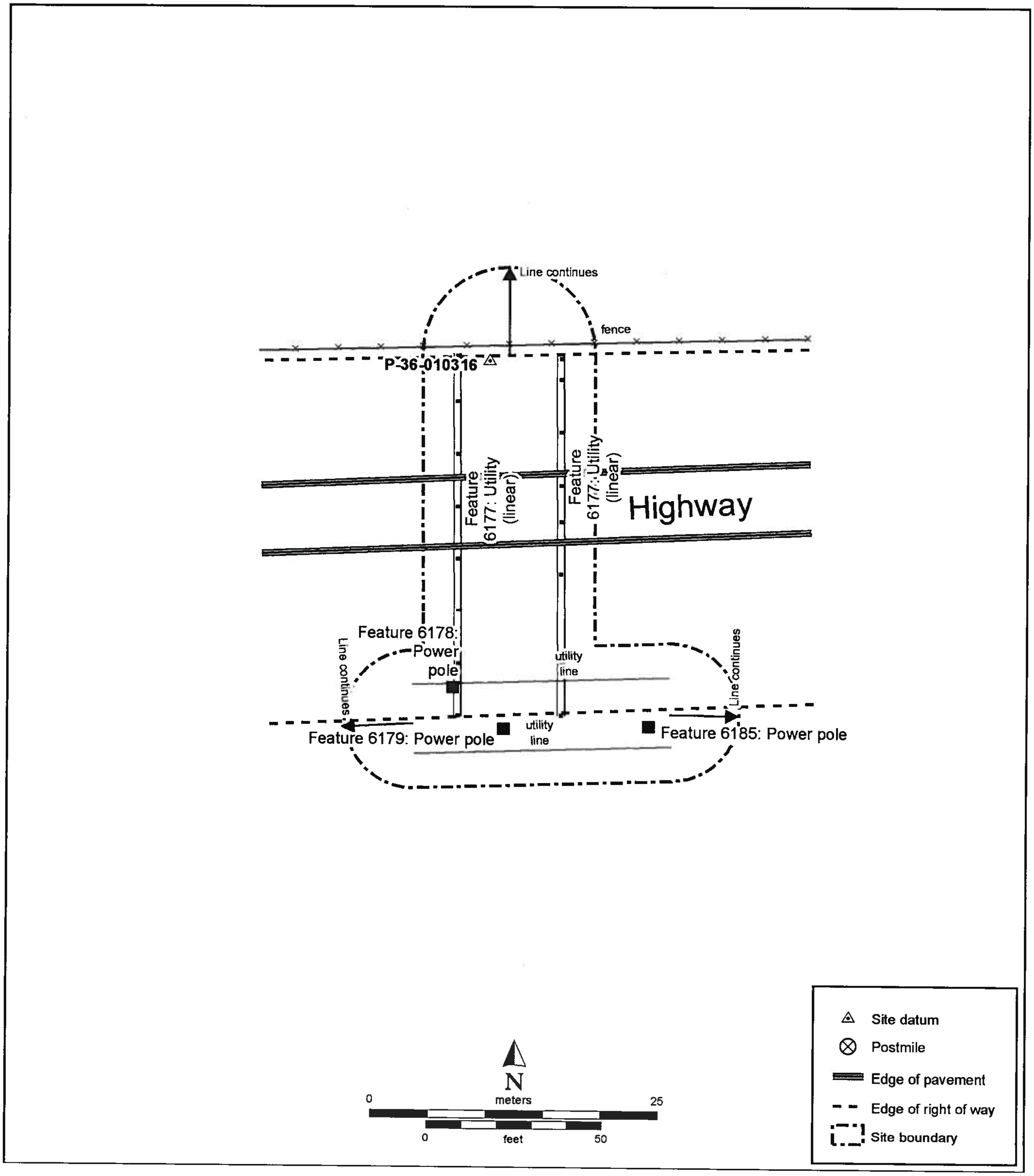
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-~~010316~~ 36-010315
HRI #
Trinomial

***Resource Name or #:** SRI-5115

***Drawn By:** S. Kremkau and Joshua Trampier

***Date:** 05/11/2011



*Required Information

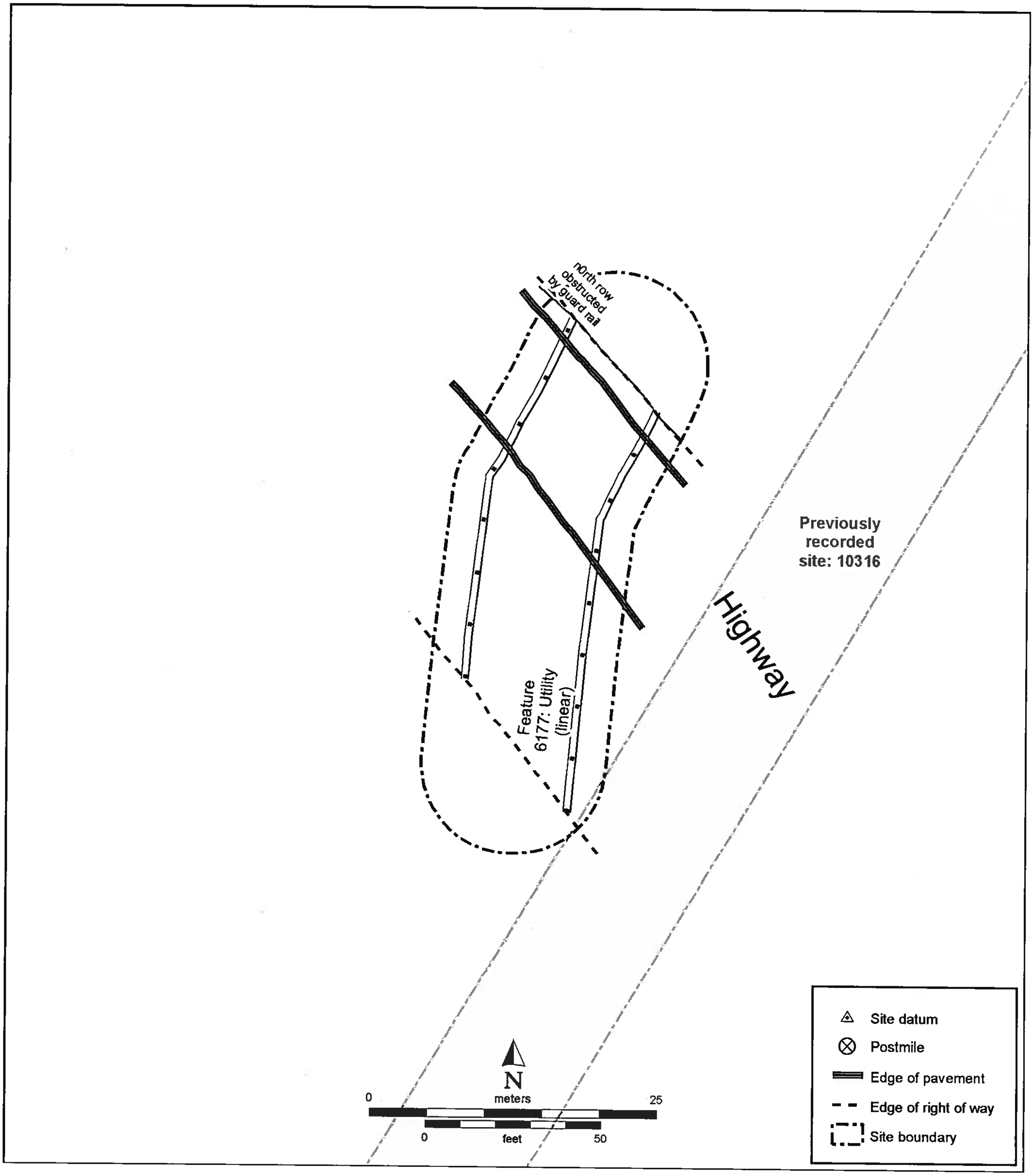
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-~~010316~~ 36-010315
HRI #
Trinomial

*Resource Name or #: SRI-5115

*Drawn By: S. Kremkau and Joshua Trampier

*Date: 05/11/2011



*Required Information

***Resource Name or #:** SRI-5115

***Recorded By:** S. Kremkau and Joshua Trampier ***Date:** 5/11/2011 [X] Continuation [ ] Update

P2b. Legal description
T 3N R 4W; NE¼ of NE¼ of Sec 31; SBBM
T 3N R 4W; SE¼ of NE¼ of Sec 31; SBBM

P2d. UTM
Zone 11; 467943 mE/ 3793231 mN NAD27 GPS
Zone 11; 469810 mE/ 3796099 mN NAD27 GPS

P4. Resources Present
[X] Structure
[X] Other (linear)

P7. Owner and Address

SOUTHERN CALIFORNIA EDISON
P.O. BOX 800
ROSEMEAD, CA

VANHOOPS HOLDINGS LP
8328 VALMONT RD
BOULDER CO 80301

A1. Method of determination
by Caltrans.

A2. Depth method of determination
buried resources at the site.

A8. Nearest water
and Silverwood Lake is located approximately 570 m northeast of the site on Highway 138

L3. Description
right-of-way, hold transformers and the lines that connect the main transmission line to the smaller utility line. The age of the smaller utility line is unknown.
Feature 6177 also crosses Highway 138, south of where it crosses Highway 173. No poles or towers are located within the right-of-way here, so all observations and mapping are limited to what can be estimated from the ground. The transmission line as it exists today consists of three, 115 kV transmission wires strung between steel pylons measuring about 80 feet high. Three transmission wires are suspended from insulating coils hung from the top of the pylon; these coils are about 4 feet high. Relative to the body of the pylon, these three coils are located on the two outer edges and the center of it. The thickness of the transmission wires is unknown, perhaps 1 inch thick. The three transmission wires are evenly spaced and span a distance of 32 feet. Within the right-of-way, the length of the line recorded on the northeast and southwest sides of Highway 138 is approximately 78 feet.

L6. Setting
various grasses. The site is located on a slope that slopes downward at an angle of 5 degrees to the west. Soil around the site is a loosely compacted, poorly sorted, sandy gravel.

1047523 Update

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION CONTINUATION SHEET	Primary # **36-10315** HRI# Trinomial **CA-SBR-10315H**

 ***Resource Name or Number:** Edison Company Boulder Dam-San Bernardino Transmission Line

***Recorded by:** J. Howard, R. Cunningham, M. Jorgenson, and M. Knypstra ***Date:** April 28, 2010 ☐ Continuation ☒ Update

QUAD: IVANPAH LAKE

CA-SBR-10315H is the Edison Company Boulder Dam-San Bernardino Transmission Line. Constructed in 1930 and 1931, the line carried power for the construction of the Boulder Dam. Since 1937, the line has been used to carry power from the dam to Los Angeles. The line is NRHP eligible for its role in patterns of settlement and development in the region (NHRP-E-93-007) (Hathaway 2006).

CA-SBR-10315H was visited by ECORP Consulting, Inc. on April 28, 2010 and again on June 3, 2011. Only the portion of the Hoover Dam to San Bernardino Transmission Line that falls within the survey boundary was checked. This portion includes the part of the transmission line that passes through Township 17 North, Range 14 East, Sections 24, 25, 26, 34, and 35 and Township 16 North, Range 14 East, Section 3. The site remains as described in its 2006 record (Hathaway 2006; Brock 1989). Two LA Water and Power easement markers were noted on the western border of CA-SBR-10315 and Ivanpah Dry Lake. These two markers are not dated but, due to their proximity to this site, are likely of historic-period origin. One marker was located just southwest of tower MKP-AOLI-312. The other marker is located just east of tower MKP-AOLI-314.

***References:**

Brock, J.
1989 Historic Resources Inventory for CA-SBR-10315H. On file at the San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands, Ca.

Chandler, Evelyn, Roger Mason, Jennifer Howard, Wendy Jones, Melanie Knypstra, and Robert Cunningham.
2012 *Class III Cultural Resources Inventory of the Stateline Solar Farm, Primm, Nevada Vicinity, San Bernardino County, California.* Prepared for the Bureau of Land Management, Needles Office.

Hathaway, Roger
2006 Archaeological Site Record for CA-SBR-10315H. On file at the San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands, Ca.

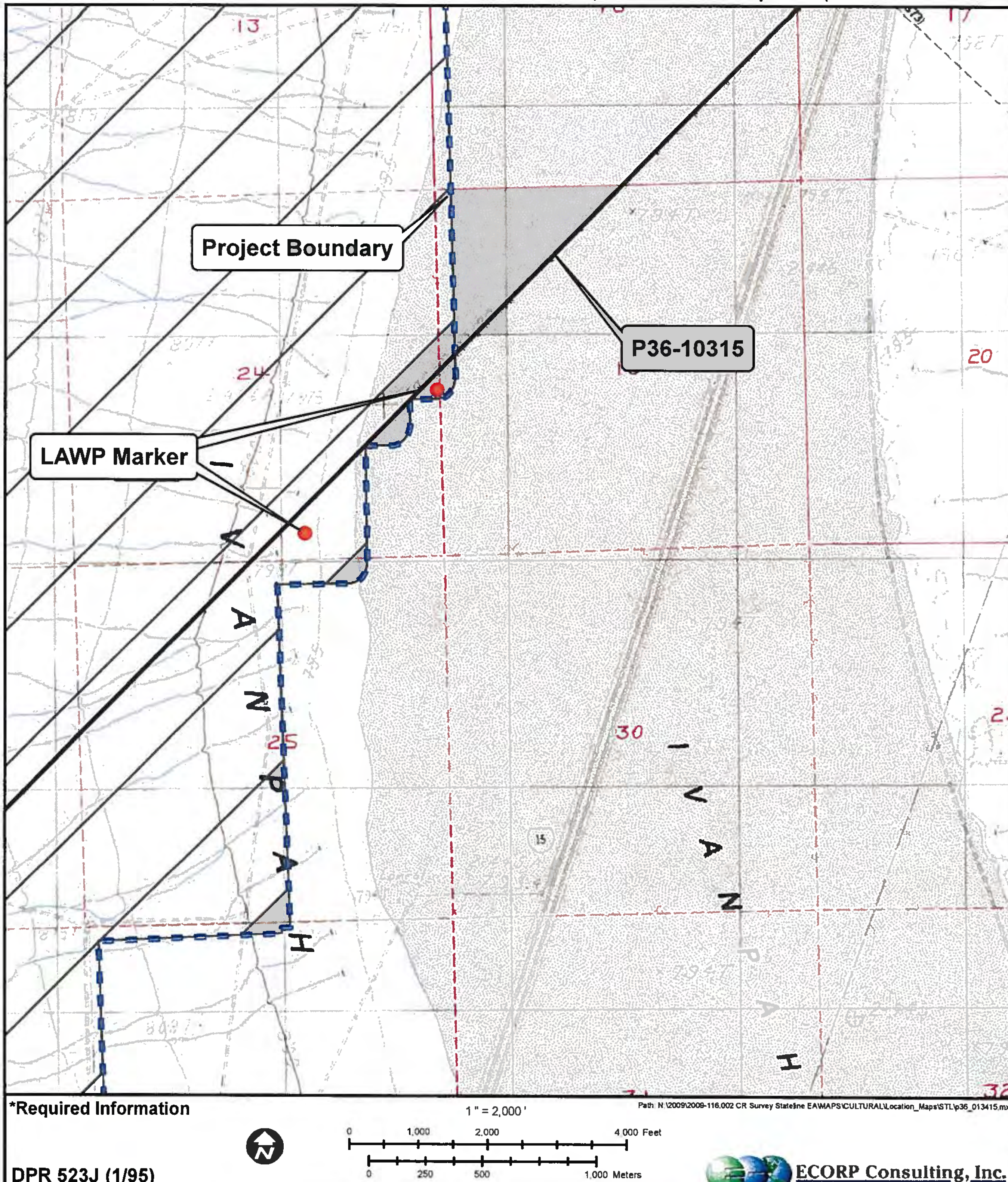
CA-SBR-13015H (Transmission line located in the background), facing northwest. Photo No. 3941.

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P36-10315
HRI #
Trinomial CA-SBR-10315

 ***Resource Name or #:**

***Map Name:** Ivanpah Lake ***Scale: 1:24,000** ***Date of Map:** 1980 (Provisional Edition1985)



***Required Information**

Path: N:\2009\2009-116.002 CR Survey Stateline EA\MAPS\CULTURAL\Location_Maps\STL\p36_013415.mxd

DPR 523J (1/95)

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

4/10

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

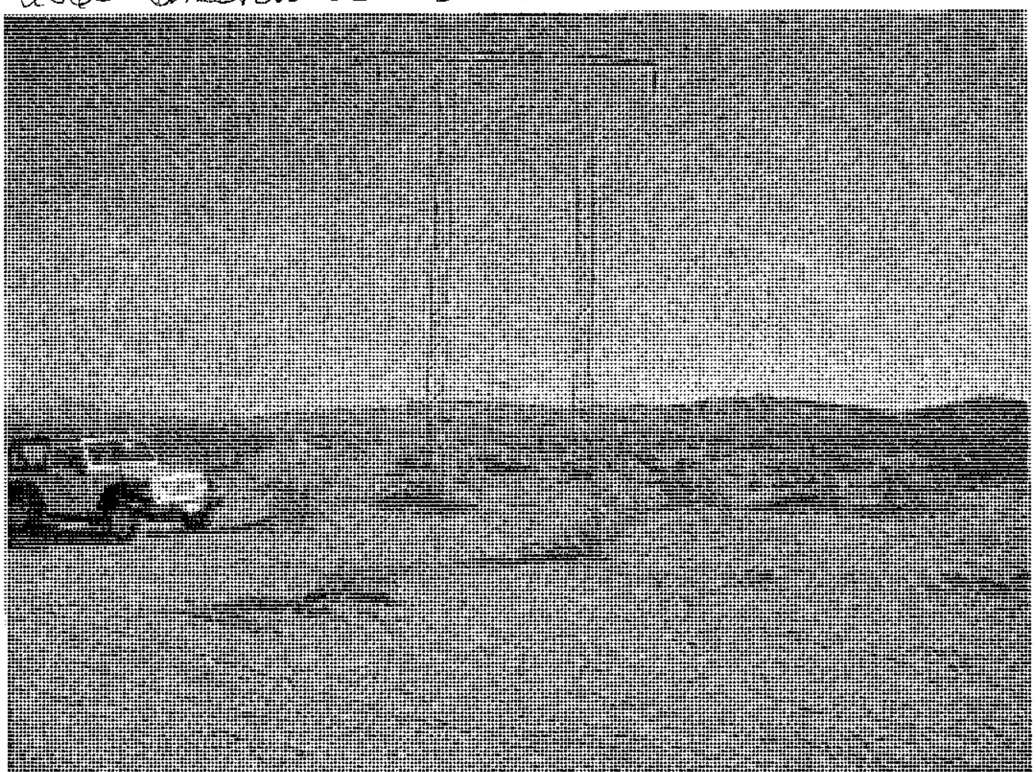
Primary # 36-010315
HRI#
Trinomial CA-SBR-10315H

 ***Resource Name or #** CA-SBR-10315H

***Updated by:** Stephen Pappas, Robert Cunningham ***Date:** 11/16/2009 ☐ Continuation ☒ Update

Site CA-SBR-10315H was revisited by ECORP archaeologists Stephen Pappas and Robert Cunningham on November 16 and 17, 2009 while surveying transmission alignments in support of the Seaggett to Tortilla Fiber Optic Line project. Portions of the site were originally recorded by N. Neuenschwander in 1988 and updated by J. Brock in 1989, R. Hatheway in 2006, and J. Sander in 2008. During ECORP's study, a 2.8-mile long portion of the resource was studied starting at Highway 247 then traveling northeast. The transmission line and towers appeared to be in good condition without any visible damages or loss of integrity.

USGS BARSTOW SE & DAGGETT



Overview of tower directly west of Highway 247, view northeast, 11/16/2009.

Update 1/09

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

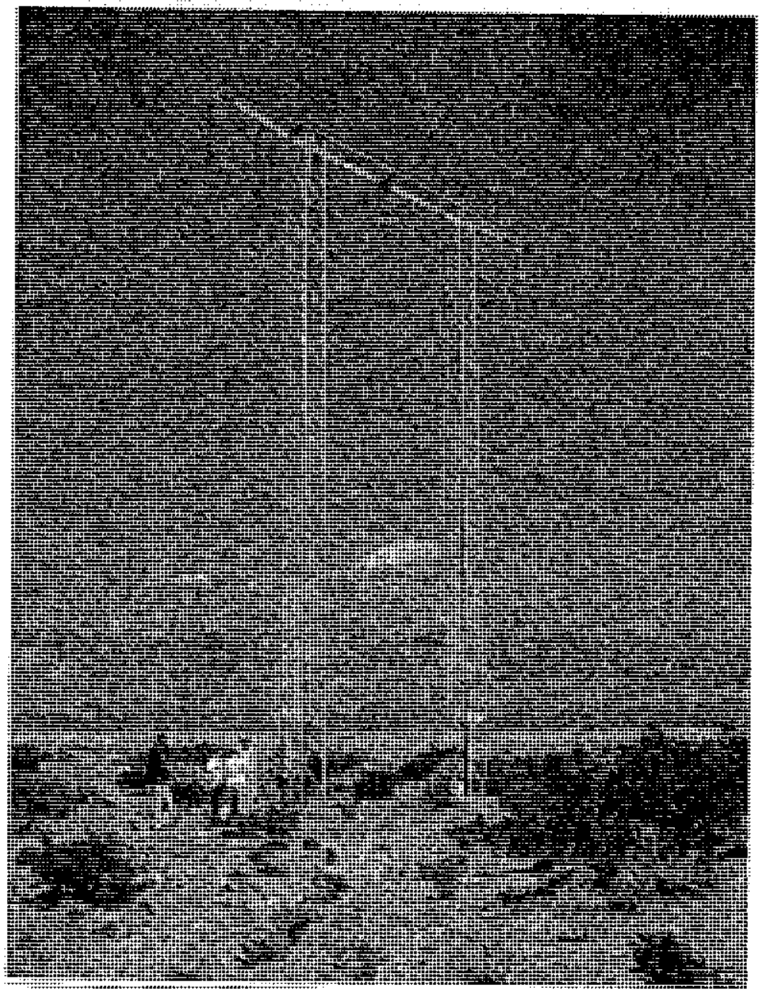
Primary #: 36-010315H
HRI #:
Trinomial: CA-SBR-10315H
NRHP Status Code:
Other Listings:

X Update or Supplement | Review Code: | Reviewer: | Date:

Chambers Group revisited this site in October of 2008. This is the Boulder-Dam-San Bernardino 132 kV Line, build in the 1930's. The site has not changed since it was determined eligible for NRHP in 1993. Alterations to the line will require mitigation.

P8. Recorded by (Name, affiliation, address):
Jay K. Sander
Jessica J. Auck
Chambers Group, Inc.
302 Brookside Avenue
Redlands, CA 92373

P11. Report Citation (Cite snrvey report and other sources, or enter "none."): Sander Jay K. et al., 2008 *A Class III Cultural Resources Inventory Southern California Edison Eldorado-Ivanpah Transmission Project, San Bernardino County, California and Clark County, Nevada.* Chambers Group, Inc., Redlands, CA.



Update 10/06

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-010315
HRI #
Trinomial CA-SBR-10315H
NRHP Status Code 1S Determined NR Eligible 10/23/93
Other Listings
Review Code **Reviewer** **Date**

 ***Resource Name or #:** Edison Company Boulder Dam-San Bernardino Electrical Transmission Line

P1. Other Identifier:
***P2. Location:** ☐ **Not for Publication** × **Unrestricted** ***a. County:** San Bernardino
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Victorville, CA **Date:** Rev. 1993 T6N; R4W; Por. of NE ¼ of Sec 26; ~~M.D.~~ SB. SB B.M.
c. Address: N/A Zip: N/A
d. UTM: Zone: 11; mE mN (G.P.S.)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:
At Intersection with Northern Boundary of Krumsick Subject Property #2(B) = 475,187 m Easting 3,826,995 m Northing
At Intersection with Western Boundary of Krumsick Subject Property #2(B) = 474,634 m Easting 3,826,994 m Northing
Assessor Parcel #: 0472-031-65-0000 (Linear Feature Portion/Segment Only)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This feature consists of an electrical transmission line with associated towers, insulators, and access road. Constructed in 1930/1931, the original line carried power to Boulder City/Boulder Dam to facilitate construction. Since August of 1937, power has been carried from the dam to Los Angeles. The towers are of fabricated steel (built at a remote location and simply erected on-site). They are simply designed, standing on two nearly square tower legs (cross-section) to present a short and compact rectangular structure. The line extends across the Mojave Desert from near Hoover/Boulder Dam to the vicinity of San Bernardino.

SEE ALSO ATTACHED CONTINUATION SHEETS

***P3b. Resource Attributes:** (List attributes and codes) HP11. Engineering Structure: Electrical Transmission Line
***P4. Resources Present:** ☐Building ×Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

SEE ATTACHED PHOTOGRAPHS

#1: TYPICAL EDISON ELECTRICAL TOWER KRUMSICK 2(B)
#2: ALIGNMENT/SOUTHEAST ACROSS SURVEY AREA KRUMSICK 2(B)

P5b. Description of Photo: (View, date, accession #)
June 2006
See Attached Photographs
***P6. Date Constructed/Age and Sources:** 1930/1931 ×Historic ☐Prehistoric ☐Both
See Bibliography
***P7. Owner and Address:**
Southern California Edison Co.
2244 Walnut Grove Avenue
Rosemead, CA 91770
Note: Property surveyed in escrow
***P8. Recorded by:** (Name, affiliation, and address)
Roger Hatheway
Principal Investigator
Hatheway & Associates
Post Office Box 3246
Crestline, CA 92325
***P9. Date Recorded:** 8/31/06

***P10. Survey Type:** (Describe) CEQA Compliance and Local Compliance: City of Victorville, California.
***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *"Due Diligence" Summary of Findings Report: An Historical and Archaeological Survey of Krumsick Subject Property #2(B), County of San Bernardino, California.* See also FINAL REPORT: *Historical and Archaeological Survey of Krumsick Subject Property #2(B).*
***Attachments:** ☐NONE ×Location Map ☐Sketch Map ×Continuation Sheet ×Building, Structure, and Object Record ☐Archaeological Record ☐District Record ×Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ×Other (List): Photographs (See Attached Photos)

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

 ***NRHP Status Code** 1S Individual property listed in NR by Keeper. Listed in CR

***Resource Name or #:** Edison Company Boulder Dam-San Bernardino Electrical Transmission Line

B1. Historic Name: Southern Sierras Power Company/Nevada-California Power Company Electrical Transmission Line; Nevada-California Electric Corporation; Southern California Edison Company Electrical Transmission Line

B2. Common Name: Edison Company Boulder Dam-San Bernardino Electrical Transmission Line

B3. Original Use: Electrical Transmission Line B4. Present Use: Electrical Transmission Line

***B5. Architectural Style:** Industrial

***B6. Construction History:** (Construction date, alterations, and date of alterations)

SEE ATTACHED CONTINUATION SHEETS

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** **Original Location:**

***B8. Related Features:** None

Part of a system originally built extending from San Bernardino to Boulder Dam.

B9a. Architect: R. H. Halpenny Design Chief b. Builder: E. J. Waugh Construction Engineer

***B10. Significance: Theme:** Engineering/Electrical Transmission **Area:** Southern California/Nevada

Period of Significance: 1930-1937 **Property Type:** Powerline **Applicable Criteria:** Consensus (Criteria Unknown)

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

SEE ATTACHED CONTINUATION SHEETS

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**

SEE BIBLIOGRAPHY ATTACHED CONTINUATION SHEETS

B13. Remarks:
-Context Fully Developed
-All CEQA/Local Cultural Resource Compliance Requirements Addressed

***B14. Evaluator:** Roger Hatheway, Principal Investigator,
Hatheway & Associates
Post Office Box 3246, Crestline, CA 92325

***Date of Evaluation:** August 31, 2006

(Sketch Map with north arrow required.)

SEE ATTACHED LOCATION MAP

(This space reserved for official comments.)

*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary #
HRI #
Trinomial

 Resource Name or #: Edison Company Boulder Dam-San Bernardino Electrical Transmission Line (Portion/Segment)

L1. Historic and/or Common Name: Southern Sierras Power Company/Nevada-California Power Company Electrical Transmission Line (Historic Name: 1930- Circa 1937).

L2a. Portion Described: ☐Entire Resource x Segment ☐ Point Observation **Designation:** UTM

b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map)

Southern Terminus: 4 m Easting 3 m Northing (Portion/Segment Within Survey/Study Area Only)
Northern Terminus: 4 m Easting 3 m Northing Portion/Segment Within Survey/Study Area Only)

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.) This feature consists of an electrical transmission line with associated towers, insulators, and access road. Constructed in 1930/1931, the original line carried power to Boulder City/Boulder Dam to facilitate construction. Since August of 1937, power has been carried from the dam to Los Angeles. The towers are of fabricated steel (built at a remote location and simply erected on-site). They are simply designed, standing on two nearly square tower legs (cross-section) to present a short and compact rectangular structure. The line extends across the Mojave Desert from near Hoover/Boulder Dam to the vicinity of San Bernardino.

SEE ATTACHED CONTINUATION SHEETS

L4e. Sketch of Cross-Section (include scale) Facing): Structures Not Measured

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

a. Top Width: Structures Not Measured

b. Bottom Width: Structures Not Measured

c. Height or Depth: Structures Not Measured

d. Length of Segment: 200+ Miles Overall ((Surveyed Portion Less Than One Mile)

L5. Associated Resources: Part of a system originally built extending from San Bernardino to Boulder Dam.

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.) Vegetation in the region is sparse and consists of high desert plant types (e.g., greasewood, Joshua trees, rabbitbush, cholla, desert trumpet). Soils are light grayish brown silty sand with gravel-sized limestone, quartz, and volcanic lithic materials. Larger cobbles are common. The landform slopes and ravines are steep sloping to east toward Bell Mountain Wash, which is within 300 meters.

L7. Integrity Considerations:

SEE ATTACHED CONTINUATION SHEETS

L8b. Description of Photo, Map, or Drawing (View, scale, etc.)

SEE LOCATION MAP: U.S.G.S., Victorville Quadrangle, Rev. 1993, Scale = 1:24,000

SEE PHOTOS #1 and #2

L9. Remarks: Historical and/or Architectural Contexts Fully Developed

L10. Form Prepared by: Roger Hatheway, Principal Investigator, Hatheway & Associates

L11. Date: 8/31/06

L8a. Photograph, Map or Drawing

SEE ATTACHED LOCATION MAP

Section P3a: Description (Continued)

GENERAL DESCRIPTION OF SURVEY FEATURE

Resource Name: *Edison Company* San Bernardino- Boulder Dam Electrical Transmission Line
Address/Location: R4W; Por. **of** NE ¼ **of Sec** 26; M. D. SB **B.M.** (Linear Feature Portion/Segment Only)
At Intersection with Northern Boundary of Krumsick Subject Property #2(B) = 475,187 m Easting 3,826,995 m Northing
At Intersection with Western Boundary of Krumsick Subject Property #2(B) = 474,634 m Easting 3,826,994 m Northing
Historic Name(s): Southern Sierras Power Company/Nevada-California Power Company Electrical Transmission Line; Nevada-California Electric Corporation; Southern California Edison Company Electrical Transmission Line
APN#: 0472-031-65-0000
Present Use: Electrical Transmission Line (East to West)
Original Use: Electrical Transmission Line (West to East)
Architectural Style: Industrial (Fabricated Steel Towers)
Architectural Integrity: High
Alterations: Reverse flow of electrical energy.
Integrity: High (80+%)
Associated Features: Boulder/Hoover Dam
Year Built: 1930-1931

DETAILED DESCRIPTION OF SURVEY FEATURE

This feature consists of an electrical transmission line with associated towers, insulators, and access road. Constructed in 1930/1931, the original line originally carried power to Boulder City/Boulder Dam to facilitate construction. Since August of 1937, power has been carried from the dam to Los Angeles. The towers are of fabricated steel (built at a remote location and simply erected on-site). They are simply designed, standing on two nearly square tower legs (cross-section) to present a short and compact rectangular structure. The line extends across the Mojave Desert from near Hoover/Boulder Dam to the vicinity of San Bernardino.

The following information is taken from the book, *The Story of the Hoover Dam*, as published by Nevada Publications (Compressed Air Magazine copyright 1931 – 1935), describing the original condition of the survey feature, and its component parts.

> This was a transmission line to deliver power to the site from generating stations at Victorville and San Bernardino, Calif., the latter more than 200 miles away. The contract for furnishing power was awarded jointly to the Southern Sierras Power Company and the Nevada-California Power Company. The line, together with a substation near the rim of the canyon on the Nevada side, was designed and constructed by the first-named company at a cost of approximately $1,500.00. Here, again, unusual speed was shown in the face of many obstacles. Despite the fact that a considerable portion of the route was across mountainous country, the 193-mile line from Victorville to the substation was put in place at the rate of 1.45 miles a day, which is said to constitute a record for such work. Field camps for from 50 to 80 men each were established at suitable intervals, and as many as five of them were maintained at a time. In some cases the trucks that delivered materials and supplies had to make their own roads; and on one occasion it was necessary to let a truck down a steep grade by means of a winch and cable. Construction activities extended over a distance of 125 miles at one time. The line consists of 2-legged, fabricated-steel towers with 34-foot, steel, angle cross arms, spaced seven to the mile. Approximately 5,000,000 pounds of steel and 1,080,000 pounds of aluminum-strand, steel-reinforced cable were used. A telephone line parallels the power line.

> ...Power was turned on on June 25, beating by several days the time limit of 240 days allowed for designing and building the system. R. H. Halpenny was in charge of design and E. J. Waugh was construction engineer. Field forces on line construction were in charge of C. H. Rhudy; and H. O. Watts supervised the building of the substation. The line is insulated for 132,000 volts, but power is being transmitted at 80,000 volts. A 6.83-mile, 33,000-volt wood-pole line was built from the substation to Boulder City and a .73-mile, 2,300-volt line was constructed into the canyon to furnish power to the No. 1 pumping station of the water-supply system for Boulder City.

The survey feature has been altered by major modifications at the extreme eastern and western ends of the transmission line. Specifically, the original western-end electrical generating plants are either off-line or demolished. The original eastern-end receiving stations and power distribution system has been demolished. The majority of the original system (over 200 miles of towers and transmission line) are reported to be intact.

Section B6: Construction History

Edison Company Boulder Dam-San Bernardino Electrical Transmission Line (Portion/Segment)

The following background history regarding the construction of Boulder/Hoover Dam has been taken from an online source of information at:

www.nevada-history.or/boulder

The Boulder Canyon Project
Hoover Dam
by
Wm. Joe Simonds

Throughout human history, mankind has built monuments to its ingenuity and skill. In Egypt it was the Pyramids. Rome, built the Colosseum. The Greeks built the Acropolis. The great cathedrals of Europe raised the skills of their builders to unequalled heights, creating awe inspiring structures. In the Americas, the cliff dwellings of Mesa Verde and the high mountain city of Machu Pichu speak to the skill and ingenuity of their builders. In the modern era, it's buildings that reach near half a mile into the sky, bridges that stretch enormous distances in a single span, and machines that extend mankind's reach far into space. One monument that must surely be counted among the great achievements of mankind is Hoover Dam.

Location

Hoover Dam and Lake Mead are located in the Black Canyon of the Colorado River about 35 miles southeast of Las Vegas, Nevada. Located on the Arizona-Nevada State line, the dam and reservoir are in the counties of Mohave, in Arizona, and Clark, in Nevada. The Colorado River Basin is an area of over 242,000 square miles that includes parts of California, Nevada, Arizona, Utah, Colorado, New Mexico, and Wyoming. The basin also includes some 2,000 square miles in Mexico.

Authorization

The passage of the Boulder Canyon Project Act came after more than two decades of studies and investigations. One of the most difficult steps in gaining approval for the project was determining the equitable allocation of the waters of the Colorado River. The people living in the Colorado River Basin depended of the waters of the river, and in many cases water rights held greater value than land titles. While all of the Basin states recognized the advantages of a large dam on the river, there were concerns about one state's ability to claim the lions's share of the water, leaving the other state without sufficient water for development. Under the doctrine of prior appropriation which was

recognized by all Basin states, an individual or agency meeting certain legal conditions and first appropriating water for beneficial use had first right to the water. Several of the Basin States feared that California, with it's vast financial resources and great thirst for water, would be the first state to begin beneficial use of the waters of the Colorado River and therefore claim rights to the majority of the water. It was clear that without some sort of an agreement on the distribution of water, the project could not proceed.
In 1920, representatives of the seven Basin states met and endorsed a proposal for an interstate compact. A commission was formed with a representative from each of the Basin states and one from the Federal Government. The Government's representative was Herbert Hoover, then Secretary of Commerce under President Harding. The commission first met in January 1922 with Hoover presiding. At first, negotiations attempted to establish amounts for each state, but an agreement could not be reached...

The first attempt to gain approval for construction of Boulder Dam came in 1922 with the introduction of two bills in the House of Representatives and the Senate. The bills were introduced by Congressman Phil D. Swing and Senator Hiram W. Johnson and were known as the Swing-Johnson bills. The bills failed to come up for a vote and were subsequently reintroduced several times. Many parties joined to oppose the bills. Arizona feared that a thirsty California was trying to get their water. Eastern legislators saw the project as a white elephant that would in no way benefit their constituents. The power lobby, under the guidance of Utah Senator Reed Smoot, saw the project as an attempt by the federal government to get into the power business, directly competing with private industry. Also joining the fight was the influential publisher of the Los Angeles Times, Harry Chandler, who owned 830,000 acres of irrigated land in Mexico. Chandler feared that the proposed project would siphon off water that was irrigating his land. In December 1928, after many failures, both the House and the Senate approved the bill and sent it to the President for final approval. On December 21, 1928, President Coolidge signed the bill approving the Boulder Canyon Project...
The Boulder Canyon Project Act became effective in June 1929 following ratification of the Colorado River Compact by six of the seven states of the Colorado River Basin.

Construction History

Investigations

The Bureau of Reclamation began studying construction of dams to control the Colorado River in 1902...
Exploratory drilling at potential dam sites began in late 1920 and continued for three years. Detailed topographic surveys were conducted in 1920 and 1921 with geologic surveys being conducted from 1921 to 1923. Also during the period of 1921 to 1923, studies into the availability of materials for concrete aggregates were made and investigations were conducted to determine the locations of railroads and highways for transporting supplies and equipment to construction sites. In 1924, after several years of investigations, the Bureau of Reclamation recommended construction of a high concrete dam at a site in the Black Canyon. The Black Canyon site was chosen for several reasons including accessibility, better foundation material, depth to bedrock, and a greater reservoir capacity. Although the Black Canyon site was chosen, the name Boulder Canyon Project was retained because of prior legislation under that title.

Design

The design of Boulder Dam evolved during several years of study that involved the efforts of some 200 engineers and other workers in Reclamation's design office in Denver and several consulting firms that were retained during the design process....
In 1928, the Secretary of Interior appointed a board of engineers and geologists to review all designs and determine the best design from the standpoints of economy, safety, and engineering feasibility. The board, known as the Colorado River Board, approved the lower Black Canyon site and recommended changes to the diversion plan, doubling the diversion capacity to 200,000 second feet

(s/f). The Board also increased the spillway capacity to 400,000 s/f, which would eliminate the possibility of overtopping during maximum flooding.

By 1928, power development had become an essential feature of the project. Studies into the best arrangement for the powerplant and dam led to two designs. The first design placed the powerplants and outlet works on the Nevada side of the canyon with two circular vertical shaft spillways on the Arizona side. The second design called for a "U" shaped powerhouse at the base of the dam with spillway tunnels and double banks of outlet works contained in both canyon walls. Intake towers would supply water to the power penstocks and outlet works. Both designs eliminated the outlet conduits through the dam structure and were designed as gravity-arch structures. The second design would form the basis for the final plan.

The initial appropriation for construction was made in July 1930.

Construction

Boulder City and Pre-Construction Activities

Before construction of the dam and appurtenant works could begin, an enormous amount of preparatory work had to be undertaken. The site of the dam is a deep canyon more than 30 miles from the nearest town. The site was in the middle of the desert with limited access and no provisions for housing the almost 5,000 people that would work on the project. Before work on the dam itself could begin, many support features had to be constructed. These included transportation and communication facilities, housing, water and sewage systems, power and lighting facilities, and a 150-ton cable way for handling heavy equipment at the dam site....

Since no source of electrical power existed in the vicinity of the dam site, two alternatives were investigated: construction of a diesel or steam powered generating plant near the dam site, or securing power from distant plants already in operation. After examining several proposals, the Government determined that securing power from existing powerplants was the best solution. On October 28, 1930, the Government signed a contract with the Southern Sierras Power Company and the Nevada-California Power Company for the construction of a 222 mile-long power transmission line from San Bernadino to a substation at Boulder City, and the delivery of power to the construction site. The transmission line served two purposes: transmission of power to the dam site during construction, and from the dam to markets in Southern California following completion of the dam. Construction of the line began in December 1930, and was completed in late April 1931. During construction, 1,250,000 pounds of conducting line was used along with 5,000,000 pounds of steel and 49,000 insulator disks. The total cost of the transmission line and substation was approximately $1,500,000.

The following excerpt is taken from the 1983 book, *"Iron Men and Copper Wires, A Centennial History of the Southern California Edison Company,"* by William A. Myers.

Finally, in December 1928 the Boulder Canyon Act, presented to Congress as the fourth Swing-Johnson Bill, was passed by Congress and signed into law by President Calvin Coolidge. Its main provisions approved the Colorado River Compact upon ratification by six of the seven states, and authorized construction of a multi-purpose dam in Boulder or Black Canyon and of the All American Canal into the Imperial Valley.

Passage of the Boulder Canyon Act effectively doomed Edison's own applications for power projects upon the Colorado. Despite this, the Company enthusiastically supported the Bill in its final form, thanks to another compromise worked out by Secretary Hoover, whereby the federal government would build the dam but the public and investor-owned utilities would generate and distribute the electricity. This made government and utilities partners in the project. John Miller wrote enthusiastically of the conclusion to years of conflict by pointing out that the Boulder Canyon Project would "stimulate growth and prosperity in Southern California." After a decade of controversy, the stage was finally set for actual construction to begin. Despite the denial of its own Colorado River applications, and the surrender of all its filed water rights and applications upon the river, Edison and its predecessor, the Southern Sierras Power Company, were destined to play important roles in the construction story.

Before construction of the new dam could begin, however, the Boulder Canyon Act stipulated that the Secretary of the Interior must have firm contracts for the sale of power from the project in order to guarantee amortization of the project expense over a 50-year period. Friction developed once again between municipal power agencies and investor-owned companies as to which would generate and distribute the power and at what price. Ten agencies were interested in obtaining power. Two of them, Edison and the Los Angeles Bureau of Power and Light, at first sought to be the sole generators and distributors for Southern California.

Once again Herbert Hoover, by now President of the United States, and Interior Secretary Ray Lyman Wilbur patiently ironed out the difficulties. By a contract dated April 26, 1930, it was agreed that the Southern California Edison Company would generate for itself and other investor-owned electric utilities, and the Los Angeles Bureau of Power and Light would generate for the states, the municipal utilities and the Metropolitan Water District.

The contract of 1930 was a firm commitment on the part of Edison, Southern Sierras and the City of Los Angeles to find a market for the dam's tremendous power output. It is a tribute to the three Southern California utilities' faith in the future that the contract was made in the face of a substantial drop in demand for electricity due to the Great Depression. They displayed great courage in contracting for energy for which there was no apparent ready market, and which was priced above current market rates, especially as most of the Southwest's other public and investor-owned utilities refused to participate although given a chance. This contract, which apparently included a guarantee of a cash advance to the government to enable construction to begin, was the final necessary preliminary before work on the dam commenced.

In preliminary site studies of Boulder Canyon, geologists discovered an earthquake fault. The final choice, therefore, was Black Canyon, 13 miles down river. In 1930, Edison turned over to the government all of its survey data on the Black Canyon damsite. To checkrein the wild, turbulent Colorado effectively, it was decided to build the highest dam in the world – 726 feet from bedrock to crest. The dam would create the world's biggest man-made lake, which could safely store the normal flow of the Colorado for two years and would trap 100,000 tons of silt. It would make possible a power plant capable of producing 5 billion kilowatt-hours of electricity a year.

Specifications and drawings for the dam were rushed to completion in the chief engineer's office of the Bureau of Reclamation in Denver. On April 20, 1931, construction contracts were awarded to the Six Companies, Inc. of San Francisco, a consortium composed of the Utah Construction Company; the Pacific Bridge Company; Henry J. Kaiser, and W. A. Bechtel Company; MacDonald and Kahn Co., Ltd.; Morrison-Knudsen Co.; and J. F. Shea Company. The Six Companies' bid was $48,890,995.50 – the largest labor contract approved by the Untied States government up to that time. A huge sum for that era, the winning bid represented nearly one-twelfth of the entire federal budget for that Depression year of 1931.

In erecting the dam, the Six Companies profited from technical solutions worked out by Edison engineers at Big Creek a decade earlier. Furthermore, when the Six Companies issued calls for engineers, hard rock miners, skilled electricians, carpenters, railroad men, truck drivers and machinists to come to work on the Colorado River, many veterans of Edison's Big Creek Project, which had wound up in 1929, provided the nucleus of experience for the new Hoover Dam Project.

The logistics of the project were equally as complex as had been those for Big Creek. An entire new town, Boulder City, was erected on a sage-covered flat about 10 miles from the damsite. To carry the anticipated millions of tons of material to the damsite, in 1930, the Union Pacific Railroad built a 23-

> mile long spur from Las Vegas to Boulder City, and the Six Companies extended the railroad ten more miles to the damsite.
>
> Of the many logistical problems encountered during construction, none was more important than arranging for a supply of electricity to the project. Nevada Power Company, the local utility in the area, had neither the facilities nor the capacity to serve the project load, and declined to participate. Edison, with the capacity to provide service, had already contracted to supply power for the Metropolitan Water District's Colorado River Aqueduct Project, and deferred to the Southern Sierras Power Company, who was eager to serve the huge construction project.
>
> On October 28, 1930, a contract was made between the government and Southern Sierras to deliver all electric energy needed for the Hoover Project, including domestic service to Boulder City. Eight months were allotted for construction of the necessary transmission lines and substation facilities. Three days after the signing of the contract, survey parties were in the field for location work, and within six weeks actual construction had begun. In a record-setting pace, crews built the 225-mile long, 132,000-volt line from San Bernardino to the damsite in only 225 days, despite having to cross some of the most inhospitable desert terrain in the world. Power deliveries began over the new line to Hoover Dam Substation, located on the rim of Black Canyon some 700 feet from the Nevada abutment of the dam, on June 25, 1931. During the nearly six years this service was provided, over 100 million kilowatt-hours were sold to the dam project, enabling this great engineering endeavor to go forward.
>
> And go forward it did. Laboring on a round-the-clock schedule and enduring extremes of climate, the engineers, foremen and craftsmen got the Herculean job done. They dug four 50-foot diameter diversion tunnels, built cofferdams upstream and downstream to turn the Colorado from its course, excavated a cavernous foundation, poured an arch-gravity dam 60 stories tall, laid in two rows of penstocks on each side of the river, and built a powerhouse and a switchrack to connect with transmission lines built by the principal energy purchasers. To complete this mighty task, the Six Companies' contract allowed seven years. The dam itself was finished in five.
>
> There remained only to start generating power for those who had contracted for it. Commercial power production in the Hoover power plant was begun on October 26, 1936, when Unit N-2, the first of four Nevada-side units then in the process of installation, was energized to serve the load of the Cities of Los Angeles, Pasadena, Glendale and Burbank. The power was delivered via the City of Los Angeles' new 266-mile long transmission line at a new world's record pressure of 287,000 volts, and earlier that month a tremendous parade illuminated by giant searchlights would through the streets of Los Angeles.
>
> In August 1937, Unit A-8 went into operation for the Nevada-California Electric Corporation, successor to the Southern Sierras Power Company, two years in advance of its previously contracted-for scheduled firm delivery date of 1940. Energy was delivered into the Electric Corporation's system at San Bernardino over the same 132,000-volt line built in 1930-31. (Myers 1983: 184-187)

The following information is taken from the book, *The Story of the Hoover Dam*, as published by Nevada Publications (Compressed Air Magazine copyright 1931 – 1935):

> Through the instrumentality of the Government, work was also underway on another very important medium of service to the contractors. This was a transmission line to deliver power to the site from generating stations at Victorville and San Bernardino, Calif., the latter more than 200 miles away. The contract for furnishing power was awarded jointly to the Southern Sierras Power Company and the Nevada-California Power Company. The line, together with a substation near the rim of the canyon on the Nevada side, was designed and constructed by the first-named company at a cost of approximately $1,500.00. Here, again, unusual speed was shown in the face of many obstacles. Despite the fact that a considerable portion of the route was across mountainous country, the 193-

mile line from Victorville to the substation was put in place at the rate of 1.45 miles a day, which is said to constitute a record for such work. Field camps for from 50 to 80 men each were established at suitable intervals, and as many as five of them were maintained at a time. In some cases the trucks that delivered materials and supplies had to make their own roads; and on one occasion it was necessary to let a truck down a steep grade by means of a winch and cable. Construction activities extended over a distance of 125 miles at one time. The line consists of 2-legged, fabricated-steel towers with 34-foot, steel, angle cross arms, spaced seven to the mile. Approximately 5,000,000 pounds of steel and 1,080,000 pounds of aluminum-strand, steel-reinforced cable were used. A telephone line parallels the power line.

Construction of a substation on a high, rocky point having a steep approach was accompanied by difficulties. A compressor to furnish air for excavating the 2,100 cubic yards of rock required to be moved for the placing of foundations was packed up the hillside in sections by burros. Later a temporary switchback road, having grades up to 17 per cent, was built to permit the moving in of construction materials and station equipment. Power was turned on on June 25, beating by several days the time limit of 240 days allowed for designing and building the system. R. H. Halpenny was in charge of design and E. J. Waugh was construction engineer. Field forces on line construction were in charge of C. H. Rhudy; and H. O. Watts supervised the building of the substation. The line is insulated for 132,000 volts, but power is being transmitted at 80,000 volts. A 6.83-mile, 33,000-volt wood-pole line was built from the substation to Boulder City and a .73-mile, 2,300-volt line was constructed into the canyon to furnish power to the No. 1 pumping station of the water-supply system for Boulder City. (Pages 33-34)

Section B10: Significance

ARCHITECTURAL/ENGINEERING SUMMARY STATEMENT OF SIGNIFICANCE
This site (a linear feature) was determined eligible to the National Register of Historic Places on 10/22/93. This line was built in 1930-1931, under a government contract with the Southern Sierras Power Company and the Nevada-California Power Company, as a means of providing power to the Boulder Dam/Hoover Dam construction site. This site is also listed on the California Register of Historical Resources.

HISTORICAL SUMMARY STATEMENT OF SIGNIFICANCE
This site (a linear feature) was determined eligible to the National Register of Historic Places on 10/22/93. This line was built in 1930-1931, under a government contract with the Southern Sierras Power Company and the Nevada-California Power Company, as a means of providing power to the Boulder Dam/Hoover Dam construction site. This site is also listed on the California Register of Historical Resources.

SUMMARY CONCLUSIONS CEQA/CRHR ELIGIBILITY

RESOURCE ATTRIBUTE CODE(S):
HP11. Engineering Structure: Electrical Transmission Line The following excerpt is taken
CALIFORNIA HISTORICAL RESOURCE STATUS CODE(S):
1S Individual property listed in NR by Keeper. Listed in CR

This site (CA-SBR-10315H) was determined eligible to the National Register of Historic Places on 10/22/93. This line was built in 1930-1931, under a government contract with the Southern Sierras Power Company and the Nevada-California Power Company, as a means of providing power to the Boulder Dam/Hoover Dam construction site. This site is also listed on the California Register of Historical Resources.

<u>Section B12:</u> References

Books and Reports

Myers, William A.
1983 Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company. Trans-Anglo Books.

Nevada Publications
1931-35 *The Story of The Hoover Dam*, Nevada Publications, Las Vegas, Nevada.

Guidelines, Bulletins, Rules and Regulations

California Environmental Quality Act (provisions regarding historical resources)
Public Resources Code 21083.2; 21084(e); 21084.1; California Code of Regulations (title 14) CEQA Guidelines 15064.5; 15126.4; 15325; 15331

California Office of Historic Preservation. Technical Assistance Series #1, *California Environmental Quality Act and Historical Resources: Questions and Answers*. Sacramento, California

California Office of Historic Preservation. Technical Assistance Series #4, *California Register of Historical Resources Q&A for Local Governments*. Sacramento, California

California Office of Historic Preservation. Technical Assistance Series #6, *California Register and National Register: A Comparison.* Sacramento, California

California Office of Historic Preservation. Technical Assistance Series #10,
California State Law and Historic Preservation: Statutes, Regulations and Administrative Policies Regarding Historic Preservation and Protection of Cultural and Historical Resources. May 23, 2001

California Register of Historical Resources
Public Resources Code 5020.1(a); 5020.4(a)(8); 5024.1; 5024.6(b)(m); 5028; 5029; 5079.20(a); 21084.1; Executive Order W-26-92

Internet

<u>www.nevada-history.org</u> The Boulder Canyon Project: Hoover Dam, Wm. Joe Simonds

Libraries

City of San Bernardino Feldheym Library (California Room and Microfilm)
City of Barstow County Library
City of Victorville County Library
San Bernardino County Library, San Bernardino
Smiley Library, Redlands
University of California, Rivera Library, Riverside

Maps

United States Geological Survey
7.5 Minute Quadrangle, Victorville, California, Revised 1993.
15 Minute Quadrangle, Victorville, California, 1958

San Bernardino County Archaeological Information Center Records
In addition to the Center's historical resources files, the following publications, manuscripts or correspondence also were consulted:

American Association for State and Local History
1989 <u>National Register of Historic Places, 1966-1988</u>. Nashville, TN.
California Office of Historic Preservation
1986 <u>Survey of Surveys: A Summary of California's Historical and Architectural Resource Surveys.</u>

1988 <u>Five Views: An Ethnic Sites Survey for California</u>.

1997 <u>California Historical Landmarks</u>.

1992 <u>California Points of Historical Interest</u>.

2005 Listing of National Register Properties--Records entered into the OHP computer file--received quarterly.
2005 Inventory of Historic Structures--Records entered into the OHP computer file of historic resources-received quarterly.

San Bernardino County Museum
1980 Historical Landmarks of San Bernardino County. Quarterly of the San Bernardino County Museum Association 28(1-2).

Respondents

Robin Laska, County of San Bernardino Archaeological Information Center
Mehdi Mostaedi, Lee & Associates, Victorville, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

 ***Resource Name:** Edison Company Boulder Dam-San Bernardino Electrical Transmission Line

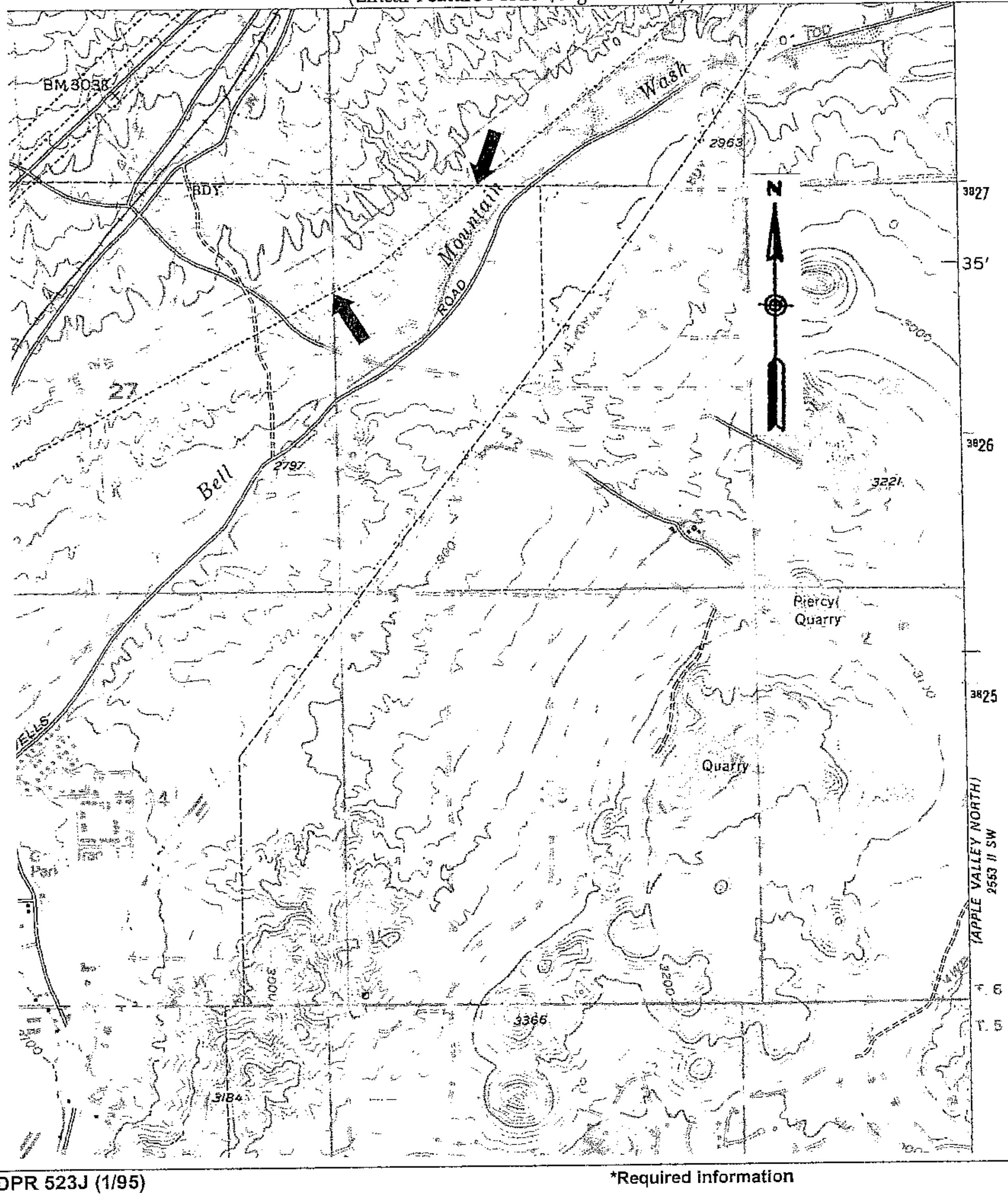
***Map Name:** USGS 7.5 Minute Topographic, Victorville, Calif. ***Scale:** 1:24,000

***Date of Map:** 1993 **Reduced to Present Scale:** Original Scale (Reproduced at 100%- -North Arrow Added)

At Intersection with Northern Boundary of Krumsick Subject Property #2(B) = 475,187 m Easting 3,826,995 m Northing

At Intersection with Western Boundary of Krumsick Subject Property #2(B) = 474,634 m Easting 3,826,994 m Northing

T6N; R4W; Por. of NE ¼ of Sec 26; M. D. SB B.M.
(Linear Feature Portion/Segment Only)



DPR 523J (1/95)

*Required information

P36-010315

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # ~~PSBR-38H~~
HRI #
Trinomial CA SBR-10,315H

Page 1 of 1 Resource Name or # (Assigned by recorder): PSBR-38H
*** Recorded by** Carrie D. Wills, Jan Jacket, Cassandra Hensher, and John Sharp
***Date** **April 25, 1997** ☐Continuation ☒Update

A visual search was utilized to try to relocate this historic three cable transmission line site. The transmission line was visually located and appears to be in good condition.

Continuation Update Prepared by:

Carrie D. Wills
May 7, 1997
William Self Associates
P.O. Box 2192
Orinda, CA 94563
(510) 631-0342

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-010315
HRI#
Trinomial SBR-10315H

CK

Other Listings:
Review Code: Reviewer: Date:

 Resource Name or #: (assigned by recorder) ~~P-SBR-38H~~

P1. Other Identifier:

P2. Location: ■ Not for Publication ☐ Unrestricted (P2b and P2c or P2d. Attach a Location Map as necessary)

a. County: San Bernardino

b. USGS 7.5' Quad: Cave Mountain Date: 1986 T. 12N ; R. 6E ; SE ¼ of SE ¼ of Sec. 26 ; S.B. B.M.

c. Address: City: Zip:

d. UTM: (Give more than one for large and/or linear resources) Zone: 11 ; 563060 mE/ ; 3883650 mN

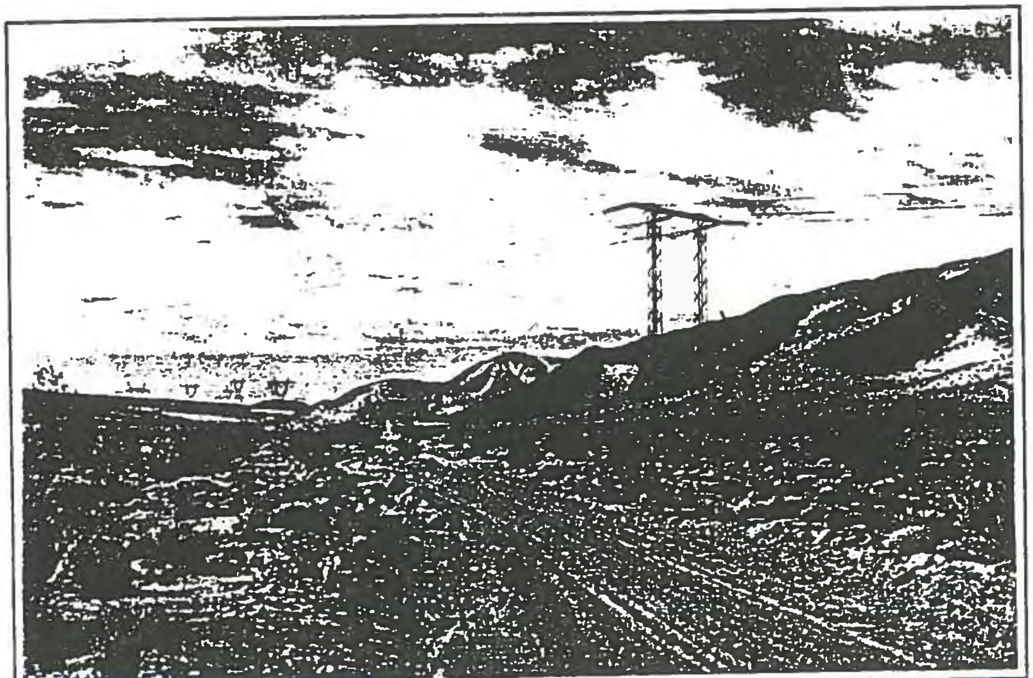
e. Other Locational Data: (e.g.parcel #, directions to resource, elevation, etc., as appropriate). The site is located approximately 2.5 miles west of the jct. of the AT&T P-140 cable route and Basin Road. Marker pole 7043 is located near the northeast corner of the intersection of the P-140 cable route access road and P-SBR-38H.

P3a. Description: (Describe resource and it major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
This resource is an electrical transmission line that was constructed in 1931 to provide power for the construction of Hoover Dam. Once Hoover Dam was completed, the power was fed in the opposite direction toward San Bernardino. Known as the Boulder Dam-San Bernardino 115KV line, the three-wire line runs for approximately 225 miles supported by a series of twin-tower H-frame supports. The line was recorded as a cultural resource in 1989 by archeologists from the Archaeological Advisory Group. The line is still in use and is maintained by the Southern California Edison Company, who acquired the line from the original builder, Southern Sierras Power Company, according to the DPR 523 form completed in 1989.

The AT&T P-140 line crosses the resource once near the western edge of the Cronise Basin. One twin-tower H-frame support is located near the P-140 line APE (see sketch map).

P3b. Resource Attributes: (List attributes and codes) HP 39 - Other (transmission line)

P4. Resources Present: ☐ Building ■ Structure ☐ Object ☐ Site ☐ District ☐ Element of a District ☐ Other (Isolates etc.)



P5b. Description of Photo: (View, date, accession #) View looking west along the AT&T P-140 cable route, access road. P-SBR-38H in center.

P6. Date Construction/Age and Sources: Historic ■ Prehistoric ☐ Both ☐

P7. Owner and Address:
Unknown

P8. Recorded By: (Name, affiliation, and address) Neal Neuenschwander
Peak & Associates, Inc.
3161 Godman Avenue, Suite A
Chico, CA 95973

P9. Date Recorded: 2/8/97

P10. Survey Type: (Describe)
Intensive

P11. Report Citation: (Cite Survey report and other resources, or enter "none") *Cultural Resource Assessment of the AT&T P-140 Coaxial Cable Line from Clark County, Nevada to near Mojave, Kern County, California*, Vols. I and II . Peak & Associates, Inc. 1997

ATTACHMENTS: None ■ Location Map ■ Sketch Map ■ Continuation Sheet ■ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ■ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ■ Photograph Record ☐ Other: _

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
BUILDING, STRUCTURE, AND OBJECT RECORD

Primary #:
HRI #:

 *NRHP Status Code: 3S

B1. Historic Name:
B2. Common Name: Boulder Dam-San Bernardino 115KV line
B3. Original Use: Energy transportation B4. Present Use: Same
B5. Architectural Style: N/A
B6. Construction History: (Construction date, alterations, and date of alterations.) This electrical transmission line was constructed in 1931 to provide electrical power for the construction of Hoover Dam. When the dam was completed, electricity flowed in the opposite direction toward the community of San Bernardino.

B7. Moved? ■ No □ Yes □ Unknown Date: N/A Original Location: N/A
B8. Related Features:

B9a. Architect: N/A b. Builder: N/A
B10. Significance: Theme Energy Transportation/Facility Development **Area** Southern California/Southern Nevada
Period of Significance 1931 - **Property Type** Electrical transmission line, towers **Applicable Criteria**
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
The Boulder Dam-San Bernardino 115KV line has been evaluated as being an eligible property under NRHP criterion a. The integrity of the tower and associated transmission lines appear to be good at the P-140 cable intersection area.

B11. Additional Resource Attributes: (List attributes and codes)
B12. References:

B13. Remarks:

B14. Evaluator: Neal Neuenschwander
Date of Evaluation: 2-8-97

This space reserved for official comments.

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURERECORD

Primary #:
HRI #:
Trinomial:

Page 3 of 8 **Resource Name or #:** (assigned by recorder) P-SBR-38H

L1. **Historic and/or Common Name:** Boulder Dam-San Bernardino 115KV Line

L2a. **Portion Described:** ☐ Entire Resource ☐ Segment ■ Point Observation **Designation:**

b. **Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) The resource is located approximately 2.5 miles west of the jct. of the AT&T P-140 cable route and Basin Road. UTM Coordinates, Zone 11; 563060mE;3883650mN

L3. **Description:** (Describe construction details, materials, and artifacts found at the segment/point. Provide plans/sections as appropriate.) The resource is a three-line electrical transmission system that was constructed in 1931 in order to provide power for Hoover Dam construction and the residents of nearby Boulder City. The lines rest on top of twin-tower, H-frame supports.

L4. **Dimensions:** (In feet for historic features and meters for prehistoric features)
a. **Top Width**
b. **Bottom Width**
c. **Height or Depth**
d. **Length of Segment**

L5. **Associated Resources:**

L6. **Setting:** (Describe natural features, landscape of characteristics, slope, etc., as appropriate) The resource is located in southern California and southern Nevada.

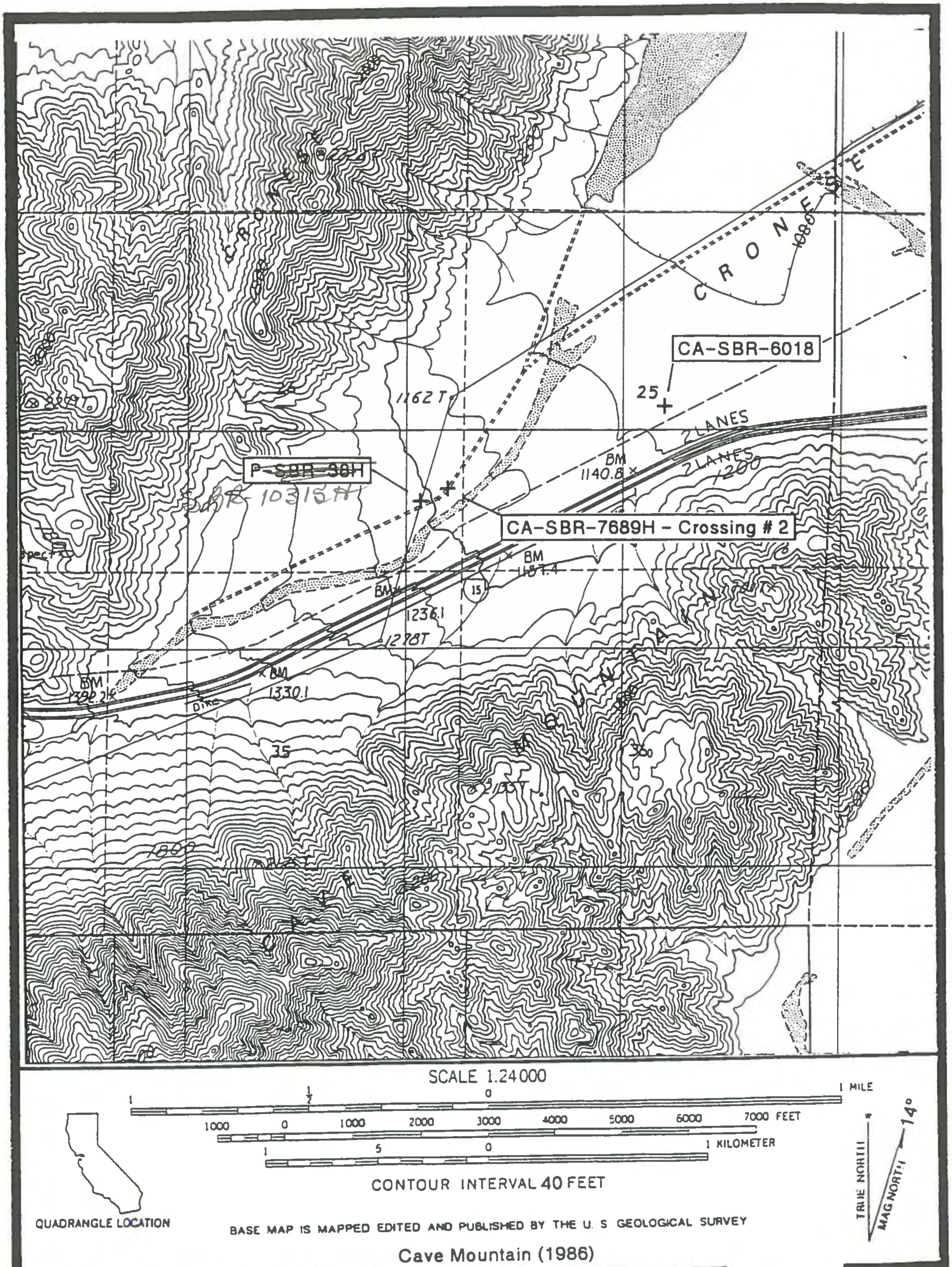
L7. **Integrity Considerations:** The original H-frame supports are still in use.

L8b. **Description of Photo, Map, or Drawing** (View, scale, etc.)
See continuation sheet

L9. **Remarks:**

L10. **Form Prepared by:** (name, affiliation. and address)
Neal Neuenschwander
Peak & Associates, Inc.
3161 Godman Avenue, Suite A
Chico, CA 95973

L11. **Date:** 2/8/97



Cave Mountain (1986)

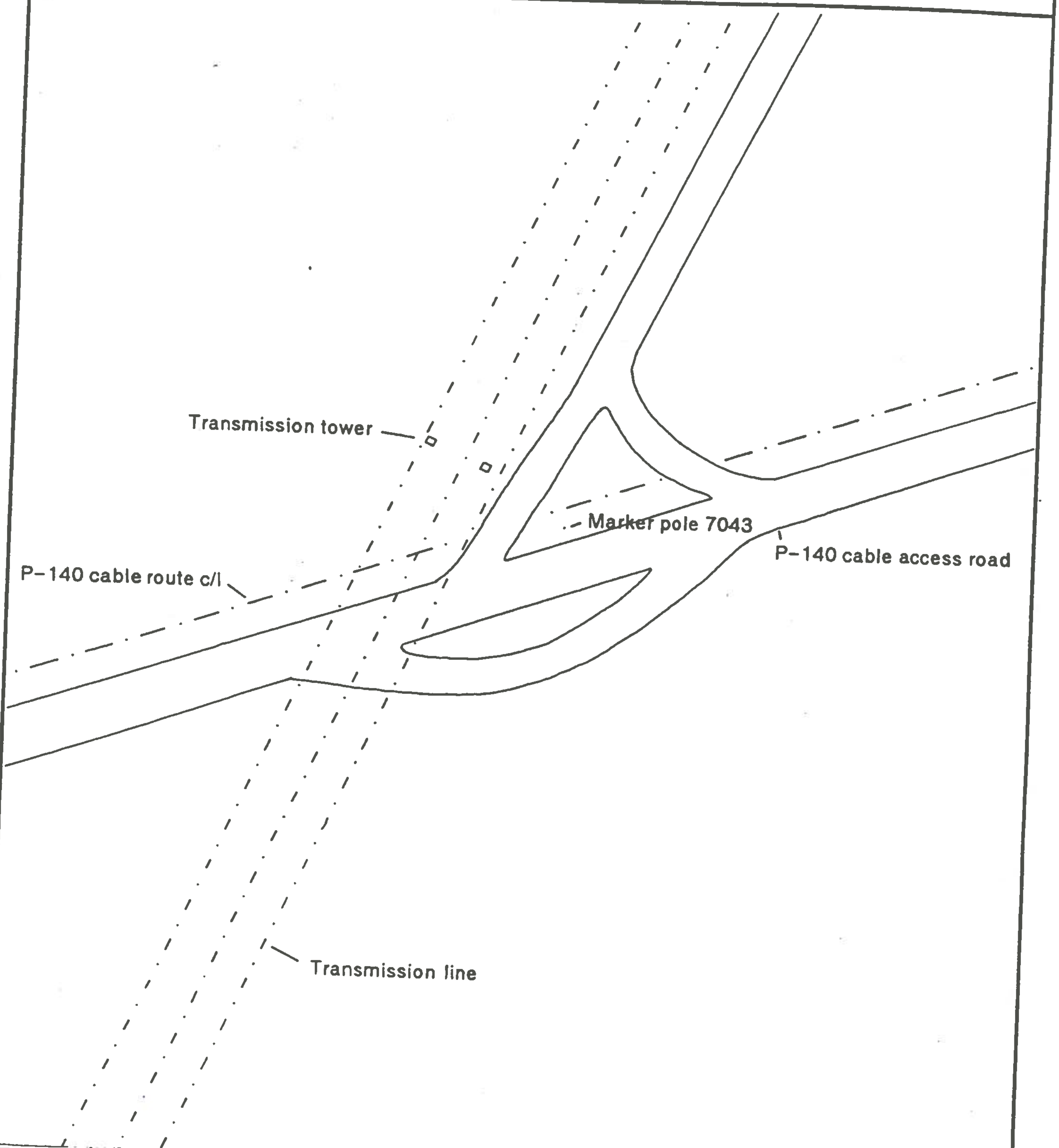
Peak & Associates, Inc.
Archeological Site Map

Scale 1 cm = 5 meters
1 inch = 41.6 feet

1 inch — 1 cm

TN MN 14°

Site Number P-SBR-38H
Field Number
Date Drawn 2/8/97
Drawn By Neuenschwander



CA-SBR-10315H P36R-38H

36-010315 Ser. No.

HABS ___ HAER ___ NR X SHL ___ Loc ___

UTM: A ___ B ___

C ___ D ___

DETERMINED ELIGIBLE 10/22/93

ARCHAEOLOGICAL ADVISORY GROUP

HISTORIC RESOURCES INVENTORY

IDENTIFICATION

1. Common name: Boulder Dam-San Bernardino 115KV line
2. Historic name: San Bernardino-Boulder Dam 132KV line
3. Street or rural address: N/A

   City ___ Zip ___ County ___
4. Parcel number: Various (resource runs 225 miles)
5. Present Owner: Southern Calif. Edison Co. Address: 2244 Walnut Grove Av

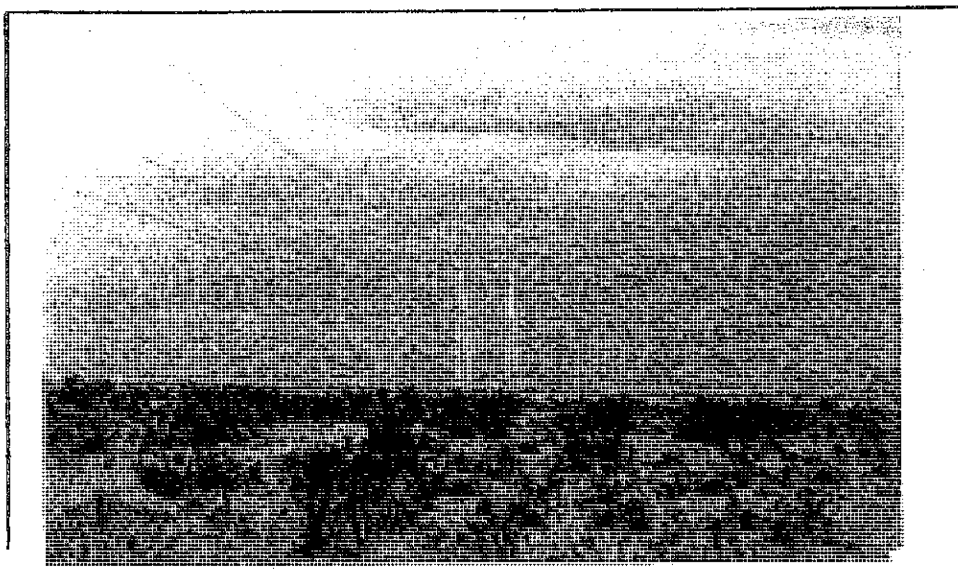
   City Rosemead, CA Zip 91770 Ownership is: Public ___ Private X
6. Present Use: E-W transmission line Original use: W-E transmission line

DESCRIPTION

7a. Architectural style: Single circuit with latice-steel H-frame towers

7b. Briefly describe the present *physical description* of the site or structure and describe any major alterations from its original condition:

This resource consists of a three cable transmission line supported by a series of twin-tower H-frame supports. The condition is very good. Original character of the resource is inticated by signs bearing the name of the company that originally built it (Southern Sierras Power Company).



8. Construction date: Estimated ___ Factual 1930-3
9. Architect Unknown
10. Builder Southern Sierras Power Co.
11. Approx. property size (in feet) Frontage 225 mi Depth 20' or approx. acreage ___
12. Date(s) of enclosed photograph(s) 25 Sept. 1989

DPR 523 (Rev. 4/79)

P36-010315 SBR-10,315H

13. Condition: Excellent ___ Good X___ Fair ___ Deteriorated ___ No longer in existence ___

14. Alterations: Some SCE signs put up, bullet holes in signs

15. Surroundings: (Check more than one if necessary) Open land X Scattered buildings ___ Densely built-up ___
Residential ___ Industrial ___ Commercial ___ Other: ___

16. Threats to site: None known ___ Private development ___ Zoning ___ Vandalism X
Public Works project ___ Other: ___

17. Is the structure: On its original site? X Moved? ___ Unknown? ___

18. Related features: Dirt road parallels resource

SIGNIFICANCE

19. Briefly state historical and/or architectural importance (include dates, events, and persons associated with the site.)

This line was built to provide all energy needed for the massive Hoover Dam project, including domestic service to Boulder City. The $50,000,000 Hoover Dam project was the largest labor contract approved by the U.S. Government up to that time and represented almost 1/12th of the Federal budget for the year 1931. The line was built at a record-setting pace of 225 miles in 225 days over some of the most relentless desert terrain in the world.

Upon completion of the dam project the line was reversed to provide power from the dam to San Bernardino. This remains its present use.

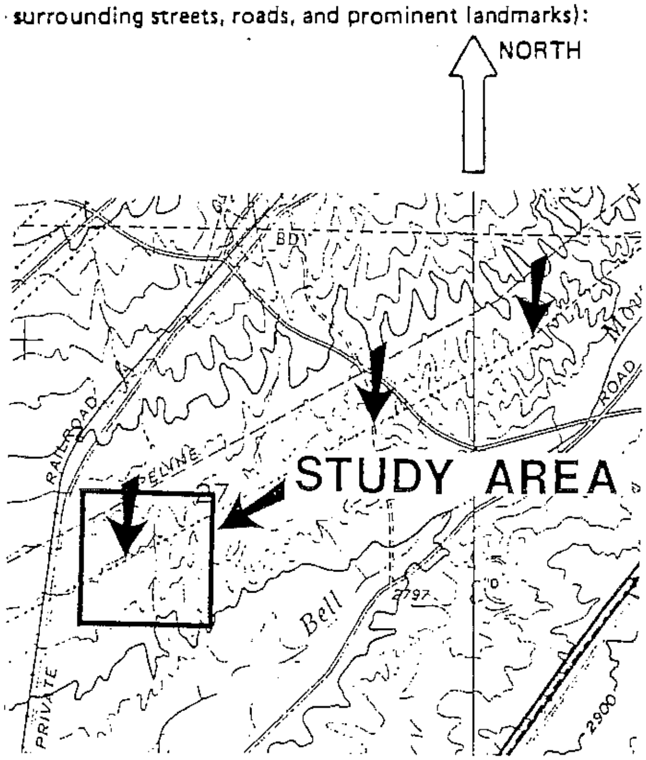
20. Main theme of the historic resource: (If more than one is checked, number in order of importance.)
Architecture ___ Arts & Leisure ___
Economic/Industrial X Exploration/Settlement ___
Government ___ Military ___
Religion ___ Social/Education ___

21. Sources (List books, documents, surveys, personal interviews and their dates).

Myers, William A.
1983 Iron Men and Copper Wires. Trans-Anglo Books, Glendale, California.

22. Date form prepared 02 Oct. 1989
By (name) J. Brock
Organization Archaeo. Advis. Grp.
Address: 1539 Monrovia Ave., Suite 11
City Newport Beach, CA Zip 92663
Phone: (714) 548-6622

Locational sketch map (draw and label site and surrounding streets, roads, and prominent landmarks):



Portion of line shown is on USGS 7.5' Victorville Quad. (1956, pr 1971) Section 27 of T6N, R4W (SBM)

P36-010315
SBR-10315H

ISOLATE RECORD

Page: 1

Information Center Number: ~~P1324-1-H~~
Temporary Number: IF-88-25
Agency Designation: AT&T 6

1. **County:** San Bernardino

2. **USGS Quad:** Barstow SE 1971 7.5'   **Photorevised:**

3. **UTM Coordinates:** Zone 11 / 494200 Easting / 3845360 Northing

4. **Township** 8N   **Range** 2W / SW¼ of NW¼ of SW¼ of Section 26 / ~~MD~~SB

5. **Map Coordinates:** 568mmS / 238mmN   6. **Elevation:** 2985'

7. **Location:** From junction of Stoddard Wells Road and State Route 247, take Stoddard Wells Road west-southwest for approximately 5.25 miles, where the transmission line crosses roadway.

8. **Artifact/Feature Description:** A Historic transmission line -- Victor Black Mt Gale Pole 435, two towers with cross bar, three line.

9. **Nearest Water:** seasonal drainage west 30 meters

10. **Vegetation Community:** creosote bush

11. **Landform:** alluvial fan/terrace   12. **Geology:** quaternary alluvium

13. **Exposure:** open   14. **Slope:** 0-1 degrees

15. **Landowner(s)/Address:** Bureau of Land Management, Barstow Resource Area, 150 Coolwater Lane, Barstow, CA 92311.

16. **Remarks:** None

17. **References:** none

18. **Name of Project:** Class III Cultural Resource Inventory of the Las Vegas, Nevada to San Bernardino, California Fiberoptic Cable System.

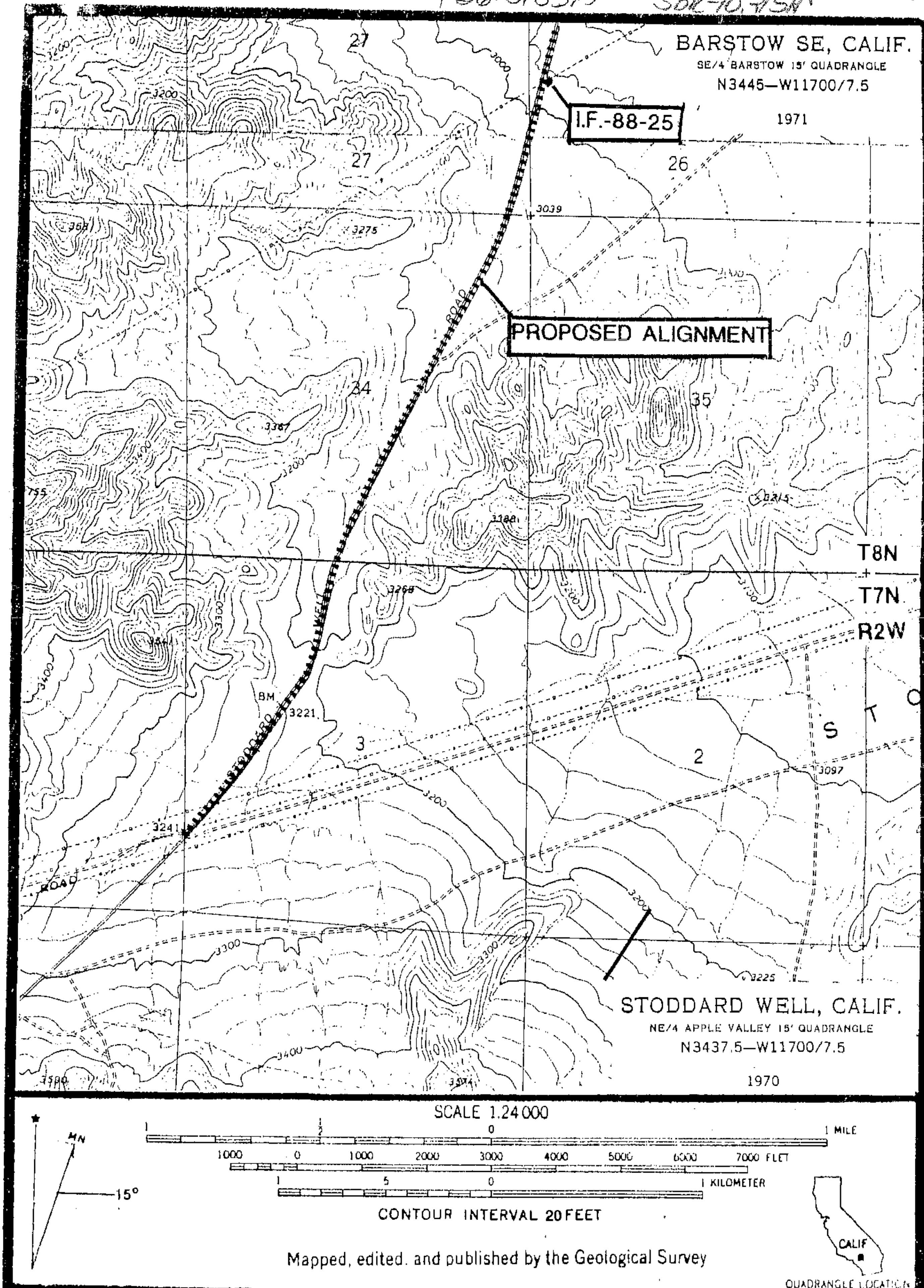
19. **Photos:** color print   20. **Photo Accession Number:** K-24:5-6

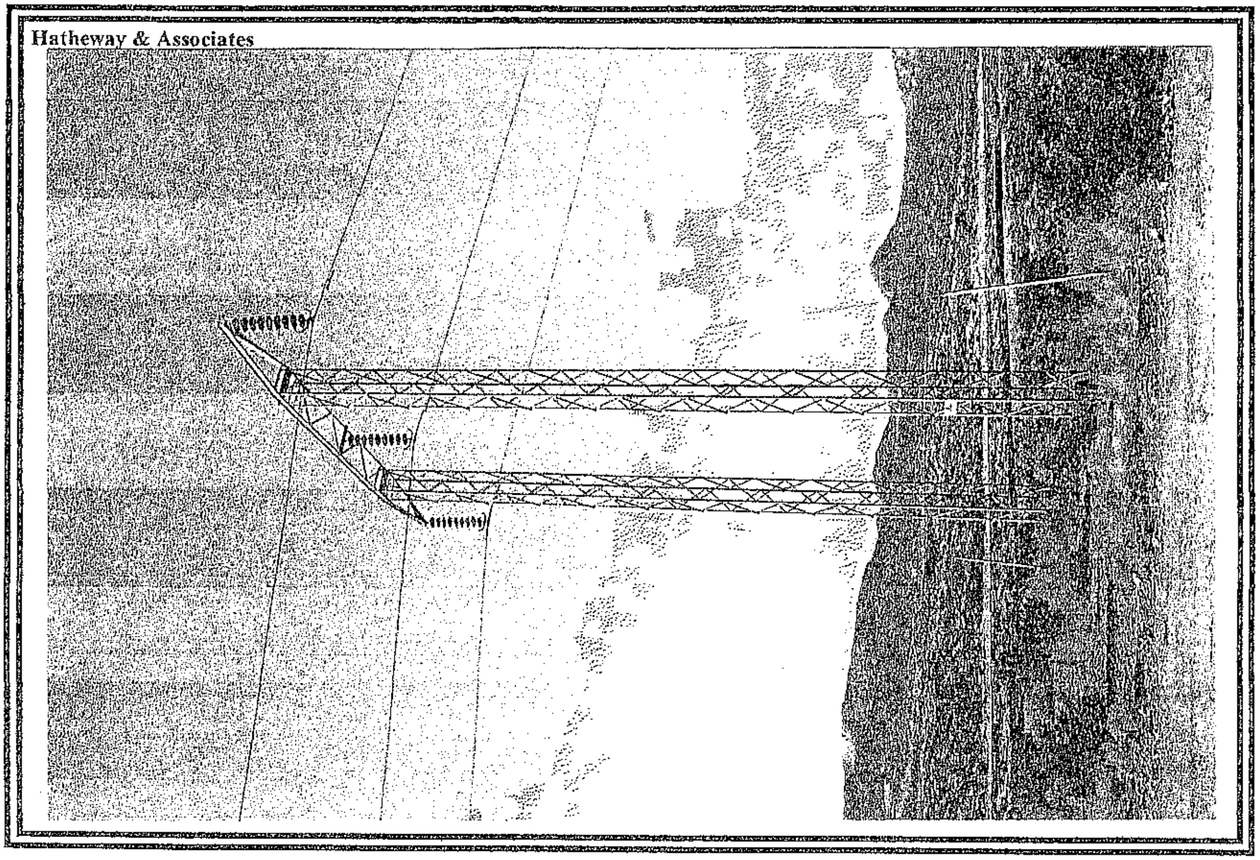
21. **Date Recorded:** 6-23-88   22. **Recorded By:** N. Neuenschwander/J. Miller

23. **Affiliation/Address:** Peak & Associates, Inc., 8167-A Belvedere, Sacto., CA 95826

24. **Curated At:** N/A

P36-010315 SBR-10,915N P ~~SBR-3241~~

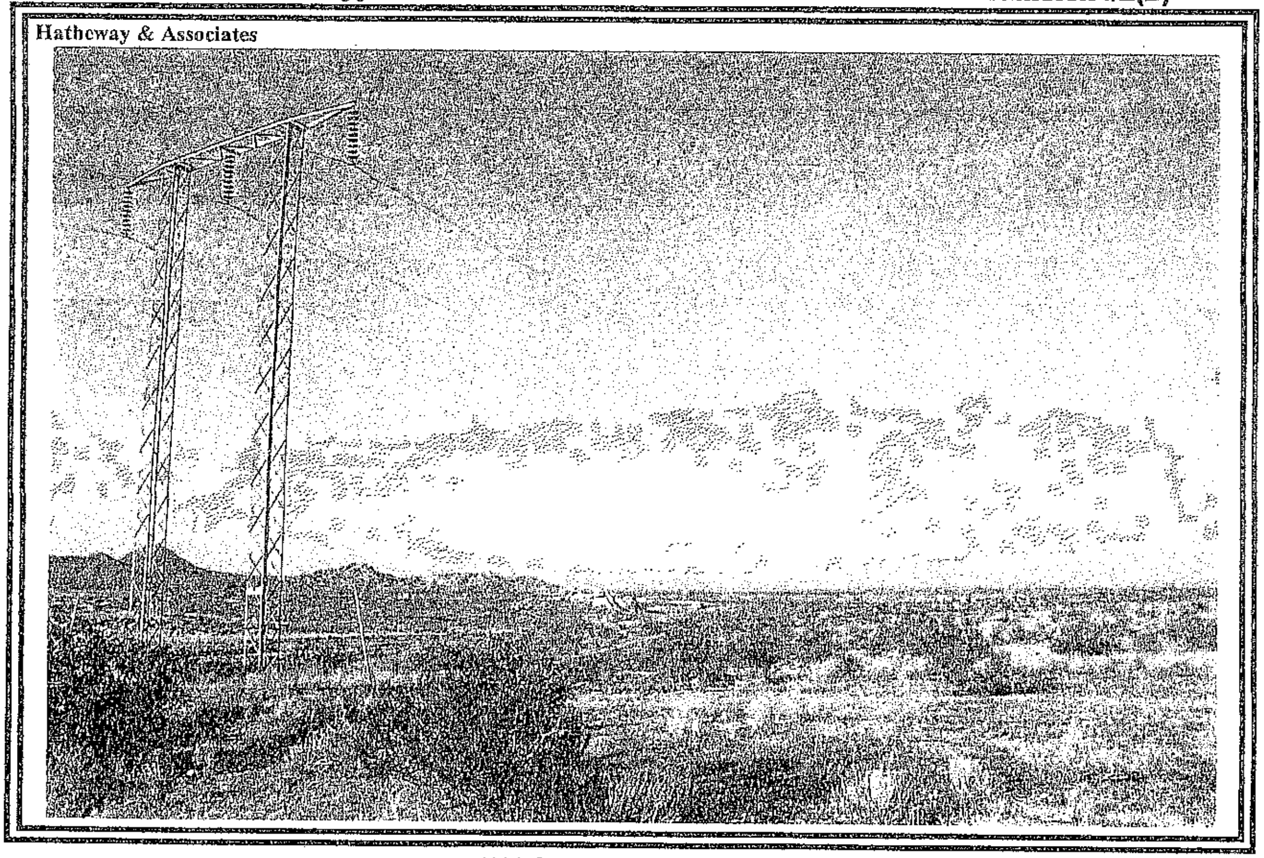




PHOTOGRAPH #1

EDISON CO. BOULDER DAM-SAN BERNARDINO ELECTRICAL TRANSMISSION LINE

IDENTIFICATION: Typical Edison Electrical Transmission Tower – Krumsick #2(B)



PHOTOGRAPH #2

EDISON CO. BOULDER DAM-SAN BERNARDINO ELECTRICAL TRANSMISSION LINE

IDENTIFICATION: Edison Alignment Looking Southeast Across Krumsick #2(B) Survey Area

update 12/13

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 36-010316
HRI#
Trinomial CA-SBR-10316H

Page 1 **of** 4 ***Resource Name or #** (Assigned by recorder) ***Required information**

***Recorded by:** ***Date:** 11/27/13 ☐ Continuation ■ Update

Fatima V. Clark
Southern California Edison
1218 South Fifth Ave.
Monrovia, CA 91016

This resource (CA-SBR-10316H) is part of Southern California Edison (SCE) Company's Kramer-Victor 115kV Transmission Line, previously constructed in 1911 by the Southern Sierra Power Company as the Control-San Bernardino Transmission Line. This resource is also known as the Tower Line and was built for the purpose of bringing power from Bishop to San Bernardino. This update is for a section of the Tower Line which extends for approximately 6.5 miles from SCE's Victor Substation on the north to Aqueduct Substation in the south. SCE's proposed project consists of entirely removing and replacing the H-frame towers, which would affect the transmission line.

The Tower Line is listed within the National Register of Historic Places. An approximately 30-mile-long segment of the Tower Line was previously documented with a Historic American Engineering Record (HAER) that is on file with the National Park Service as part of a Programmatic Agreement in association with SCE's El Dorado-Ivanpah Transmission Project. The HAER documented all tower types from the original line and per the Programmatic Agreement was deemed by the SHPO to be adequate mitigation for any "adverse effects" under the National Historic Preservation Act, provided that a site record update were filed to document any future incremental destruction of remaining original line sections.

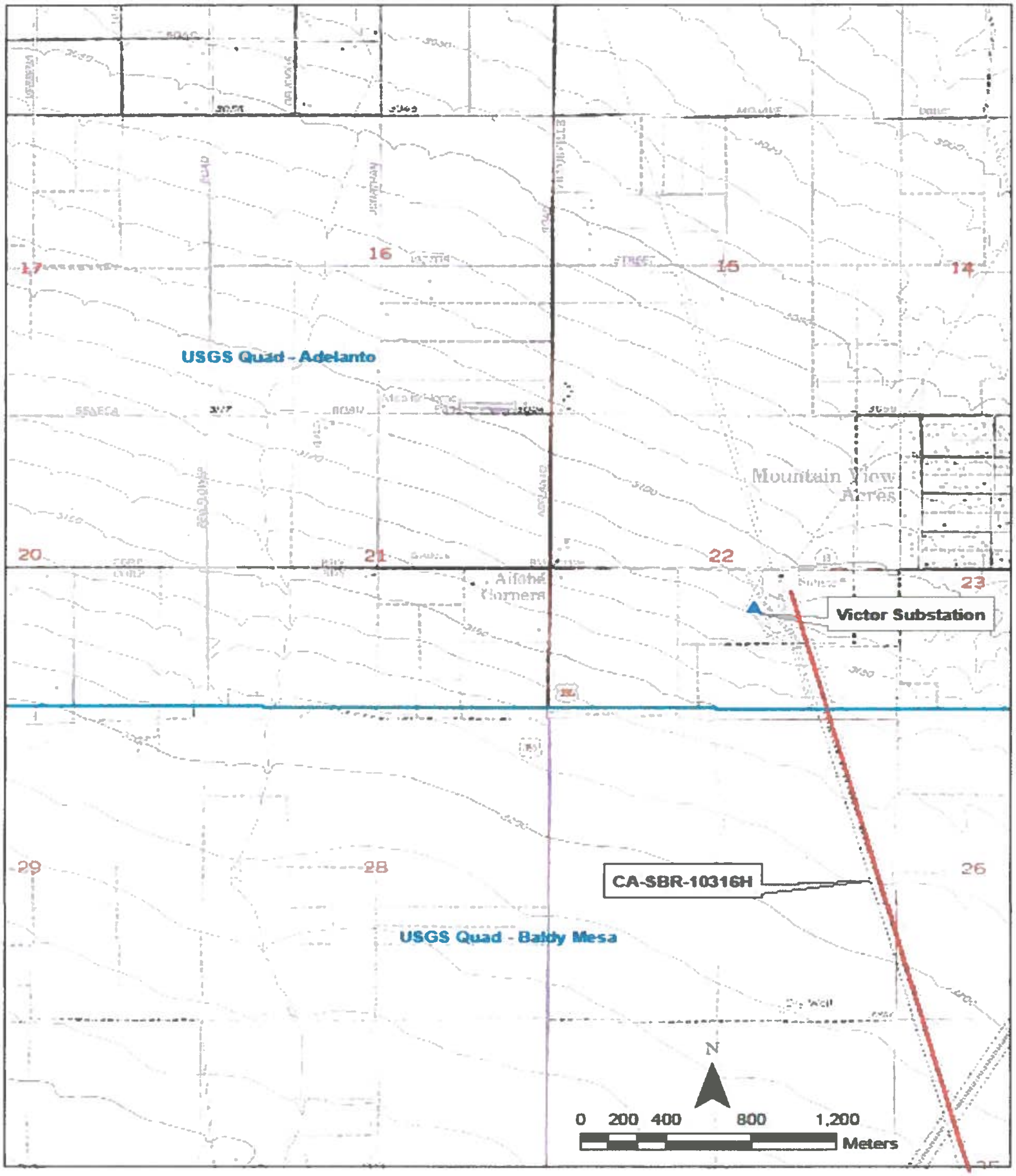
Resource Identified: "Tower Line" Transmission Lines.
Date of Field Survey: 11/25/2013
References: Clark, Fatima and Dave Hanna (2013) SCE's G.O 131D Evaluation for the *Mesa-Narrows 66kV Reconductor Project*
Anderson, Katherine (2009) Site Record for CA-SBR-10316H, on file at the San Bernardino Archaeological Information Center.
USGS Quads: Adelanto, Baldy Mesa & Hesperia.

Photograph 1: Tower Line on the far left and next to other transmission lines.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	Primary # HRI# Trinomial

Page 2 of 4 *Resource Name or #: CA-SBR-10316H

*Map Name: Adelanto & Baldy Mesa *Scale: 1:24,00

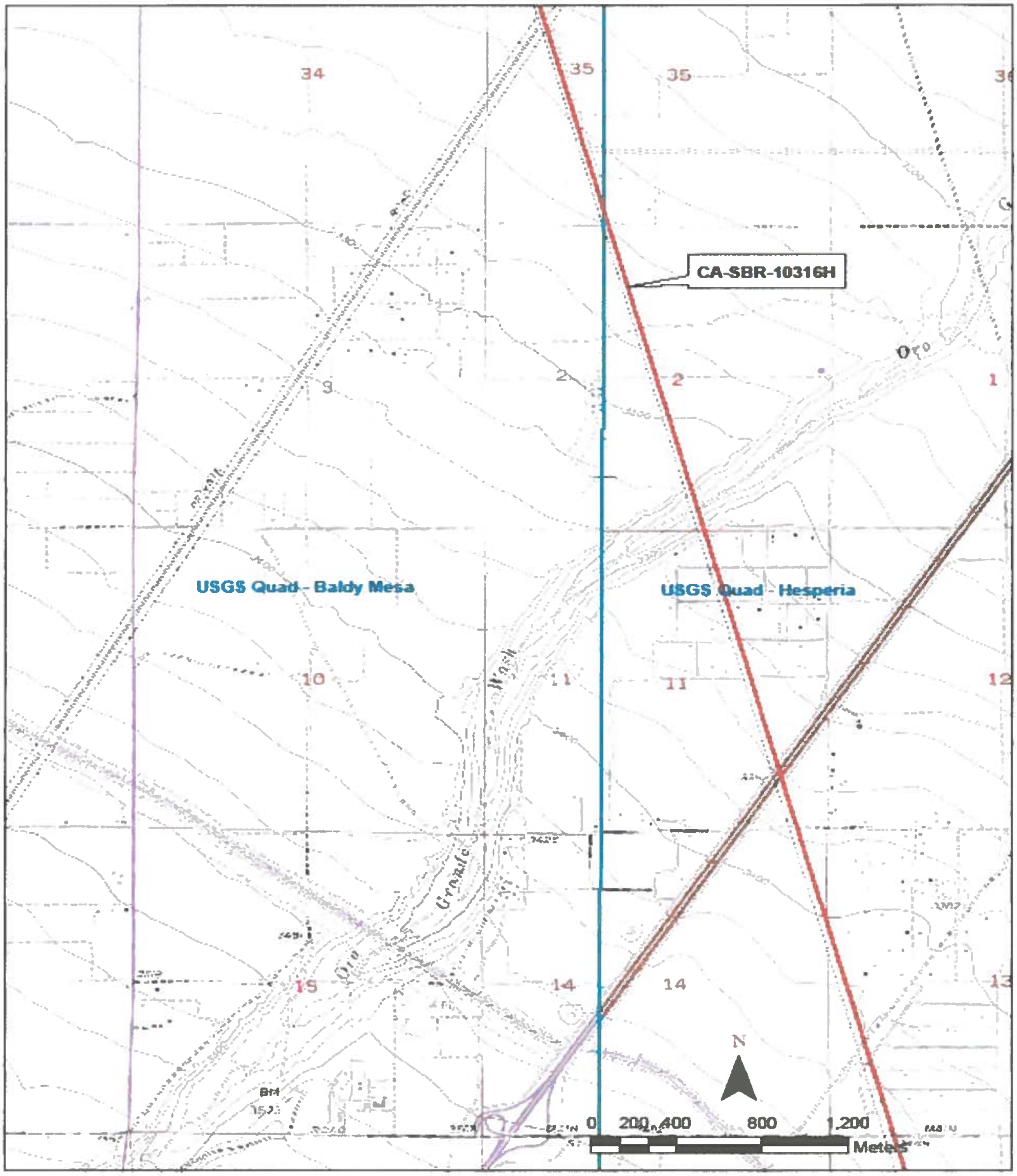


State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

 ***Resource Name or #:** CA-SBR-10316H

***Map Name:** Baldy Mesa & Hesperia ***Scale:** 1:24,000

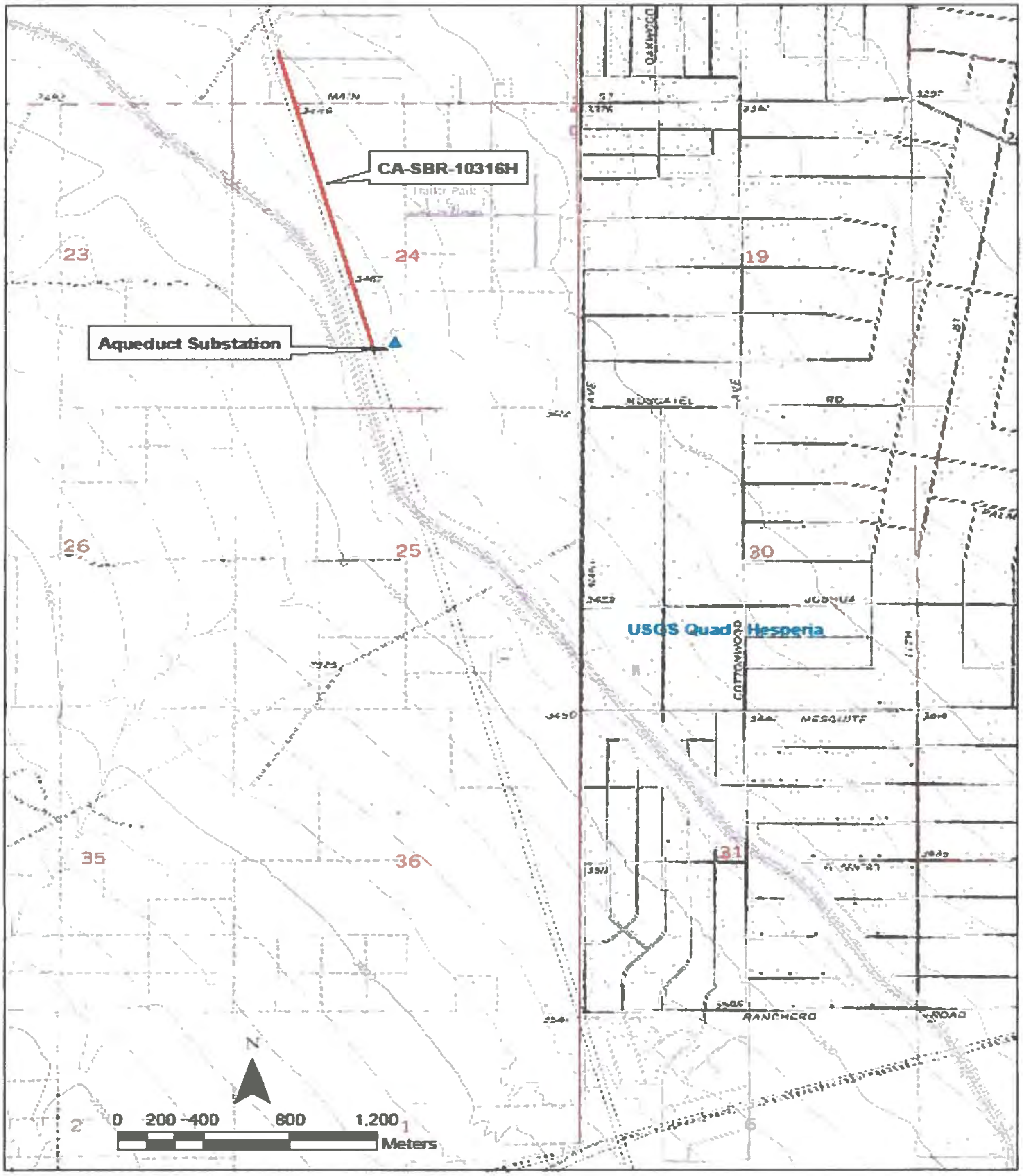


State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

 *Resource Name or #: CA-SBR-10316H

*Map Name: Hesperia *Scale: 1:24,000



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-010316 (UPDATE)
HRI #
Trinomial CA-SBR-10316H (UPDATE)
NRHP Status Code

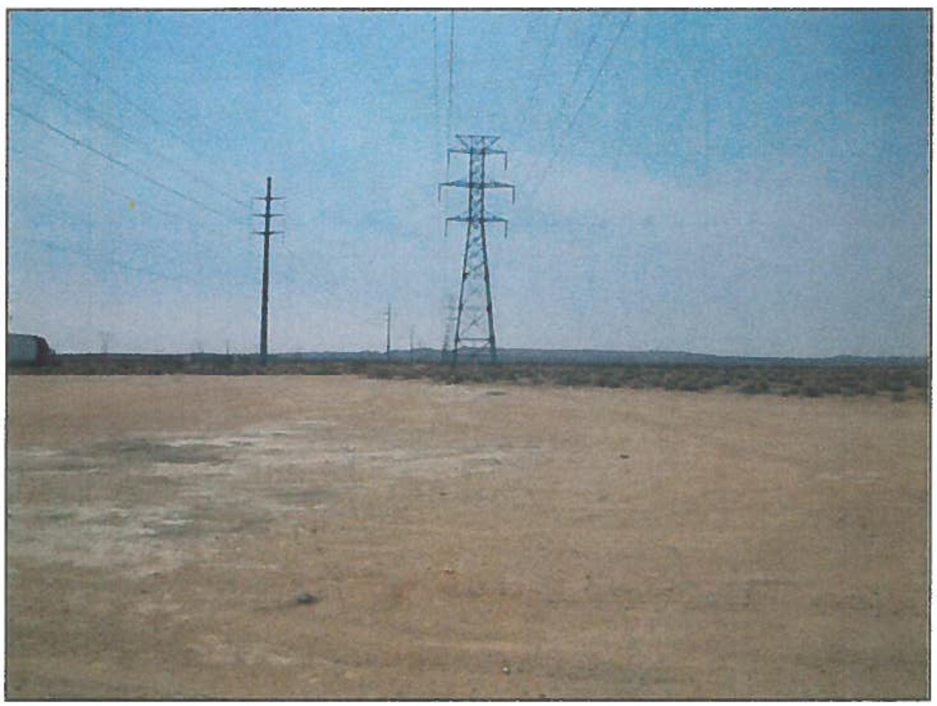
Other Listings
Review Code Reviewer Date

*Resource Name or #: "Tower Line" (UPDATE)

P1. Other Identifier: Kramer-Victorville Transmission Line
*** P2. Location:** ☑ Not for Publication ☐ Unrestricted ***a. County:** San Bernardino
*** USGS Quad(s):** Kramer Junction (1973), Saddleback Mtn (1973)
Sec. 32, T11N R6W SBB&M
Sec. 31, T11N R6W SBB&M
Sec. 5, T10N R6W SBB&M
Sec. 6, T10N R6W SBB&M
c. Address:
d. UTM (NAD 83): Zone 11 ; 450362 mE 3871803 mN (End)
Zone 11 ; 450283 mE 3873406 mN (Begin)
e. Other Locational Data:
This linear resource travels north and south of the PG&E Line 300 A and B pipelines near Kramer Junction.

*** P3a. Description:**
This update describes a previously undocumented segment of the "Tower Line" or Kramer-Victorville Transmission line encountered within the right-of-way of PG&E gas lines 300 A and B. The recorded segment extends one-quarter mile north of Line 300 B and one-quarter mile south of Line 300 A. The transmission line appears to have been completely upgraded at this location, as the line is still in use.

*** P3b. Resource Attributes:** AH16(Other historic)
*** P4. Resources Present:** ☐ Building ☑ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (isolates, etc.)



***P5b. Description of Photo:**
Overview of transmission line, view to the south.

***P6. Date Constructed/Age & Sources:**
☑ Historic ☐ Prehistoric ☐ Both
Originally constructed ca. 1913, but has been replaced and upgraded over the decades.

***P7. Owner and Address:**
Bureau of Land Management, Private

***P8. Recorded by:**
C. Higgins, T. Lucas, R. Kellawan, and L. Daub, Far Western, 2727 Del Rio Place Suite A, Davis CA 95618

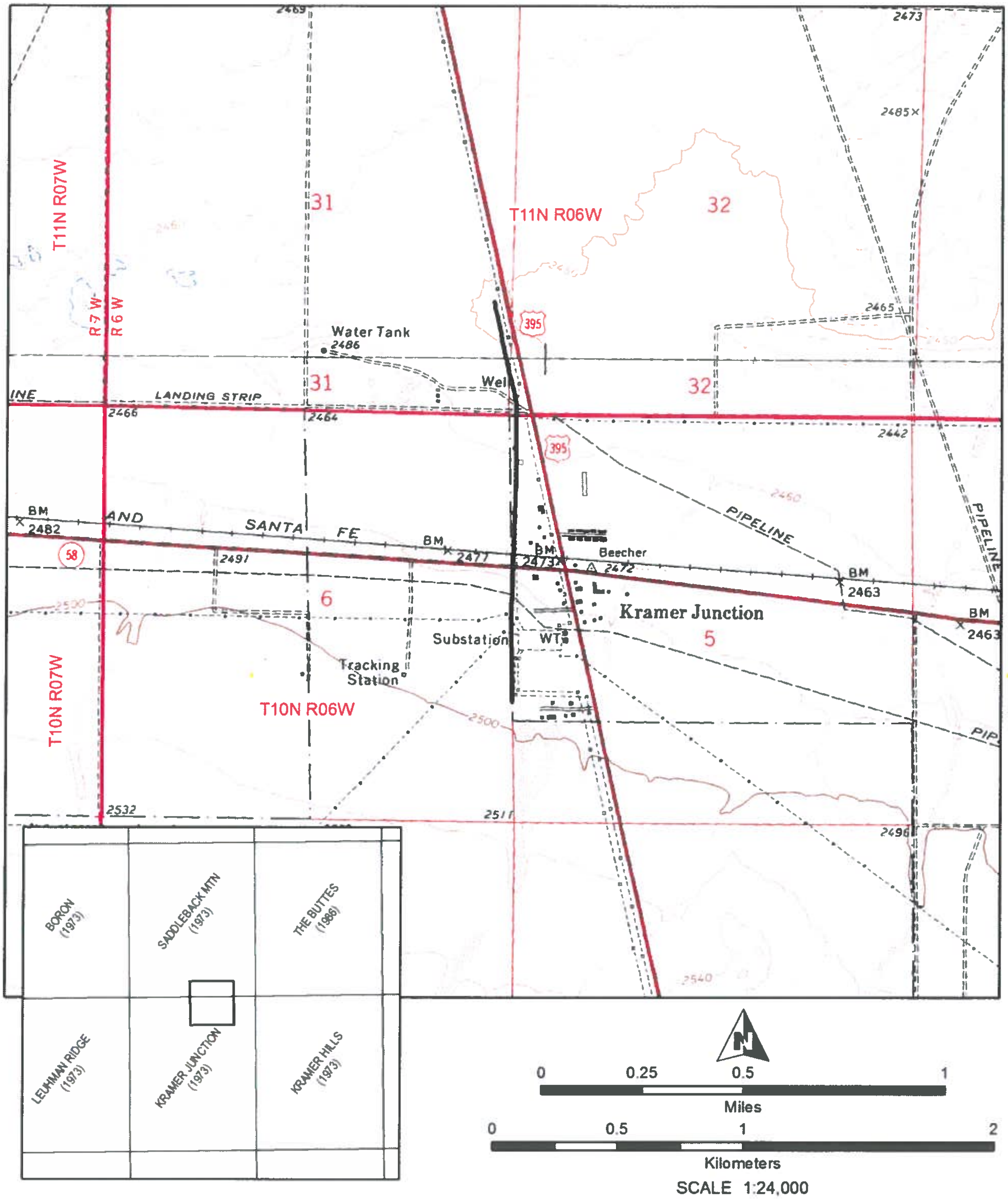
***P9. Date Recorded:** 5/4/2013
***P10. Survey Type:**
Intensive

*** P11. Citation:** Higgins, Courtney, Rebecca Kellawan, Daron Duke and Thomas Lucas (2013) Cultural Resource Inventory of Approximately 5,300 Acres for PG&E Pipelines 300 A and B, San Bernardino and Kern Counties, California. And Kern Counties, California

*** Attachments:** ☐ None ☑ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other:

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	**Primary #** P-36-010316 (UPDATE) **HRI #** **Trinomial** CA-SBR-10316H (UPDATE)

***Resource Name or #:** "Tower Line" (UPDATE)



*Required Information

update

State of California — The Resources Agency **DEPARTMENT OF PARKS AND RECREATION** **CONTINUATION SHEET**	**Primary #** 36-010316 **HRI#** **Trinomial**

Page 1 **of** 1 ***Resource Name or #** 36-010316
***Recorded by:** Linda Honey ***Date:** 3-3-2013 ☐ Continuation ☒ Update

This resource is the "Tower Line" transmission line that was constructed in 1911 by the South Sierra Power Company to bring electricity from Bishop to San Bernardino. The transmission line is NRHP Eligible. The resource was originally recorded by K. Anderson in 2009. One existing transmission line was centered on the survey corridor along the eastern portion of the project area. In San Bernardino County, this resource has been recorded as an existing power transmission line listed as NRHP Eligible. SBR-10316H runs north-south along the Kramer Junction, Saddleback Mountain, Boron NE, Red Mountain, and Johannesburg Quadrangles. Field inspection determined that within the original towers have been replaces by steel lattice towers with concrete footings, therefore this resource lacks integrity. The power transmission line overlaps a portion of the proposed project area.

Updated by: Linda Honey for Great Basin Sage Inc.

Update for: *"Phase I Cultural Resources Assessment for the_Fremont Valley Preservation Project Transmission Line and Pipeline, Kern County and San Bernardino County, California,"* April 2013

Update

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-010316
HRI #
Trinomial CA-SBR-10316 H
NRHP Status Code

Other Listings
Review Code Reviewer Date

*Resource Name or #: SRI-3459

P1. Other Identifier: SRI-3459

***P2. Location:** ☑ Not for Publication ☐ Unrestricted ***a. County:** San Bernardino

***b. USGS Quad:** 7.5' SILVERWOOD LAKE (2009); T 2N R 4W, SE¼ of NE¼ of Sec. 7; SBBM

c. Address:

d. UTM: Zone 11; 469539 mE/ 3792616 mN NAD27 GPS

e. Other Locational Data:
The powerline crosses Highway 138 near postmile 28.3.

***P3a. Description:**
The site consists of a section of transmission line crossing Highway 138, just south of Silverwood Lake. The current project only examines the first 15 meters from the edge of the highway, corresponding to the Caltrans right-of-way. The site continues beyond the right-of-way, but these portions were not recorded. The line consists of wooden power poles spaced at approximately 300 foot intervals with five cables strung between each pole. The lines run in two levels, with two cables at the top of the poles, and three cables at the bottom levels. The cables run south from the water intakes at the south side of Silverwood Lake that run south down the San Bernardino Mountains, into Fontana. The site is visible on the 1956 Silverwood Lake 7.5-minute USGS topographic quad.

***P3b. Resource Attributes:** HP39 Other (Public utility)

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☑ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing: none

***P5b. Description of Photo:**
No photo

***P6. Date Constructed/Age & Sources:**
☑ Historic ☐ Prehistoric ☐ Both

***P7. Owner and Address:**
SAN BERNARDINO NATIONAL FOREST, 602 S. TIPPECANOE AVE.
SAN BERNARDINO, CA

***P8. Recorded by:**
S. Kremkau, Statistical Research

***P9. Date Recorded:** 4/29/2011

***P10. Survey Type:**
Reconnaissance survey of highway right-of-way

***P11. Citation:** Report forthcoming

***Attachments:** ☐ None ☑ Location Map ☑ Sketch Map ☑ Continuation Sheet ☐ Building, Structure, and Object Record ☑ Archaeological Record ☐ District Record ☑ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other:

***A1. Dimensions: a. Length** 53 m (N/S) **x b. Width** 13 m (E/W)
Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☑ GPS ☐ Other:
Method of Determination: ☐ Artifacts ☑ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☐ Other: None
Reliability of determination: ☑ High ☐ Medium ☐ Low
Explain: The site is clearly visible.
Limitations: ☑ Restricted access ☐ Paved/built over ☑ Site limits incompletely defined ☐ Disturbances ☐ Vegetation ☐ Other:

A2. Depth: None ☑ None ☐ Unknown **Method of determination:** None

***A3. Human Remains:** ☐ Present ☑ Absent ☐ Possible ☐ Unknown

***A4. Features:**
Feature 11266 is a section of transmission line crossing Highway 138, just south of Silverwood Lake. The line consists of wooden power poles spaced at approximately 300 foot intervals with five cables strung between each pole. The lines run in two levels, with two cables at the top of the poles, and three cables at the bottom levels. The cables run south from the water intakes at the south side of Silverwood Lake that run south down the San Bernardino Mountains, into Fontana. Feature 11268 is a wooden powerpole located on the south side of Highway 138, approximately 10 m from the edge of the highway.

***A5. Cultural Constituents:**
None.

***A6. Were Specimens Collected?** ☑ No ☐ Yes

***A7. Site Condition** ☑ Good ☐ Fair ☐ Poor
The portion of the site within the right-of-way is in good condition.

***A8. Nearest Water:** Silverwood Lake is located 350 m north of Highway 138.

***A9. Elevation:** 1109 m amsl

A10. Environmental Setting:
The portion of the site recorded here is located just south of Silverwood lake. Soil around the site is a loosely compacted, poorly sorted, sandy gravel. Vegetation consists of mixed pine forest, oak woodland, and various grasses. The site crosses Highway 138 on a hillside that slopes steeply downward to the north.

A11. Historical Information:
The site is visible on the 1956 Silverwood Lake 7.5-minute USGS topographic quad.

***A12. Age:** ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ☐ 1914-1945 ☑ Post-1945 ☐ Undetermined

A13. Interpretations:
None

A14. Remarks:
None

A15. References:
None

A16. Photographs: See photograph record
Original Media/Negatives Kept At: 21 W. Stuart Ave, Redlands, CA 92373

***A17. Form Prepared By:** S. Kremkau **Date:** 4/29/2011
Affiliation and Address: Statistical Research, Inc., 21 W. Stuart Ave, Redlands, CA 92373

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # ______
HRI # ______
Trinomial ______

 ***Resource Name or #:** SRI-3459

L1. Historic and/or Common Name: None

L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** Feature 11266

L2b. Location of Point or Segment:
Zone 11; 469531 mE/ 3792636 mN NAD27 GPS
Zone 11; 469544 mE/ 3792595 mN NAD27 GPS

L3. Description:
Feature 11266 is a section of transmission line crossing Highway 138, just south of Silverwood Lake. The line consists of wooden power poles spaced at approximately 300 foot intervals with five cables strung between each pole. The lines run in two levels, with two cables at the top of the poles, and three cables at the bottom levels. The cables run south from the water intakes at the south side of Silverwood Lake that run south down the San Bernardino Mountains, into Fontana. Feature 11268 is a wooden powerpole located on the south side of Highway 138, approximately 10 m from the edge of the highway.

L4. Dimensions:
a. Top Width: None
b. Bottom Width: N/A
c. Height or Depth: None
d. Length of Segment: None

L4e. Sketch of Cross-Section: **Facing:**

L5. Associated Resources:
None

L6. Setting:
The portion of the site recorded here is located just south of Silverwood lake. Soil around the site is a loosely compacted, poorly sorted, sandy gravel. Vegetation consists of mixed pine forest, oak woodland, and various grasses. The site crosses Highway 138 on a hillside that slopes steeply downward to the north.

L7. Integrity Considerations:
The portion of the site within the right-of-way is in good condition.

L8b. Description of Photo, Map, or Drawing
See sketch map

L9. Remarks:
None

L10. Form Prepared By:
S. Kremkau

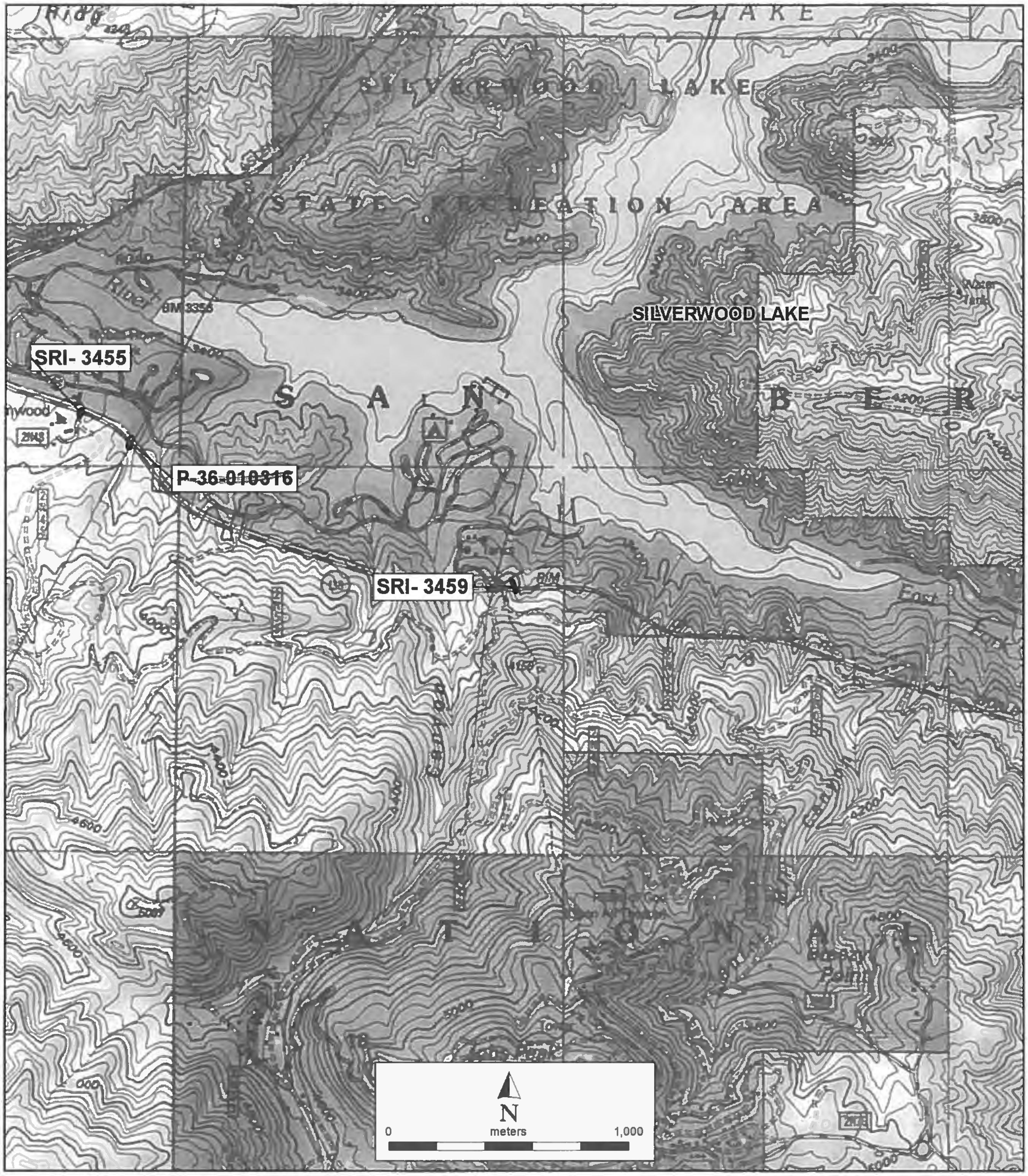
L11. Date: 4/29/2011

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI #
Trinomial

***Resource Name or #:** SRI-3459

***Map Name:** 7.5' SILVERWOOD LAKE USGS Topographic Quad Scale: 1:24,000 ***Year:** 2009

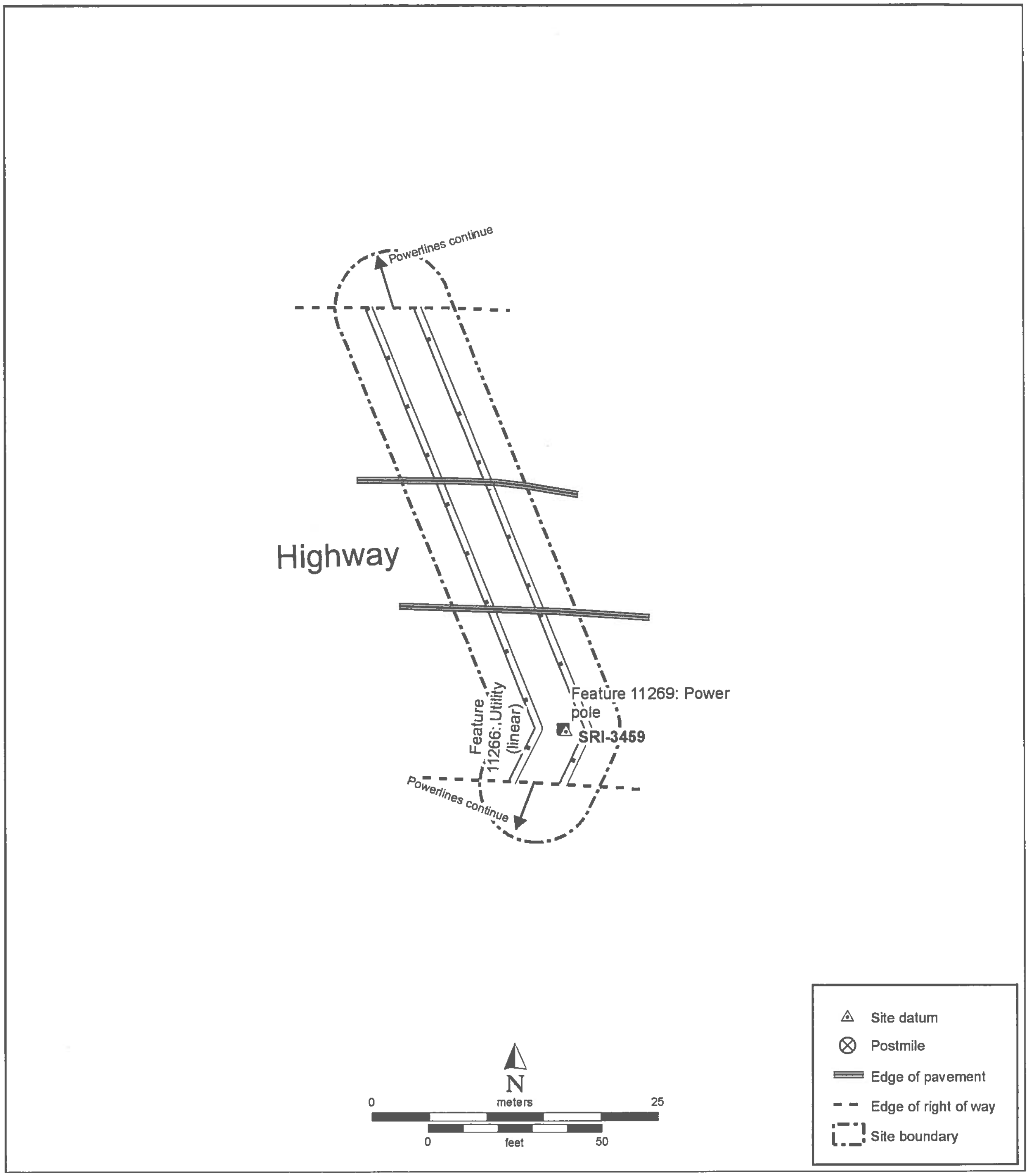


State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # ______
HRI # ______
Trinomial ______

 ***Resource Name or #:** SRI-3459

***Drawn By:** S. Kremkau ***Date:** 04/29/2011



CONTINUATION SHEET

Primary #
HRI #
Trinomial

 ***Resource Name or #:** SRI-3459

***Recorded By:** S. Kremkau ***Date:** 4/29/2011 ☑ Continuation ☐ Update

P2d. UTM
Zone 11; 469544 mE/ 3792595 mN NAD27 GPS

P4. Resources Present
[X] Other (linear)

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #:** P-36-010316 **HRI #** **Trinomial:** CA-SBR-10316H **NRHP Status Code**

Other Listings
Review Code **Reviewer** **Date**

 ***Resource Name or #:** CA-SBR-10316 (update)

P1. Other Identifier: Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line; Æ-Shapiro-2H; South Sierra Power Company's Transmission Line

***P2. Location:** ☒ **Not for Publication** ☐ **Unrestricted**

***a. County:** San Bernardino

***b. USGS 7.5' Quad:** see continuation sheet **Date:** **T**; **R** ; **¼ of ¼ of Sec;** S. B **B.M.**

c. Address: vicinity **City:** Kramer Junction, Adelanto, Victorville **Zip:** 93516, 92392, 92301

d. UTM: Zone: 11 ; 450542 mE/ 3872012 mN (NW section) (NAD 83)
464511 mE/ 3818191 mN (SE section)

e. Other Locational Data: This portion of the transmission line is approximately 35 miles long and runs northwest-southeast from the Kramer Junction substation to the Victor Substation.

***P3a. Description:** This resources was originally recorded by J. Underwood and S. Rose in 2000 as the Southern California Edision Company's Kramer-Victor 115kV Transmission Line, which was part of the 238-mile long Southern Sierra Power Company's Control-San Bernardino Transmission Line, also known as the Tower Line.

The site was updated in 2005 by B. Sheets and M. Linder, and again in 2008 by Koral Ahmet (SCE), and SWCA Environmental. According to K. Ahmet (2008), the original Tower Line was completed in 1913, bringing electricity from Bishop to San Bernardino along what was then the world's longest power line. Portions of the line have since been rebuilt and upgraded, tower for tower, in many places using the same footprints.

The current survey includes the portion of the transmission line between the Kramer and Victor substations (Victor 115kV Transmission Line). All of the towers along this 34 mile segment were replaced in 1989 by larger steel towers with concrete footings.

In 1995 the 238-mile long Tower Line was determined eligible for the National Register through Section 106 consultation and listed on the California Register. The portion of the Line considered in this evaluation was replaced in 1989 and is regularly maintained, compromising its historic integrity. AECOM therefore contends that this section is not a contributing factor to its overall eligibility and recommends that it is not eligible for the NRHP.

***P3b. Resource Attributes:** HP11 Engineering Structure

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: Cannon 6, 10/2/2010, photo # 330, site overview, view to the south

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
1913, Koral Ahmet, SCE

***P7. Owner and Address:**
Southern California Edision
2244 Walnut Grove Ave.
Rosemead, CA 91770

***P8. Recorded by:** S. Jow
AECOM
1420 Kettner Blvd. Suite 500
San Diego, CA 92101

***P9. Date Recorded:** 09/13/2010

***P10. Survey Type:** Intensive pedestrian

***P11. Report Citation:** Cultural Resources Class III Survey Report for the Proposed Mojave Solar Project and Lockhart Substation Connection & Communication Facilities, San Bernardino County, California. AECOM 2010.

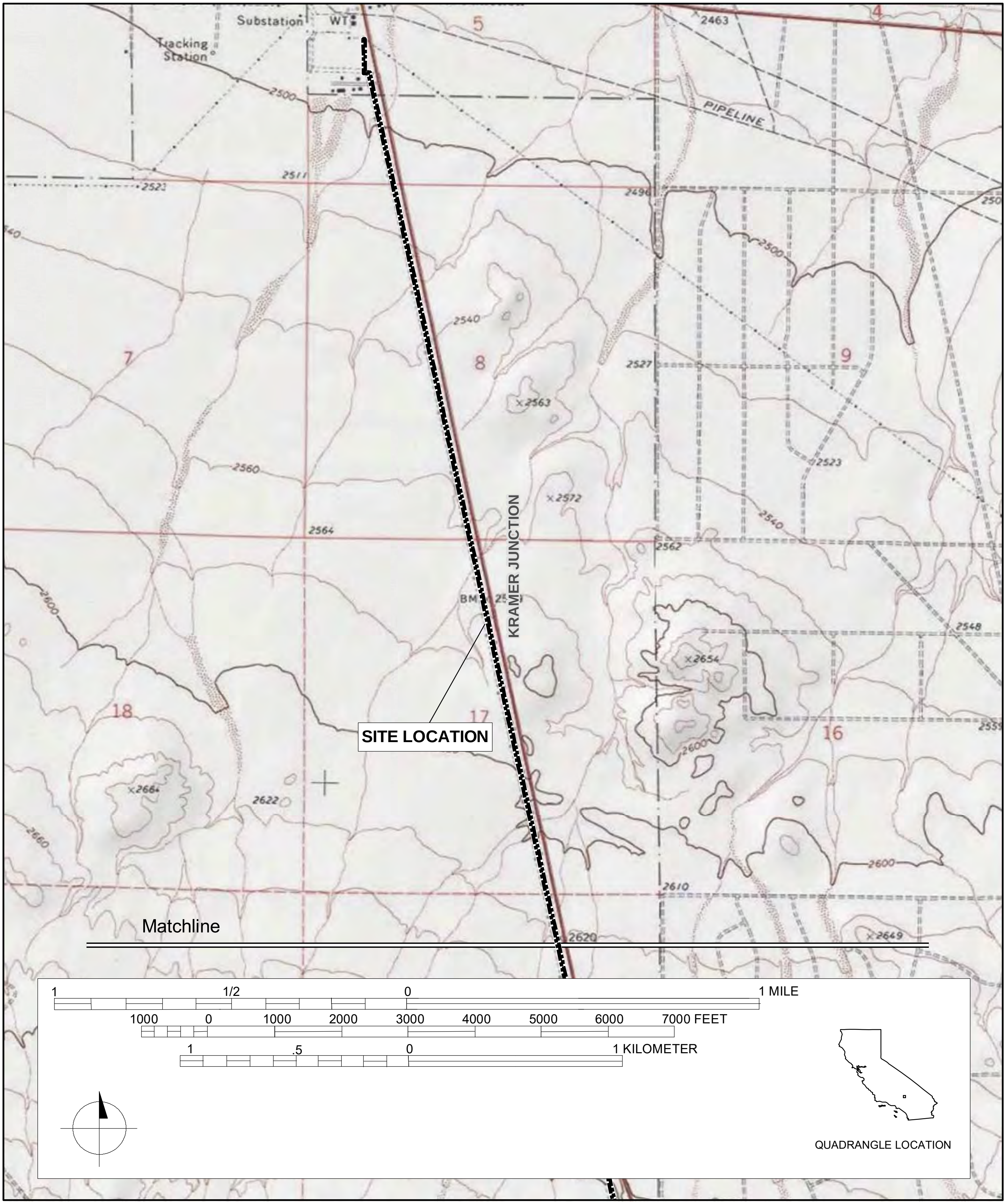
***Attachments:** ☐NONE ☒Location Map ☐Sketch Map ☒Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 2 of 16   * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad KRAMER JUNCTION   * Scale: 1:24,000   * Date of Map: 1973



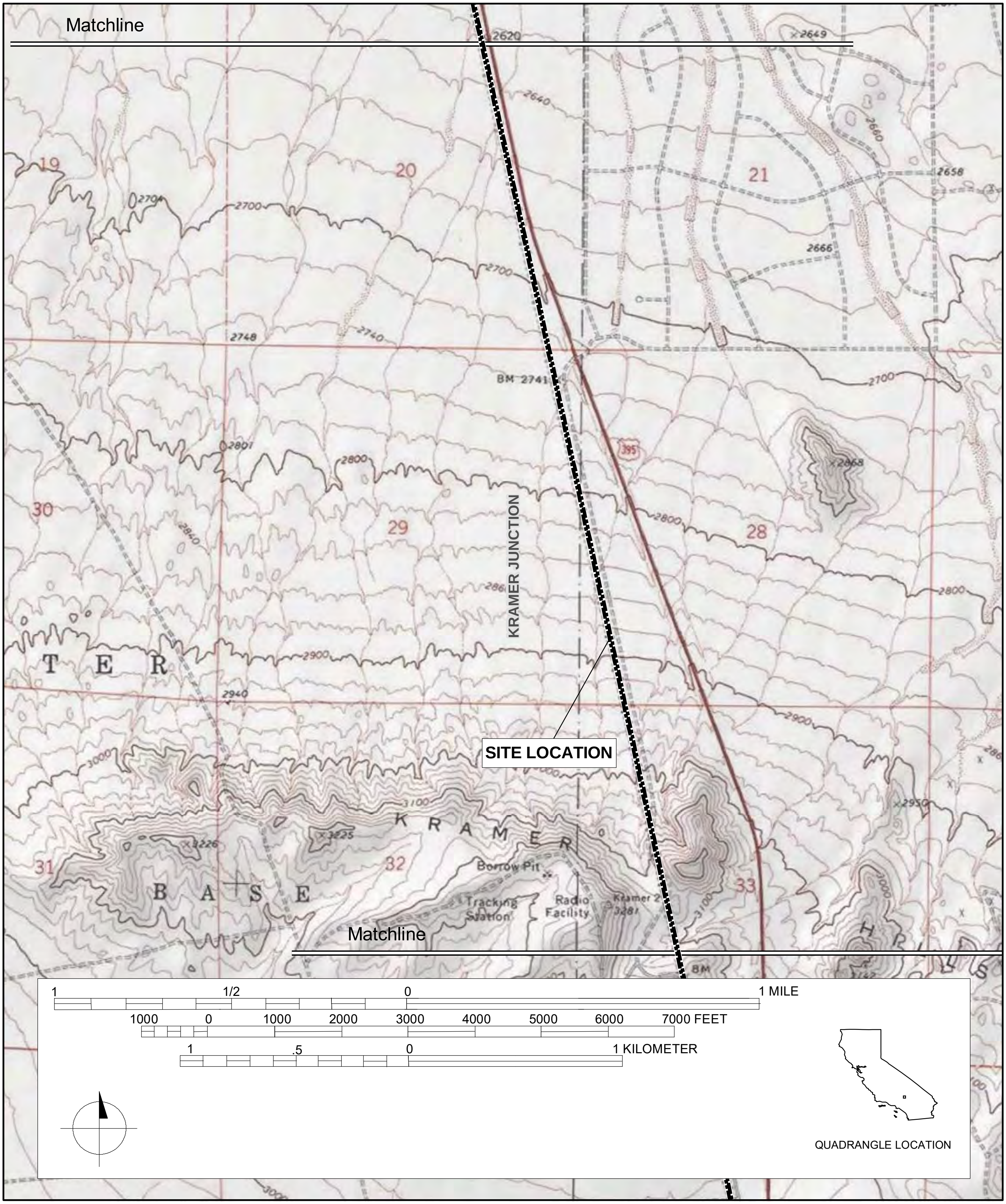
DPR 523J (1/95)   *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 3 of 16 * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad KRAMER JUNCTION * Scale: 1:24,000 * Date of Map: 1973



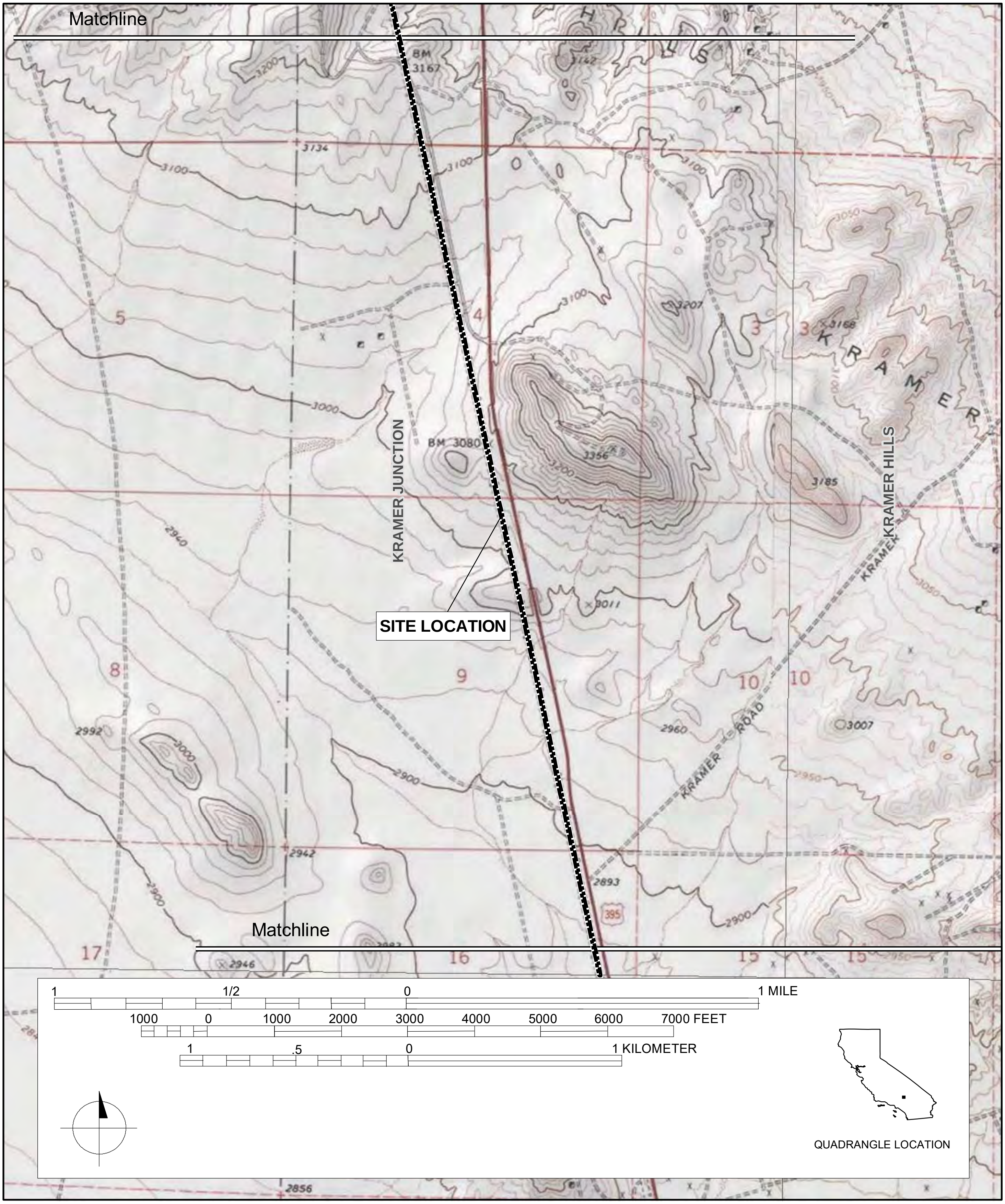
DPR 523J (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 4 of 16 * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad KRAMER JUNCTION * Scale: 1:24,000 * Date of Map: 1973



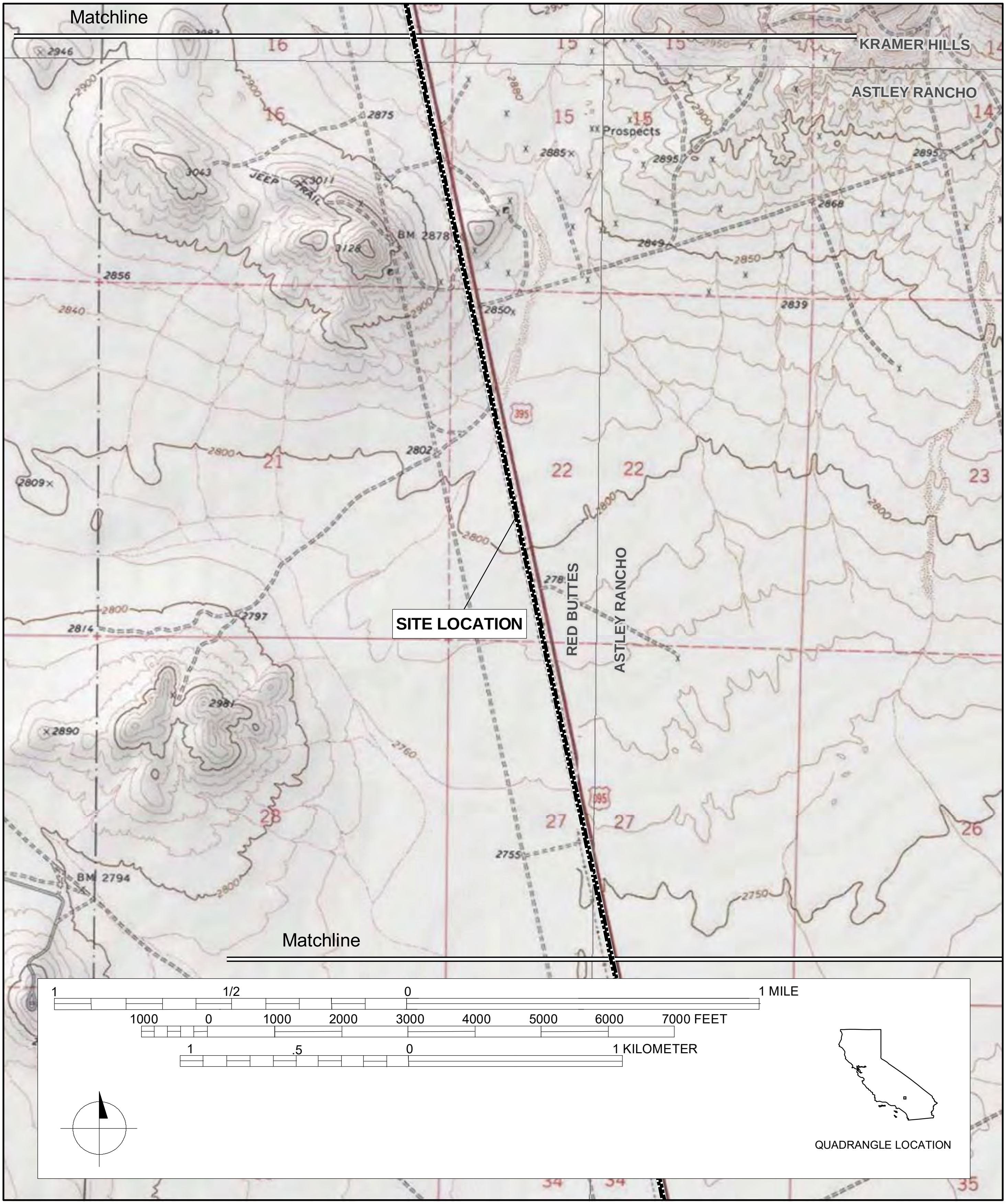
DPR 523J (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 5 of 16 * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad KRAMER JUNCTION, RED BUTTES, ASTLEY RANCHO * Scale: 1:24,000 * Date of Map: 1973



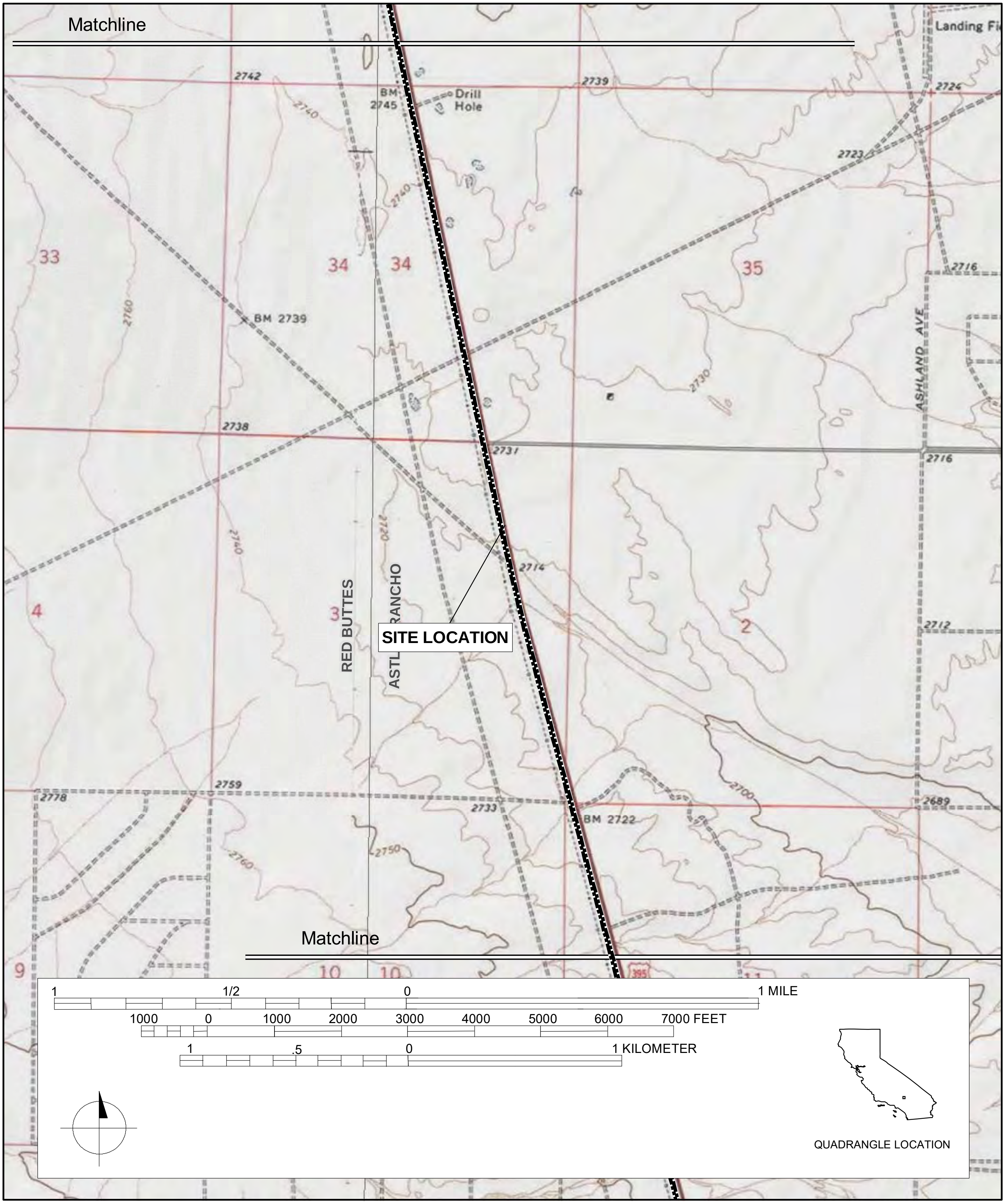
DPR 523J (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

* Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad ASTLEY RANCHO * Scale: 1:24,000 * Date of Map: 1973



DPR 523J (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 7 of 16 * Resource Name or # (Assigned by recorder)

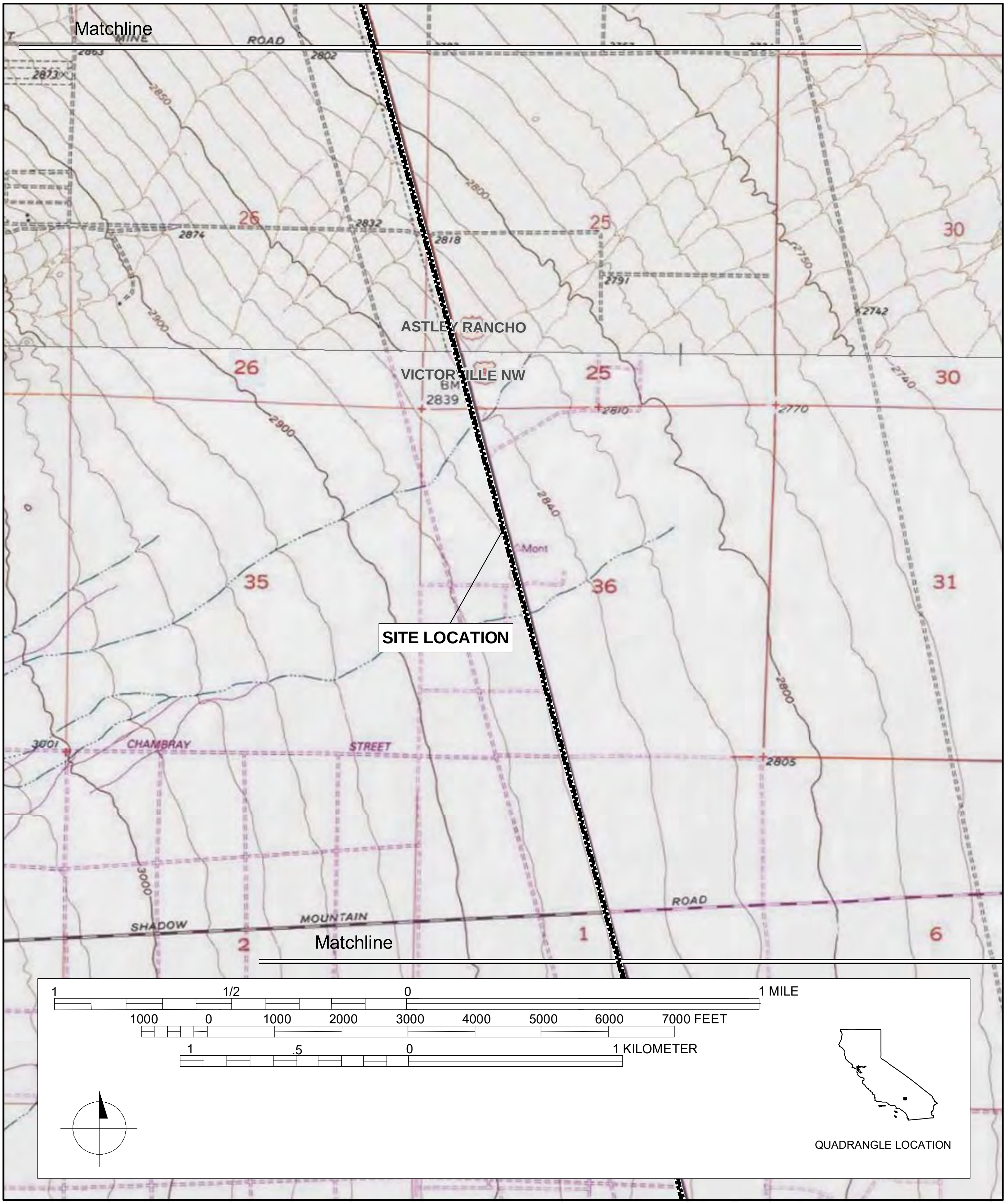
* Map Name: CA 7.5' Quad ASTLEY RANCHO * Scale: 1:24,000 * Date of Map: 1973

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 8 of 16 * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad ASTLEY RANCHO, VICTORVILLE NW * Scale: 1:24,000 * Date of Map: 1973 & 93

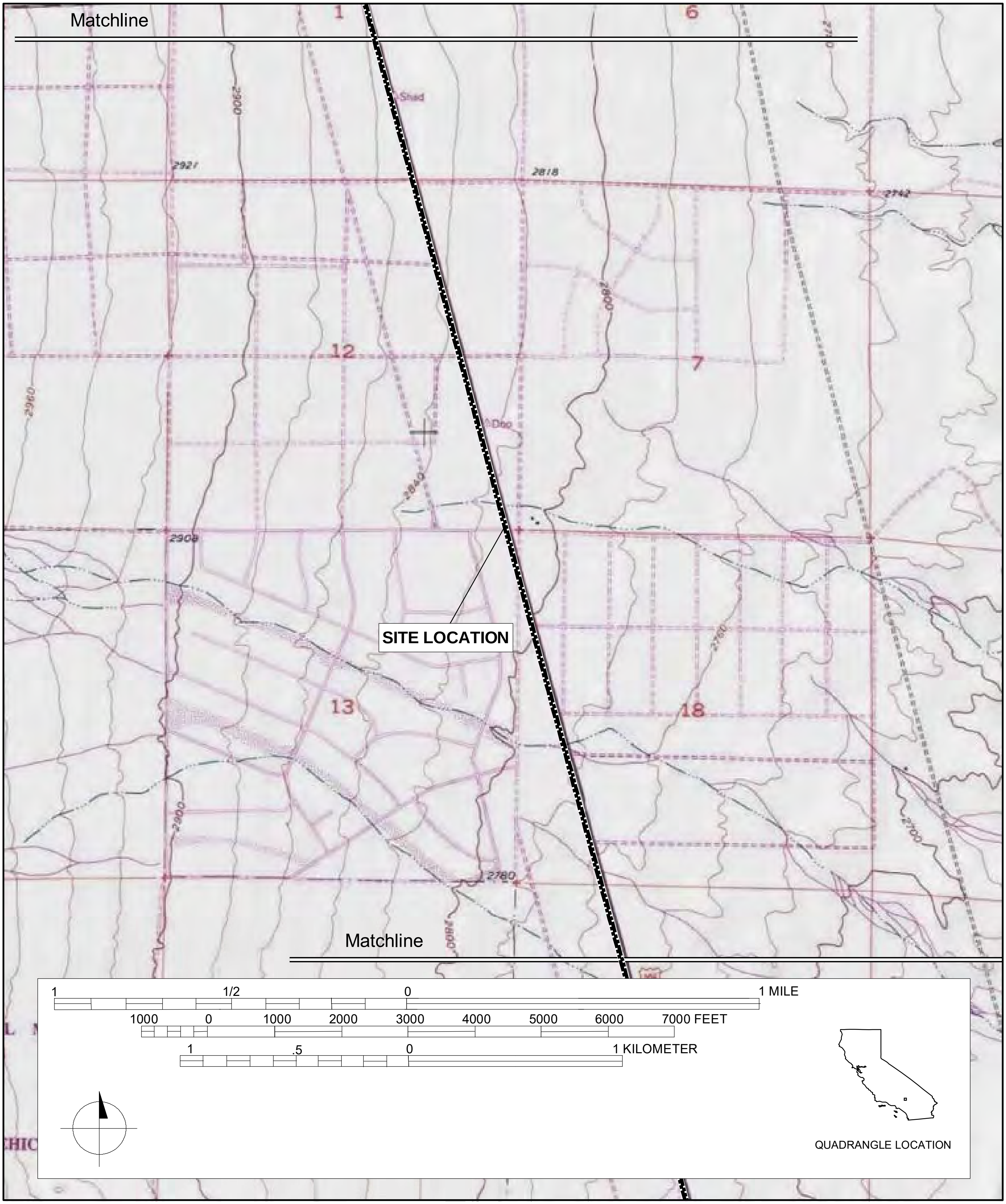


State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 9 **of** 16 *** Resource Name or #** (Assigned by recorder)

*** Map Name:** CA 7.5' Quad VICTORVILLE NW *** Scale:** 1:24,000 *** Date of Map:** 1973 & 93



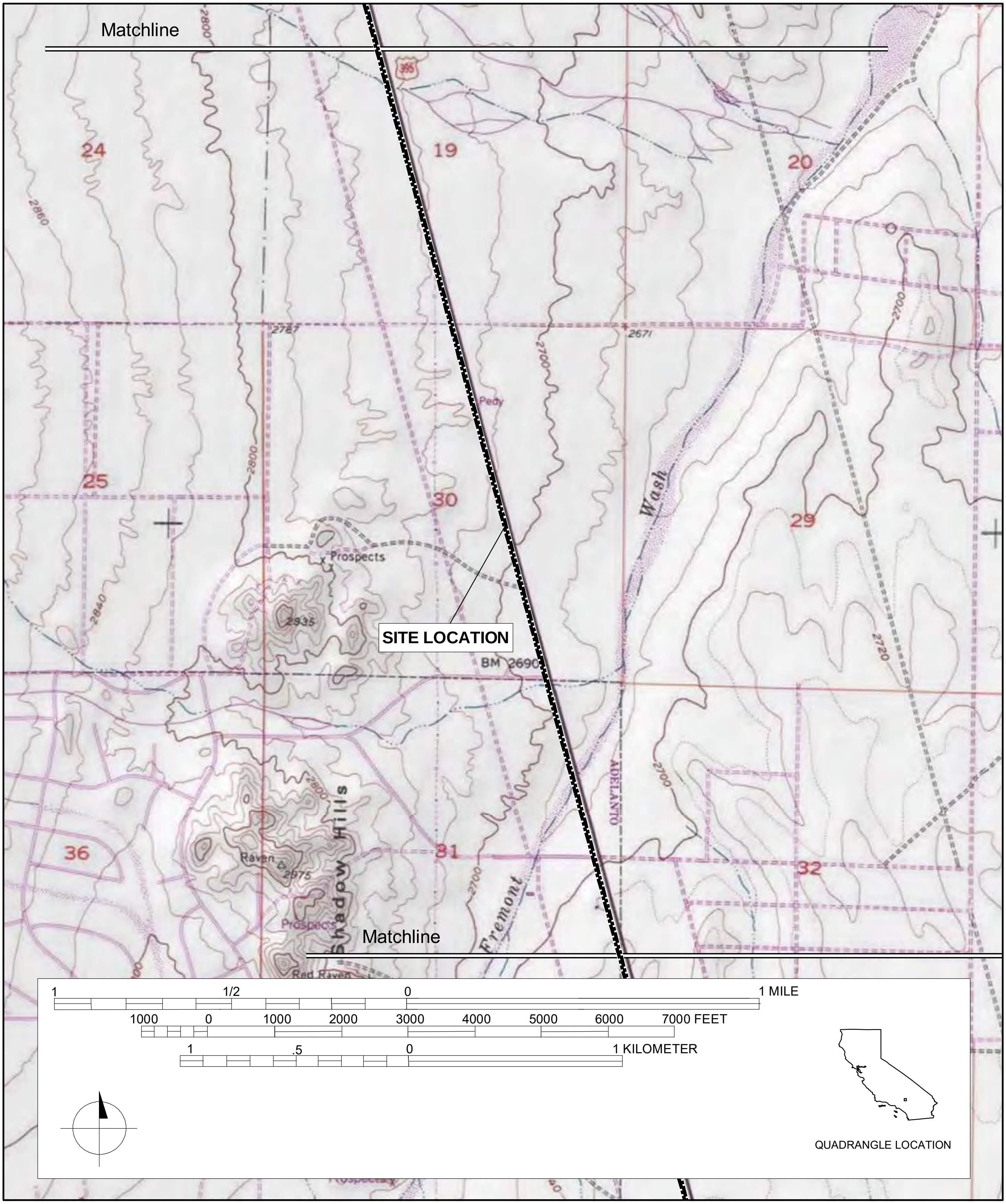
DPR 523J (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 10 **of** 16 *** Resource Name or #** (Assigned by recorder)

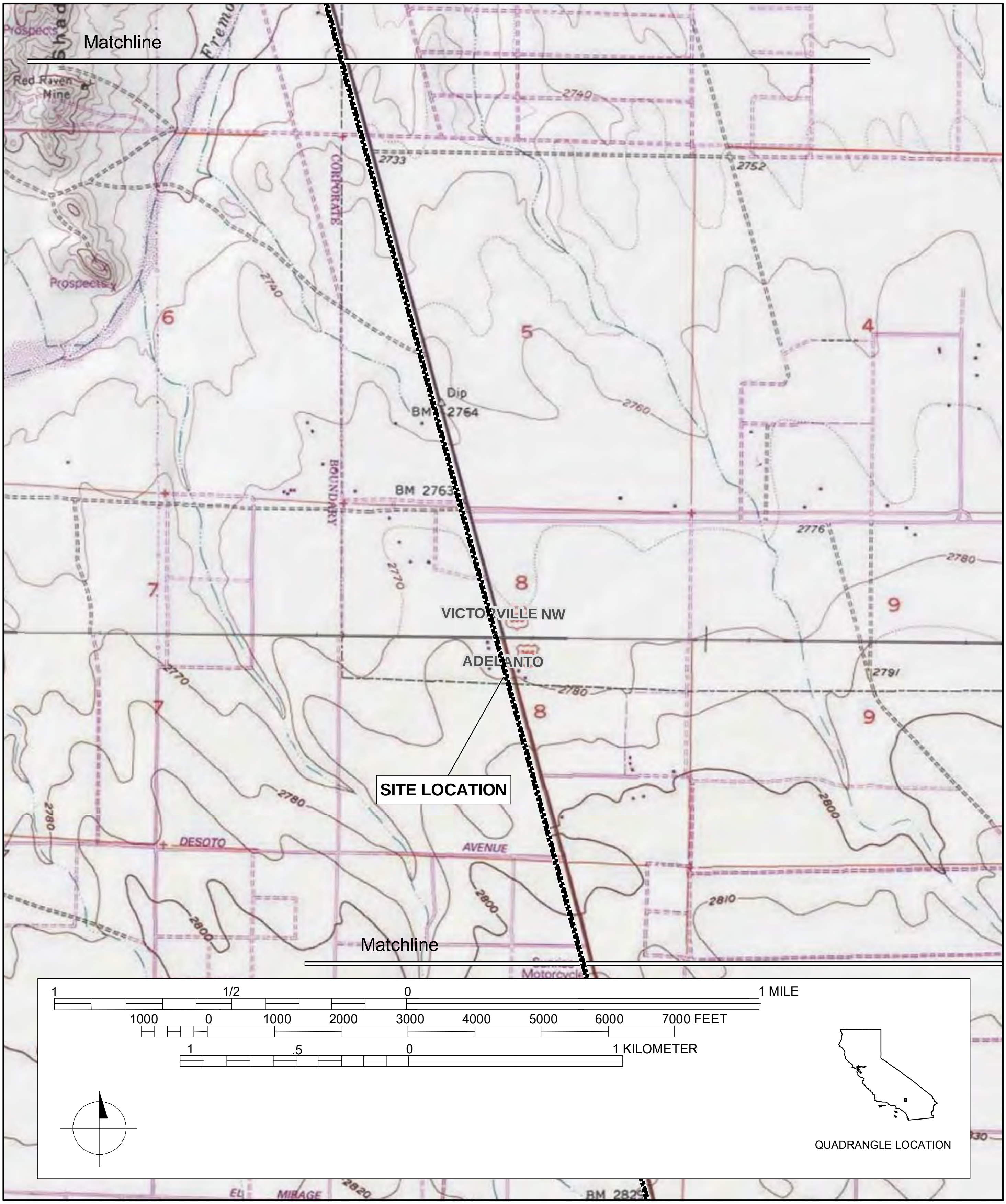
*** Map Name:** CA 7.5' Quad VICTORVILLE NW *** Scale:** 1:24,000 *** Date of Map:** 1973 & 93



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 11 of 16 * Resource Name or # (Assigned by recorder)
* Map Name: CA 7.5' Quad VICTORVILLE NW, ADELANTO * Scale: 1:24,000 * Date of Map: 1993



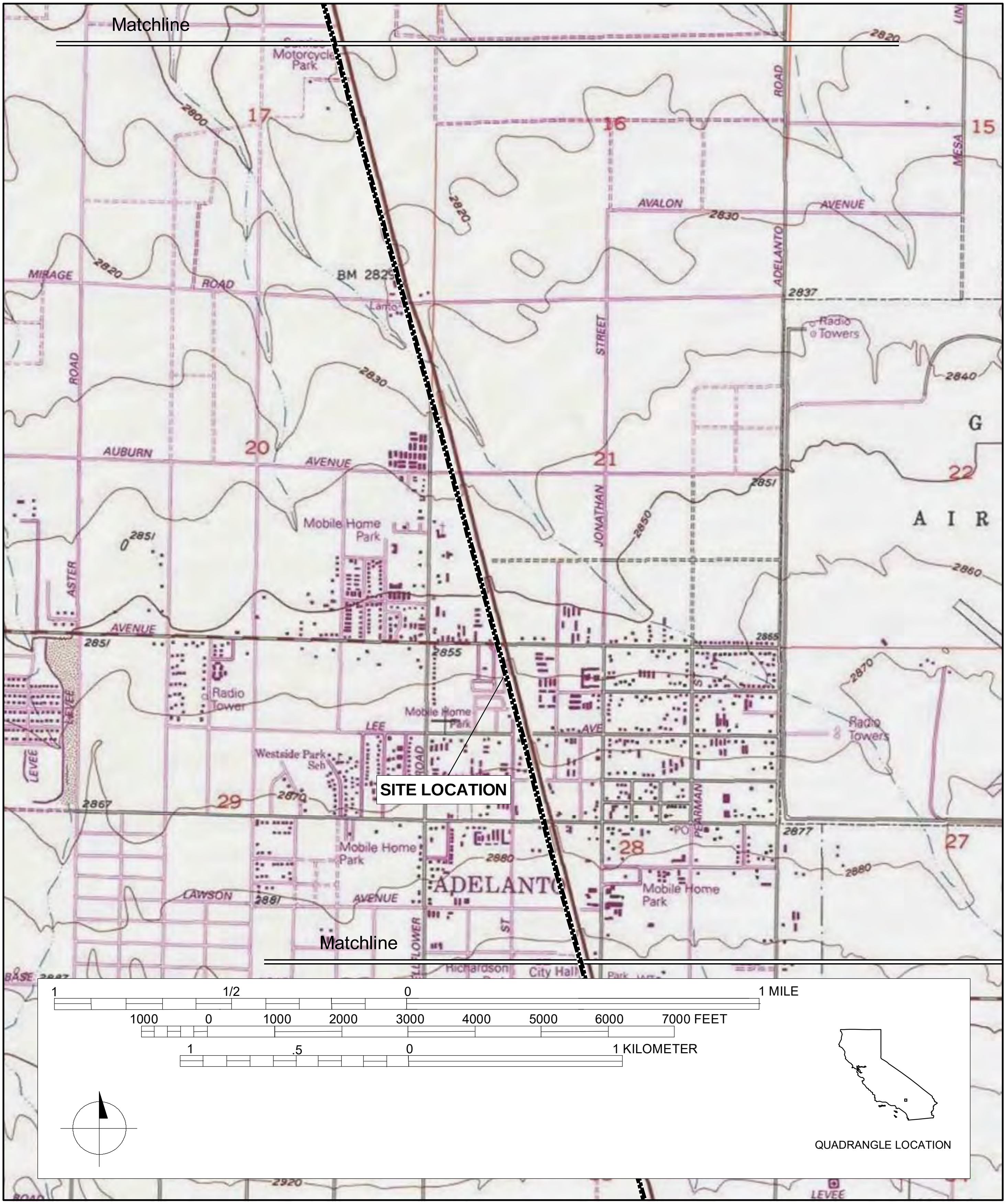
DPR 523J (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 12 of 16 | * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad ADELANTO | * Scale: 1:24,000 | * Date of Map: 1993



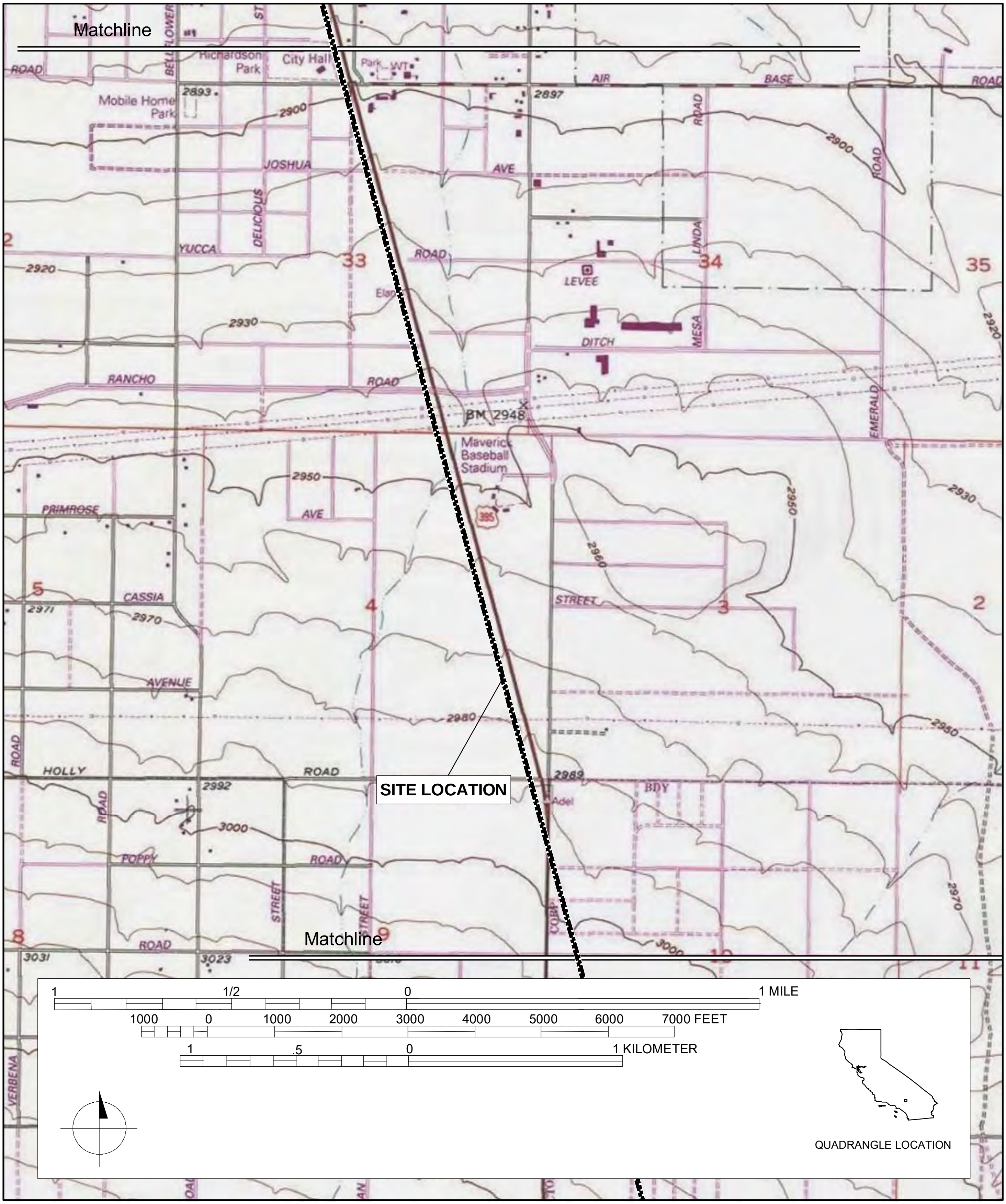
DPR 523J (1/95) | *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 13 of 16 * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad ADELANTO * Scale: 1:24,000 * Date of Map: 1993



DPR 523J (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-10316H
HRI #
Trinomial

Page 14 of 16 * Resource Name or # (Assigned by recorder)

* Map Name: CA 7.5' Quad ADELANTO * Scale: 1:24,000 * Date of Map: 1993

***Resource Name or #:** CA-SBR-10316 (update)

***Recorded by:** S. Jow ***Date:** 10/18/2010 ☒ Continuation ☐ Update

Locational Information for the current survey:

Quadrangle	Township/Range	Section
Adelanto	50N 50W	003
Adelanto	50N 50W	004
Adelanto	50N 50W	009
Adelanto	50N 50W	010
Adelanto	50N 50W	015
Adelanto	50N 50W	016
Adelanto	50N 50W	022
Adelanto	60N 50W	016
Adelanto	60N 50W	017
Adelanto	60N 50W	020
Adelanto	60N 50W	021
Adelanto	60N 50W	028
Adelanto	60N 50W	029
Adelanto	60N 50W	033
Adelanto	60N 50W	034
Astley Rancho	80N 60W	002
Astley Rancho	80N 60W	011
Astley Rancho	80N 60W	014
Astley Rancho	80N 60W	023
Astley Rancho	80N 60W	024
Astley Rancho	80N 60W	025
Astley Rancho	80N 60W	026
Astley Rancho	90N 60W	035
Kramer Junction	100N 60W	003
Kramer Junction	100N 60W	004
Kramer Junction	100N 60W	005
Kramer Junction	100N 60W	006
Kramer Junction	100N 60W	007
Kramer Junction	100N 60W	008
Kramer Junction	100N 60W	017
Kramer Junction	100N 60W	020
Kramer Junction	100N 60W	021
Kramer Junction	100N 60W	028
Kramer Junction	100N 60W	029
Kramer Junction	100N 60W	032
Kramer Junction	100N 60W	033
Kramer Junction	110N 60W	031
Kramer Junction	110N 60W	032
Kramer Junction	110N 60W	033
Kramer Junction	110N 60W	034
Kramer Junction	90N 60W	004
Kramer Junction	90N 60W	009
Kramer Junction	90N 60W	010

Quadrangle	Township/Range	Section
Kramer Junction, Astley Rancho, Red buttes	90N 60W	015
Kramer Junction, Red buttes	90N 60W	016
Red buttes	90N 60W	021
Red Buttes, Astley Rancho	80N 60W	003
Red Buttes, Astley Rancho	80N 60W	010
Red Buttes, Astley Rancho	90N 60W	022
Red Buttes, Astley Rancho	90N 60W	027
Red Buttes, Astley Rancho	90N 60W	034
Victorville NW	60N 50W	005
Victorville NW	60N 50W	006
Victorville NW	70N 50W	007
Victorville NW	70N 50W	018
Victorville NW	70N 50W	019
Victorville NW	70N 50W	029
Victorville NW	70N 50W	030
Victorville NW	70N 50W	031
Victorville NW	70N 50W	032
Victorville NW	70N 60W	001
Victorville NW	70N 60W	012
Victorville NW	70N 60W	013
Victorville NW	70N 60W	024
Victorville NW	80N 60W	035
Victorville NW	80N 60W	036
Victorville NW, Adelanto	60N 50W	008

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #: P-36-10316H
HRI#
Trinomial: CA-SBR-10316

***Resource Name or #:** CA-SBR-10316 (update)

***Recorded by:** S. Jow ***Date:** 10/18/2010 ☒ Continuation ☐ Update

Photographs for the current survey:

CA-SBR-10316H, steel pole

CA-SBR-10316, steel pole showing concrete footing

CA-SBR-10316H, T-line name enscribed on pole

CA-SBR-10316, 1989 pole replacement plaque

10666652 Update 5/10

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 36-010316
HRI#
Trinomial CA-**SBR-10316H**

 ***Resource Name or #** "Tower Line" Transmission Lines (CA-SBR-10316H)

***Recorded by:** Katherine Anderson,
ESA | 2600 Capitol Ave, STE 200.
Sacramento, CA 95816

***Date:** 6/16/2009 ☐ Continuation ■Update

As previously recorded, site CA-SBR-10316H consists of a segment of the historic "Tower Line" transmission lines that were constructed in 1911 by South Sierra Power Company to bring electricity from Bishop to San Bernardino. This update includes a description, photpographs, and location map for a segment of the historic electric transmission lines. These historic transmission lines intersect the right of way (ROW) of the East Branch of the California Aqueduct (EBA) in Pool 65, north of Hesperia.

Field inspection determined that, similar to other evaluated segments within the county, within this segment the original towers have been replaced by steel lattice towers with concrete footings, therefore this resource lacks the integrity necessary for eligibility for listing in the National Register (Ahmet, 2008).

Resource Identified: "Tower Line" Transmission Lines

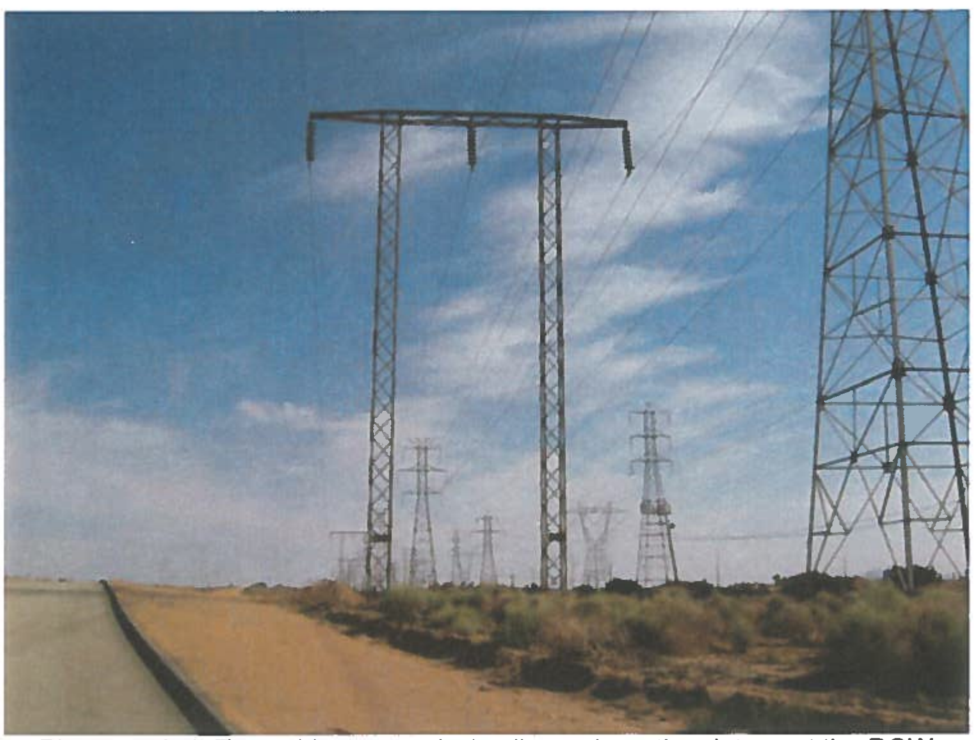
Date of Field Survey: 6/16/09

Reference: ESA, *Preliminary Archaeological Survey Report for 98 Linear Miles of the East Branch Extension of the California Aqueduct for the DWR East Branch Enlargement Project, Los Angeles and San Bernardino Counties (CA)*, April, 2010.

Ahmet, K. Site record for CA-SBR-10316H, on file at the San Bernardino County Archaeological Information Center, 2008.

Location of Resource: GPS: 34.407861, -117.354777 to 34.405715, -117.353935 (see page 3)

USGS Quad: Hesperia (1956)



Photograph 1. Tower Line transmission lines where they intersect the ROW

State of California- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

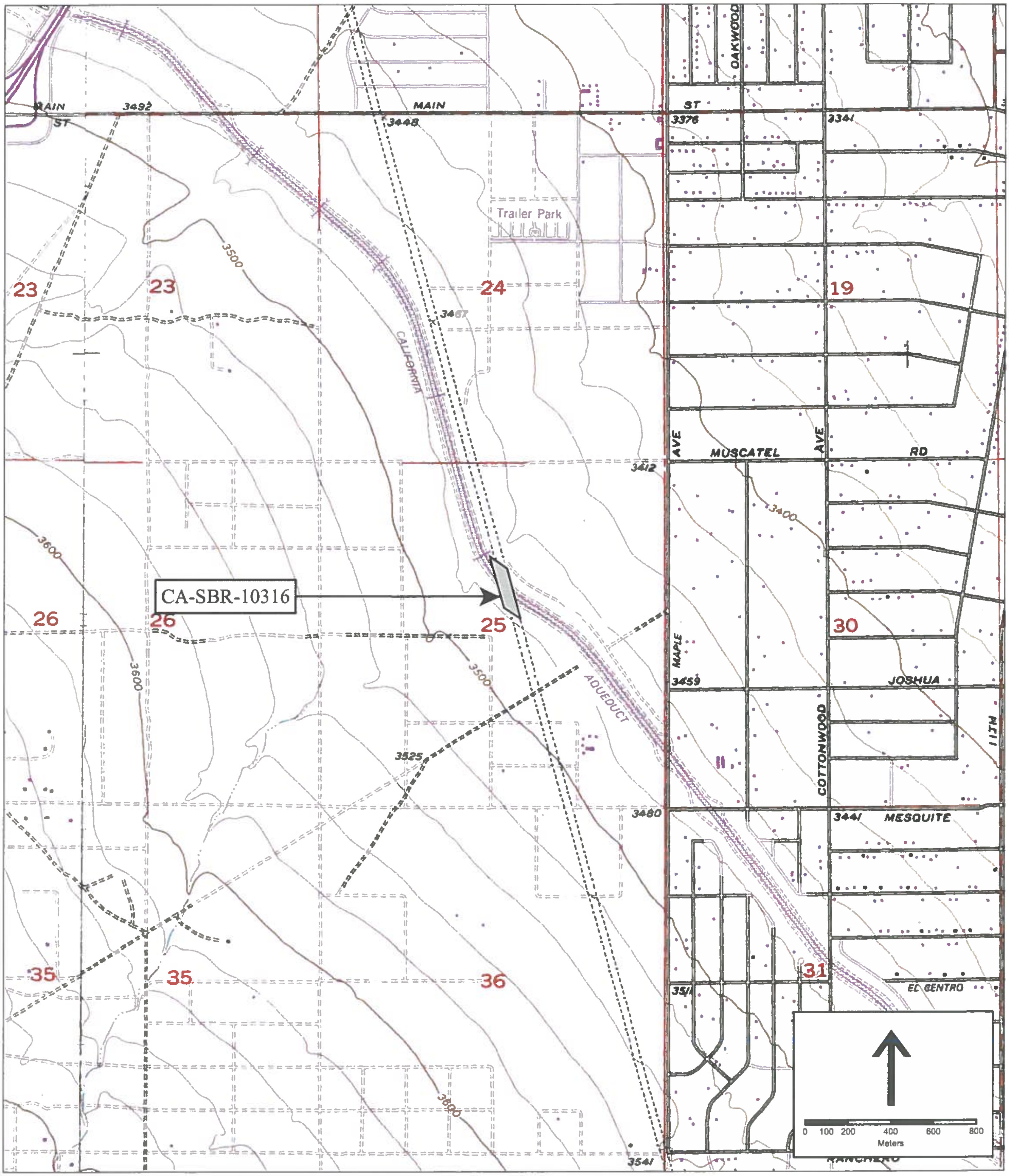
Primary #
HRI #
Trinomial CA-SBR-10316H

* Resource Name or Number: CA-SBR-10316H

*Map name: Hesperia

*Scale: 1:24000

*Date of Map: 1980



* Required Information

update 10/09

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-010316 (update)
HRI #
Trinomial CA-SBR-10316H (update)
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

 ***Resource Name or #:** Tower Line

P1. Other Identifier: Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line; Æ-Shapiro-2H; South Sierras Power Company Transmission Line

***P2. Location:** ■ **Not for Publication** ☐ **Unrestricted** ***a. County:** San Bernardino
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** San Bernardino North **Date:** 1967 (PR 1988) **T** 1N ;**R** 4W; unsectioned **¼ of ¼ of Sec ;** S.B **B.M.**
c. Address: City: San Bernardino Zip:
d. UTM: Zone: 11 ; mE/ mN (G.P.S.)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: approx. 1,499 feet amsl
This portion of the transmission line runs in a north-south direction and crosses the intersection of Kendall Drive and University Parkway, in the City of San Bernardino.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
This resource was originally recorded by J. Underwood and S. Rose in December 2000 as the Southern California Edison Company's Kramer-Victor 115kv Transmission line, which was part of the 238-mile long Southern Sierra Power Company's Control-San Bernardino Transmission Line, also known as the Tower Line. The site was updated in 2005 by B. Sheets and M. Linder, and in 2008 by Koral Ahmet.

According to K. Ahmet (2008), the original tower line was completed in 1913, bringing electricity from Bishop to San Bernardino along what was then the world's longest power line. The line has been rebuilt and upgraded, tower for tower, in many places using the same footprints. The original towers from this segment have been replaced by larger steel towers with concrete footings and are now known as the Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line.

The current survey includes the tower line in the area of the intersection of Kendall Drive and University Parkway in San Bernardino on October 7, 2008. SWCA crew determined that the previous site recordings are accurate and correctly characterize the site and its current condition. The tower line is currently in use and is regularly maintained, no further alterations or modification were apparent.

***P3b. Resource Attributes:** (List attributes and codes) HP11. Engineering structure
***P4. Resources Present:** ☐Building ■ Structure ☐Object ☐ Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #)
Overview of steel lattice tower within the Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line seen in background, view to the northwest. Photo #1430

***P6. Date Constructed/Age and Sources:**
■Historic ☐Prehistoric ☐Both
1913, Koral Ahmet

***P7. Owner and Address:**
Southern California Edison
2244 Walnut Grove Avenue, Rosemead, CA 91770

***P8. Recorded by:** (Name, affiliation, and address)
Gini Austerman and
Caprice (Kip) Harper
SWCA Environmental Consultants
625 Fair Oaks Avenue, Suite 190
South Pasadena, CA 91030

***P9. Date Recorded:** October 7, 2008
***P10. Survey Type:** Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Cultural Resources Technical Report *sbX* E Street Corridor BRT Project, Cities of San Bernardino and Loma Linda, San Bernardino County, California (SWCA Environmental Consultants 2008).
Archaeological Determinations of Eligibility (OHP 2008); Primary Record for P-36-010316 (Underwood and Rose 2000; Sheets and Linder 2005); Continuation Sheet for P-36-010316 (Ahmet 2008).

***Attachments:** ☐NONE ■Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

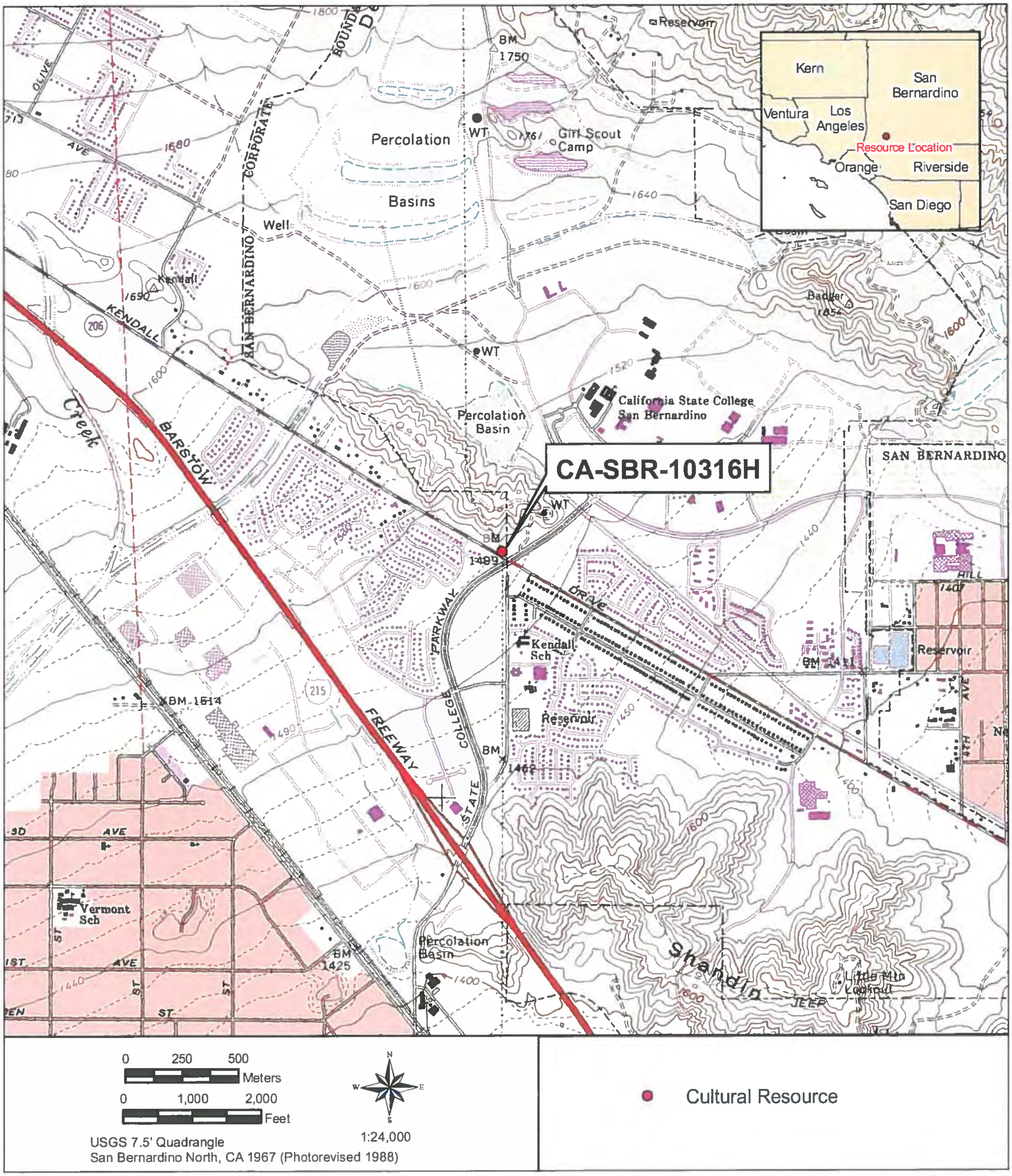
Update

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 36-010316 (update)
HRI#
Trinomial CA-SBR-10316H (update)

Page 2 of 2 *Resource Name or #: Tower Line

*Map Name: San Bernardino North, CA *Scale: 1:24,000 *Date of Map: 1967 (Photorevised 1988)



DPR 523J (1/95) *Required information

Update 3/08

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #: 36-010316
HRI#/Trinomial: CA-SBR-10316H
FS#

***Resource Name or Number (Assigned by recorder):** Arrowhead – Mojave Siphon – Devil Canyon – Shandin 115kV Line

***Recorded by:** K. Ahmet (S. Cal. Edison) ***Date:** 3/4/2008 ☐ Continuation ☒ Update

This update is an addendum to the primary record by B. Sheets and M. Linder in 2005 and includes location maps for a 22-kilometer long segment of the projected "Tower Line" that runs south from Silverwood Lake to San Bernardino. The original towers from this segment have been replaced by larger steel lattice towers with concrete footings that are now part of the Arrowhead – Mojave Siphon – Devil Canyon – Shandin 115kV Line that terminates in the south at the Calelectric Substation at 1400 Chestnut Street, San Bernardino. During routine operations and maintenance work by Edison, an archaeological inspection around Structure 121813 was conducted prior to the brushing of a spur road leading to the structure. Structure 121813 is located on a flat-topped ridge just north of a DWR plant and between a pipe conveyor and Devil Canyon Road.

During an inspection around the tower, remnants of an older steel lattice tower were observed 3 meters south of structure 121813 (Figure 1). These remains consist of four tower footings made of steel that stick out of the ground with no concrete footings. Each the footings have been cut roughly 2 feet above ground level. In addition, six strings of porcelain insulators were observed south of the cut footings. Each insulator string consists of six porcelain disks connected by metal spider-like attachments. The insulator disks have a pale blue exterior glaze and contain the following dark blue glazed patent and manufacture date "Pat. Feb 3, 1920 Mfg. Oct 1926" (Figure 2). This patent was assigned by Robert M. Johnston to the Jeffery De Witt Company (U.S. Pat. No. 1,329,770) (National Insulator Association). All the porcelain disks on the six insulator strings on the ground are damaged.

Reference: National Insulator Association: Insulator Historical Timeline website located at http://www.nia.org/timeline/1920.htm

Location of Structure 121813: Nad 27 UTM Zone 11 E:469207/N:3785284 (see page 4 of 7)

Elevation: 2,152 ft

Northern extent of Arrowhead – Mojave Siphon – Devil Canyon – Shandin 115kV Line at south edge of Silverwood Lake:

E: 469454/N:3793455 (see page 3 of 7)

Southern extent of Arrowhead – Mojave Siphon – Devil Canyon – Shandin 115kV Line at the Calelectric Substation:

E: 470475/N:3772594 (see page 7 of 7)

USGS 7.5' Quads: Silverwood Lake, 1996; San Bernardino North, 1967 (Photorevised 1973); San Bernardino South, 1967 (Photorevised 1980)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #: 36-010316
HRI#/Trinomial: CA-SBR-10316H
FS#

***Resource Name or Number (Assigned by recorder):** Arrowhead – Mojave Siphon – Devil Canyon – Shandin 115kV Line

***Recorded by:** K. Ahmet (S. Cal. Edison) ***Date:** 3/4/2008 ☐ **Continuation** ☒ **Update**

Figure 1. View north showing Structure 121813 in background and steel footings for older steel-framed tower in foreground.

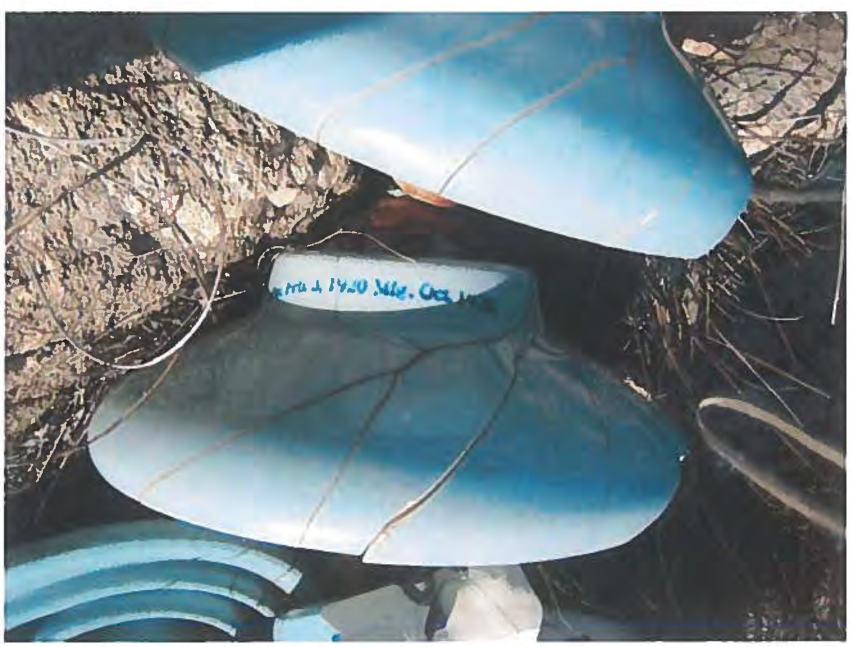


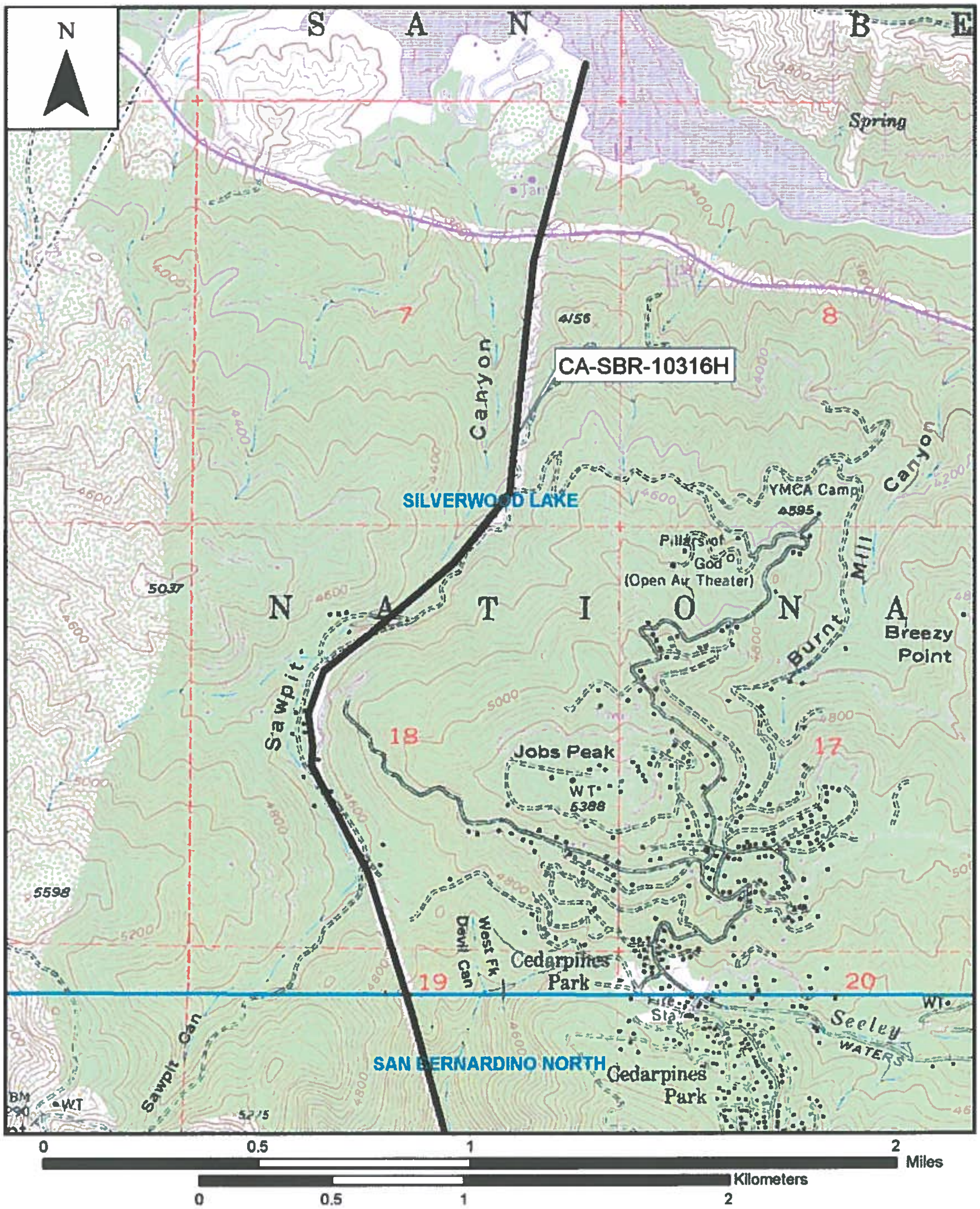
Figure 2. Porcelain insulator disk with patent and manufacture date.

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP (UPDATE)

Primary #: 36-010316
HRI#
Trinomial: CA-SBR-10316H
FS #

Page 3 of 7 *Resource Name or Number (Assigned by recorder): Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line

*Map Names: Silverwood Lake *Scale: 1:24,000 *Date of Map: 1996



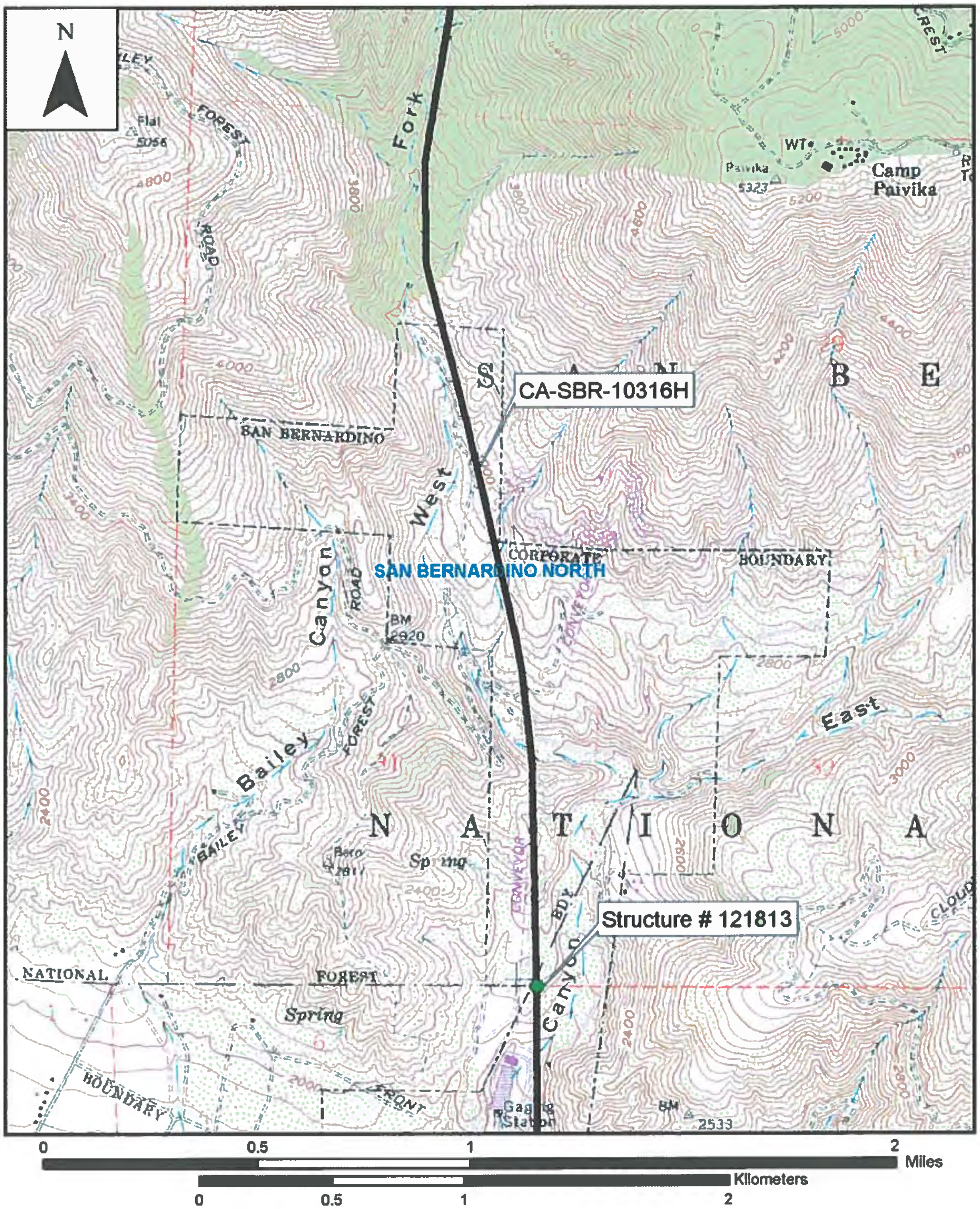
DPR 523J (1/95) * Required information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP (UPDATE)

Primary #: 36-010316
HRI#
Trinomial: CA-SBR-10316H
FS #

Page 4 of 7 ***Resource Name or Number (Assigned by recorder):** Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line

***Map Names:** San Bernardino North ***Scale:** 1:24,000 ***Date of Map:** 1967 (photorevised 1973)



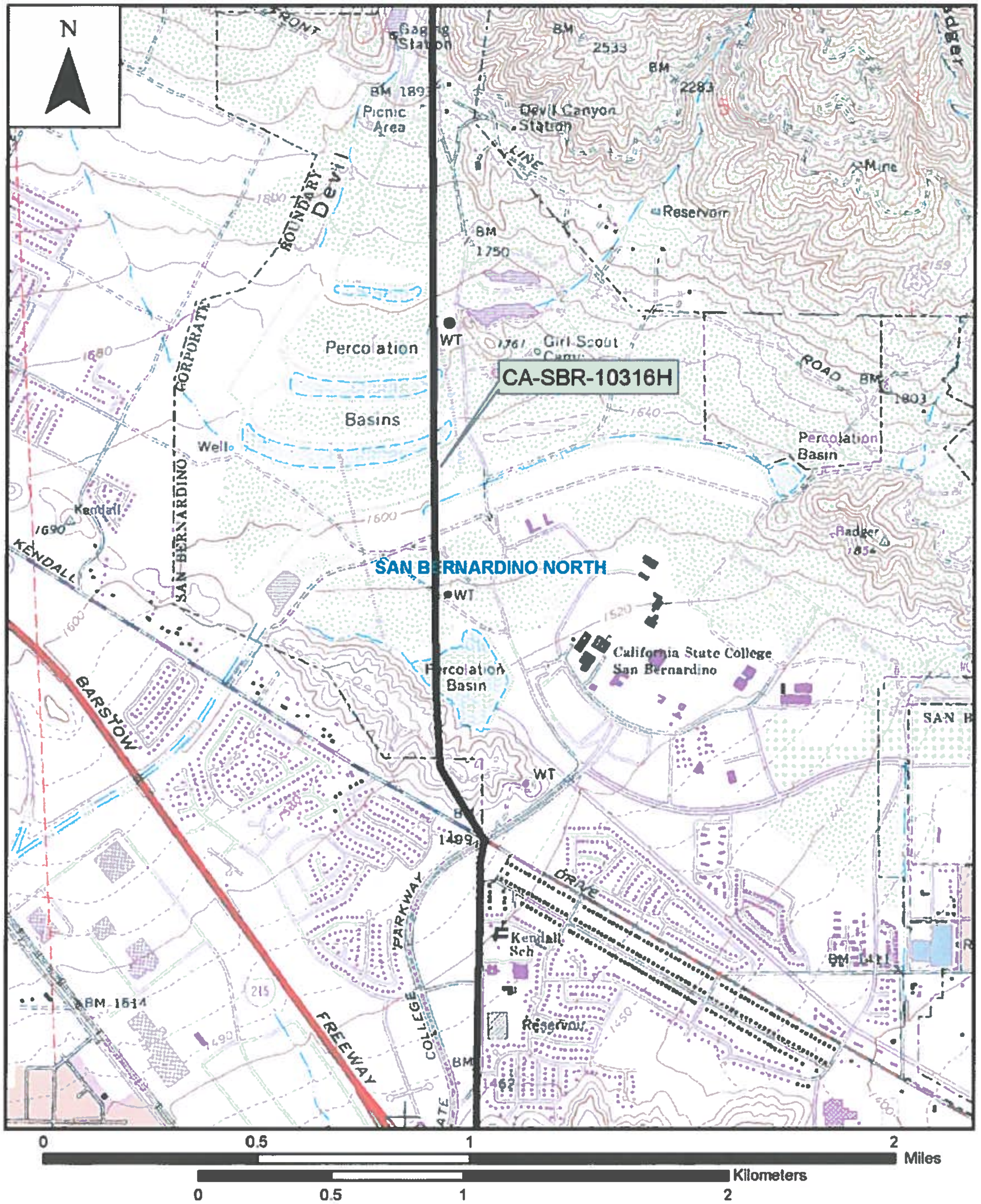
DPR 523J (1/95) * Required information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP (UPDATE)

Primary #: 36-010316
HRI#
Trinomial: CA-SBR-10316H
FS #

Page 5 **of** 7 ***Resource Name or Number (Assigned by recorder):** Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line

***Map Names:** San Bernardino North ***Scale:** 1:24,000 ***Date of Map:** 1967 (photorevised 1973)



DPR 523J (1/95) * Required information

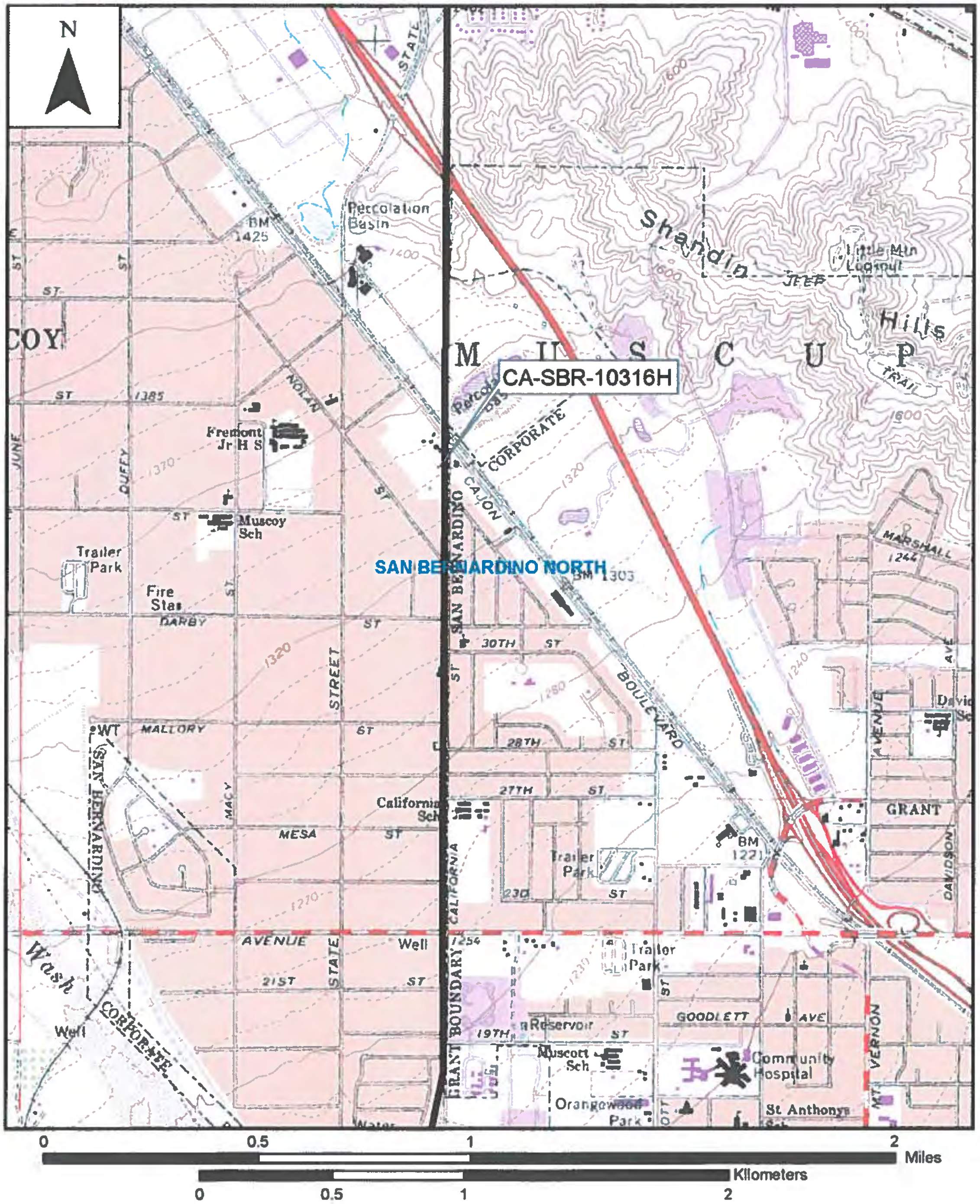
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP (UPDATE)

Primary #: 36-010316
HRI#
Trinomial: CA-SBR-10316H
FS #

Page 6 **of** 7 ***Resource Name or Number (Assigned by recorder):** Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line

***Map Names:** San Bernardino North ***Scale:** 1:24,000 ***Date of Map:** 1967 (photorevised 1973)

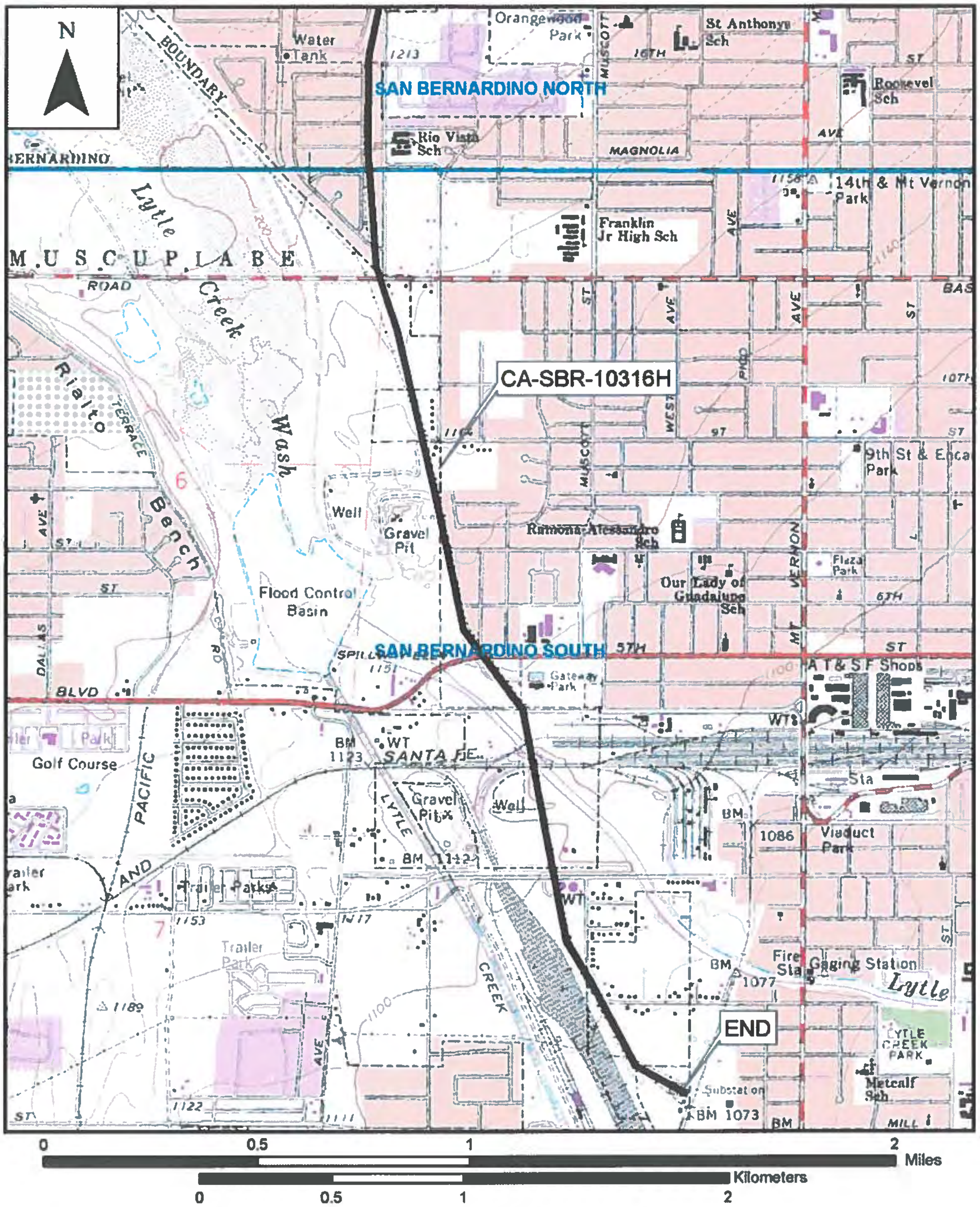


State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP (UPDATE)

Primary #: 36-010316
HRI#
Trinomial: CA-SBR-10316H
FS #

Page 7 of 7 *Resource Name or Number (Assigned by recorder): Arrowhead-Mojave Siphon-Devil Canyon-Shandin 115kV Line

*Map Names: San Bernardino South *Scale: 1:24,000 *Date of Map: 1967 (photorevised 1980)



DPR 523J (1/95) * Required information

1066161 Update 4/09

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #: P-36-10316 (UPDATE)
HRS#:
Trinomial: CA-SBR-10316H (UPDATE)

Resource Name or #: CA-SBR-10316H (UPDATE)

Recorded by: Koji Tsunoda **Date**: 19 January 2008 ☐ Continuation ■ Update

During the current survey, a portion of CA-SBR-10316H was observed. This cultural resource is a historic electric transmission line that is determined eligible for National Register of Historic Places in 1995. No obvious alteration or damage was apparent on the observed portion of this cultural resource.

Report Citation:

Tsunoda, Koji
2007 Archaeological Letter Report for the Wet Crossing Emergency Repair Project, San Bernardino County, California (WO#4725-8902)

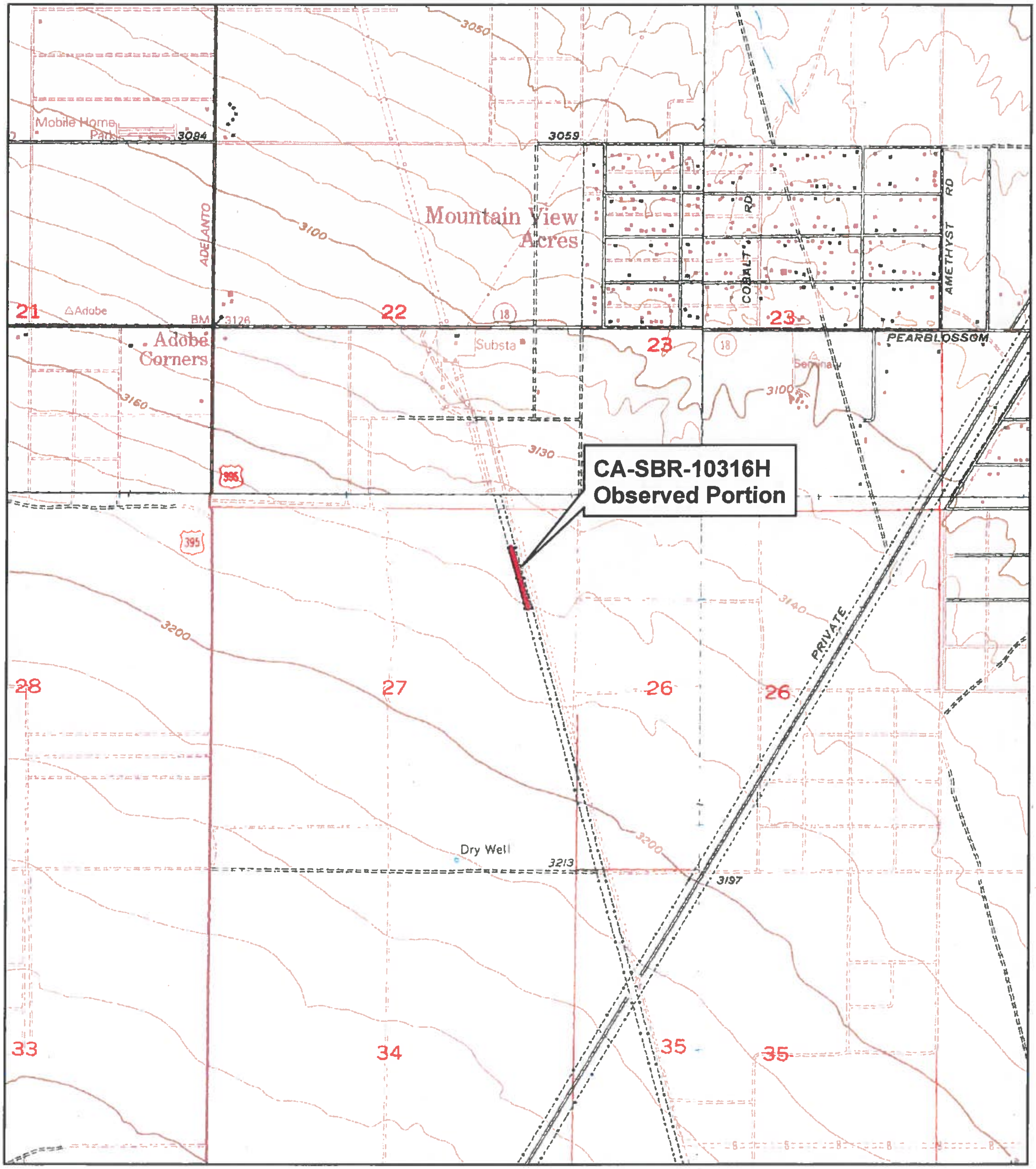
Attachments: ☐NONE ■Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐Other (List):

State of California - The Resource Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #: 36-10316 (UPDATE)
Trinomial: CA-SBR-10316H (UPDATE)

Resource Name or #: CA-SBR-10316H (UPDATE)

Map Name: Baldy Mesa **Scale:** 1:24,000 **Date of Map:** 1956 (Photorev. 1988)



Required information is bold

4/13

State of California— The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-010316
HRI
Trinomial # CA-SBR-10316 H
NRHP Status Code 6Z
Other Listings
Review Code Reviewer Date

*Resource Name or # (Assigned by recorder) "Tower Line" segment (CA-SBR-10316H, formerly ~~CA-SBR~~ PSBR-39H); Map Reference 9

P1. Other Identifier:

***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** Kramer Junction **Date** 1973 **T** 10N **;R** 6W; **¼of** **¼ of Sec** 5; S.B. **B.M.**

c. Address none City Zip

d. UTM: (Give more than one for large and/or linear resources) Zone ; mE/ mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

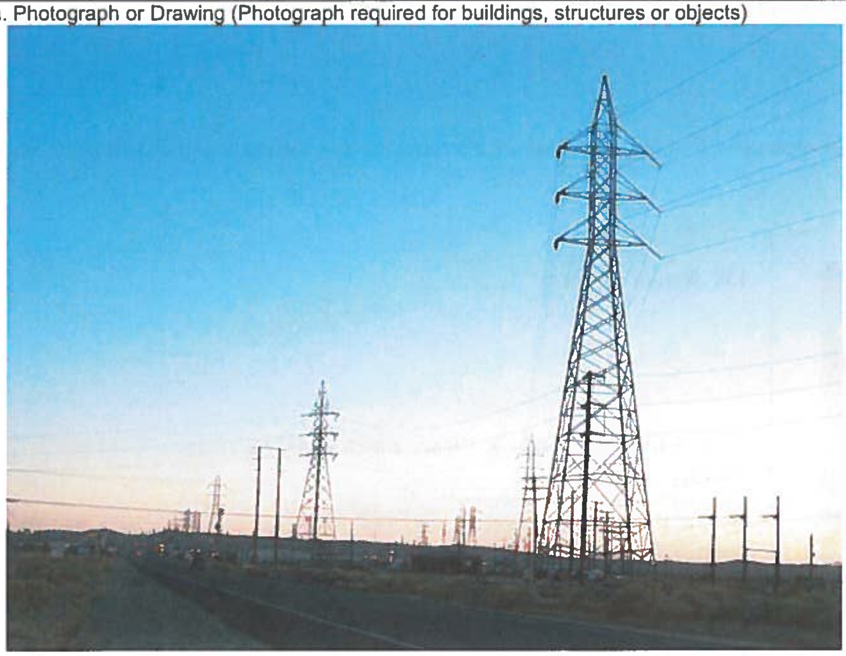
The Tower Line is a 238-mile long transmission line constructed by the Southern Sierra Power Company in 1912-13 between Bishop and San Bernardino. This form evaluates a 3,150 foot segment of the Tower Line that lies on either side of SR-58 and runs N-S along the west side of US-395. It is today part of the Southern California Edison Company's Kramer-Victor 115 kv transmission line. The towers and lines located within the evaluated segment were replaced in 1989. Segments of the "Tower Line" were previously identified and recorded in 2000 and 2005 (CA-SBR-10316H, formerly CA-SBR-39H). This DPR form serves as an update to the prior records and consists of a 3,150 foot segment of the transmission line located in San Bernardino County on either side of State Highway 58. The segment is perpendicular to the Highway, and also runs west of and is nearly parallel to U.S. Highway 395. The topography of the area surrounding the transmission line is generally flat.

(See Continuation Sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP11. Engineering structure

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.):

*P5a. Photograph or Drawing (Photograph required for buildings, structures or objects)



P5b. Description of Photo: (view, date, accession #) View looking southwest at the transmission line segment, January 15, 2008

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
1912-13, Southern California Edison (however, with subsequent alterations)

***P7. Owner and Address:**
Southern California Edison
P. O. Box 800
Rosemead, CA 91770

***P8. Recorded by:** Name, affiliation, and address)
Christeen Taniguchi
Galvin Preservation Associates Inc.
1611 S. Pacific Coast Hwy. Suite 104
Redondo Beach CA, 90277

***P9. Date Recorded:** December 27, 2007

***P10. Survey Type:** (Describe)
☒ Intensive
☐ Reconnaissance

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Historic Resources Evaluation Report for the State Route 58 Realignment Project, from 0.4 Miles West of the Kern County Line to 7.5 Miles East of Kramer Junction, San Bernardino County (December 2012).

***Attachments:** ☐ NONE ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure & Object Record ☐Archaeological Record ☐ District Record ☒Linear Feature Record ☐ Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photographic Record ☐ Other (List)

L1. Historic and/or Common Name:
Historic name: "Tower Line"
Common name: Kramer-Victor 115 kv transmission line

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐Point Observation **Designation:** see Location Map

b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map)

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
See description on Primary Record.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

a. Top Width:

b. Bottom Width:

c. Height or Depth: about 140 feet (height of tower)

d. Length of Segment: 3,150 feet

L4e. Sketch of Cross-Section (include scale) **Facing:**

(See Location Map)

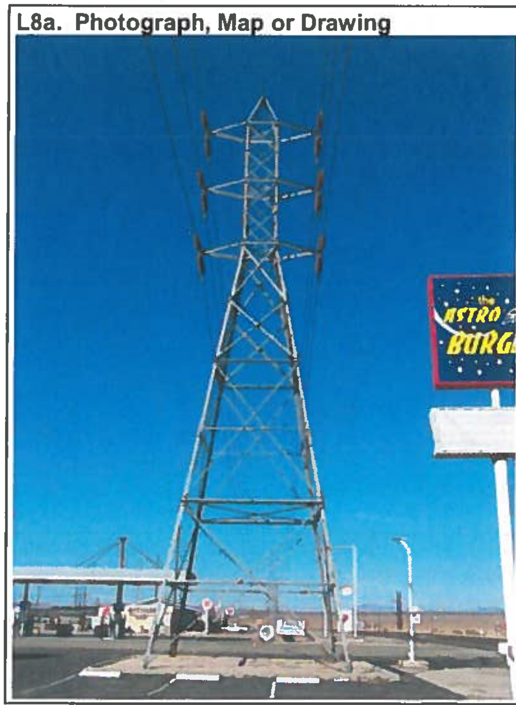
L5. Associated Resources: Southern California Edison Kramer Junction substation

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The evaluated transmission line is located within the western Mojave Desert. As it runs through the community of Kramer Junction, the line is parallel to U. S. Highway 395, and also passes over State Highway 58 and the Atchison, Topeka and Santa Fe Railway. The nearest Southern California Edison substation is located just south of Highway 58.

L7. Integrity Considerations:
(see page 5)

L8b. Description of Photo, Map, or Drawing Detailed view looking north one of the transmission towers located within the segment (north side of State Route 58), November 2, 2007

L8a. Photograph, Map or Drawing



L9. Remarks: none

L10. Form Prepared by: (Name, affiliation, and address)
Christeen Taniguchi
Galvin Preservation Associates
1611 S. Pacific Coast Highway, suite 104
Redondo Beach, CA 90277

L11. Date: December 27, 2007

DPR 523E (1/95)

BUILDING, STRUCTURE AND OBJECT RECORD

*NRHP Status Code

*Resource Name or # (Assigned by recorder) "Tower Line" segment (CA-SBR-10316H, formerly CA-SBR-39H); Map Reference 9

B1. Historic Name: "Tower Line"

B2. Common Name: Kramer-Victor 115 kv transmission line

B3. Original Use: transmission line B4. Present Use: same

*B5. **Architectural Style** None

*B6. **Construction History:** (Construction date, alterations, and date of alterations)
This transmission line was originally constructed in 1912-13 by the Southern Sierra Power Company. However, the current lines and associated towers located within this segment are modern.

*B7. **Moved?** ☒No ☐Yes ☐Unknown **Date:** **Original Location:**

*B8. **Related Features:** The Inyokern Southern California Edison substation is located south of State Highway 58.

B9a. Architect: Milliken Brothers (original line) b. Builder: Southern Sierra Power Company (original line)

*B10. **Significance: Theme** Development of the "Tower Line" **Area** western Mojave Desert

Period of Significance: 1912-13 **Property Type:** transmission line **Applicable Criteria:** N/A

The 238-mile Tower Line has been previously determined not eligible for the NRHP due to lack of integrity (See Appendix C, SHPO Letter). Likewise, the 3,150 foot portion of the line evaluated here does not retain integrity, and is subsequently not eligible for the NRHP.

The 238.16 mile long double-circuit "Tower Line" was originally constructed by the Southern Sierras Power Company (SSPC) from 1912-13. The Company was incorporated on June 15, 1911, as a subsidiary of Nevada-California Power Company (NCPC), which was first formed to serve the Nevada mines. Other subsidiaries were Interstate Telegraph Company, Bishop Light & Power Company and the Corona Gas & Electric Light Company.

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) None

*B12. **References:** (see page 6)

B13. Remarks: None

*B14. **Evaluator:** Christeen Taniguchi
Galvin Preservation Associates Inc.
1611 South Pacific Coast Highway, Suite 104
Redondo Beach, CA 90277

***Date of Evaluation:** December 27, 2007

(This space reserved for official comments.)

See Location Map

*Resource Name or # "Tower Line" segment (CA-SBR-10316H, formerly CA-SBR-39H); Map Reference 9
Recorded By: Christeen Taniguchi Date: December 27, 2007 ☒ Continuation ☐ Update

(continued from page 1)

***P3a. Description:**

This transmission line stands about 140 feet tall and is made with bolted steel profiles. The structure has three cross arms. There are six conductors near the top that are connected to aluminum and steel cables. The tower has four legs that taper down into square shaped poured concrete footings. There are cross bracing throughout the structure. Only one of the towers within the segment is made of wood. This rectangular shaped structure also has six conductors connecting to the power cables.

Although the route of the line has remained the same, the actual lines and associated towers are modern. The condition of the tower line is excellent to good.

(continued from page 3)

***B10. Significance:**

The "Tower Line" originates from Bishop Creek No. 5, where No. 3 and No. 6 converge at Bishop Creek in California, then continued southward.[1] From Bishop Creek, the line goes to the Owens valley, then Rose Springs valley, Indian Wells valley, the Randsburg mining district, across the Mojave Desert and then crossing the San Bernardino mountain range to the San Bernardino valley. The valley includes such cities as San Bernardino, Riverside, Redlands and Corona. This 89,000 volt 238 mile long line was at the time either one of the longest or the longest straight-away line, built for the highest commercial voltage to be used. [2]

The towers were manufactured by Milliken Brothers of Staten Island, New York, using a standard transmission tower design used in the United States. After assembly, each tower was raised using shear legs and a team of horses. A tower was erected about every 660 feet, which meant about eight towers within a mile.[3] To service the towers of this line, a parallel supply and patrol road was located directly to the east, which was later purchased by the Federal government and made into U. S. Highway 395.[4]

The "Tower Line" was one of the first major applications of the new aluminum cable, steel reinforced (ACSR) conductor material.[5] This cable was made of seven wires which consisted of six helical aluminum wires with a core wire made of steel.[6] It was considered a "unique design, forming a new step in the advance of power transmission practice."[7] The aluminum and steel cables had less sag as compared to copper cables, and are today standard on high voltage transmission lines.[8]

There were four transformer substations in between, dividing the line into five sections that were each about 50 miles long. These stations were Lone Pine, Inyokern, Randsburg and Victorville.[9] The Kramer Junction substation, established in 1937, is located near the evaluated transmission line segment near the southwest corner of Highways 58 and 395.

The SSPC became a subsidiary company of the California Electric Power Corporation holding company. SSPC and the other subsidiary companies were then consolidated into the California Electric Power Company (CalElectric) in 1941. CalElectric was acquired by Southern California Edison (SCE) in 1941. SCE continues to own and operate the line today.[10] The evaluated segment was part of the

[1] Frederick Hall Fowler, Hydroelectric Power Systems of California and Their Extensions into Oregon and Nevada, Water-Supply Paper 493, Washington, D. C.: Government Printing Office, 1923, 764.
[2] Rudolph W. Van Norden, "System of Southern Sierras Power Company, Part I – Power Plants," *Journal of Electricity, Power and Gas*, vol. XXXI, no. 1, July 5, 1913, 4-5.
[3] Poole, op. cit., 1144-45.
[4] William A. Myers. *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company*. Glendale, California: Trans-Anglo Books, c1983, 1986, 79.
[5] Myers, op. cit., 220.
[6] Rudolph W. Van Norden, "System of Southern Sierras Power Company, Part II -- Transmission and Distribution System," *Journal of Electricity, Power and Gas*, vol. XXXI, no. 2, July 12, 1913, 43.
[7] Van Norden, op. cit., 5.
[8] Thomas T. Taylor, e-mail correspondence with Christeen Taniguchi, January 7,. 2008.
[9] C. O. Poole, "Hydroelectric Development on Bishop Creek, Cal. – IX," *Electrical World*, vol. 64, no. 24, December 12, 1914, 1144.
[10] Thomas T. Taylor, e-mail correspondence with Christeen Taniguchi, December 11, 2007.

line that was replaced in 1989, and is today known as the Kramer-Victor 115 kv transmission line. The northern section of the "Tower Line," however, retains its original lines and towers and is called Inyokern-Kramer–Randsburg No. 1 (sees Figure 1 and 2).

Integrity Statement

The subject transmission line segment was evaluated against the seven aspects of integrity as outlined in National Register Bulletin 15 that include location, setting, feeling, association, materials, design and workmanship.

The evaluated segment retains its original location; it has not been moved.

The transmission line's surroundings and associations have remained generally the same. It is located within an essentially undeveloped area of the western Mojave Desert. Its immediate surroundings consist of the community of Kramer Junction, which is a truck stop intersection at State Highway 58 and U. S. Highway 395. The buildings associated with Kramer Junction began to be constructed in as early as the 1920s (after the "Tower Line was established), although today the area consists mainly of modern buildings. Highway 395 was originally a parallel supply and patrol road for the construction of the "Tower Line." Originally unpaved, has since been paved with asphalt and has likely been widened. Most of the areas surrounding this linear feature, however, have remained the same. Therefore, the transmission line's setting, feeling and association have not significantly changed since the period of significance.

The evaluated transmission line was originally constructed in 1912-13. However, the line and its towers located within the evaluated segment were replaced in 1989 as part of the Kramer-Victor 115 kv transmission line. Therefore, the integrity in materials, design and workmanship to the period of significance is poor.

The overall integrity of the transmission line segment is fair to poor.

National Register of Historic Places Evaluation

The property was assessed under National Register of Historic Places (NRHP) Criterion A for its potential significance as a part of a historic trend that may have made a significant contribution to the broad patterns of our history. The evaluated transmission line was originally constructed in 1912-13 and called the "Tower Line." The line was significant for being likely the longest line to carry the highest commercial voltage. The "Tower Line" had also one of the first major applications of the new aluminum cable, steel reinforced (ACSR) conductors, which are today industry standards. However, the physical fabric of the evaluated segment of the line is today modern. Although the "Tower Line" as a whole appears to qualify for this Criterion, the evaluated segment does not appear to qualify for the NRHP under Criterion A.

The property was considered under Criterion B for its association with the lives of persons significant in our past. No individual names of significance were found that were directly associated with the establishment of this transmission line. Even if there were such names, changes have resulted in a resource that no longer effectively represents any associations with a significant person. Therefore, the evaluated transmission line segment does not appear to qualify for the NRHP under Criterion B.

This transmission line segment was evaluated for Criterion C for embodying the distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or possessing high artistic values, or representing a significant and distinguishable entity whose components may lack individual distinction. The evaluated line was constructed in 1912-13 as the "Tower Line." However, the current transmission line and its towers located within the evaluated segment, were rebuilt in 1989. Although the "Tower Line" as a whole appears to qualify for this Criterion, the evaluated line segment does not appear to qualify for the NRHP under Criterion C.

The property was considered for Criterion D for the potential to yield or likelihood to yield information to prehistory or history. In order for buildings, structures, and objects to be eligible for this criterion, they would need to "be, or must have been, the principal source of important information." This is not the case with this property. Therefore, the evaluated transmission line segment does not appear to qualify for the NRHP under Criterion D.

In summary, the property does not appear to qualify for the NRHP under any of these criteria. **Therefore, this transmission line segment is not a historic property for the purposes of Section 106 of the National Historic Preservation Act (NHPA).** The property was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code, and does not appear to be a historical resource for the purposes of CEQA.

Primary #
HRI

***B12. References:**

Darr, Dennis. Personal interview by Christeen Taniguchi. November 26, 2007.

Fowler, Frederick Hall. *Hydroelectric Power Systems of California and Their Extensions into Oregon and Nevada, Water-Supply Paper 493*. Washington, D. C.: Government Printing Office, 1923.

Horne, Melinda C. and David D. Earle. "Historic Property Survey Report for State Route 58 Realignment Project, From Kern County Line to 1.7 Miles East of State Route 395 San Bernardino County, California." June 2002.

Myers, William A. *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company*. Glendale, California: Trans-Anglo Books, c1983, 1986.

Poole, C. O. "Hydroelectric Development on Bishop Creek, Cal. – IX." *Electrical World*. vol. 64, no. 24, December 12, 1914.

Sheets B. and M. Linder, Applied EarthWorks, Inc. State of California -- The Resources Agency, Department of Parks and Recreation DPR 523 (CA-SBR-10316H), November 23, 2005.

Taylor, Thomas T. e-mail correspondence with Christeen Taniguchi. December 11, 2007 and January 7, 2008.

Underwood, Dr. J. and S. Rose, KEA Environmental, Inc. State of California – The Resources Agency, Department of Parks and Recreation DPR 523 (CA-SBR-10316H), December 14, 2000.

Van Norden, Rudolph W. "System of Southern Sierras Power Company, Part I – Power Plants." *Journal of Electricity, Power and Gas*. vol. XXXI, no. 1, July 5, 1913.

----. "System of Southern Sierras Power Company, Part II – Transmission and Distribution System." *Journal of Electricity, Power and Gas*. vol. XXXI, no. 2, July 12, 1913.

***Resource Name or #** "Tower Line" segment (CA-SBR-10316H, formerly CA-SBR-39H); Map Reference 9

Recorded By: Christeen Taniguchi **Date:** December 27, 2007 ☒ Continuation ☐ Update

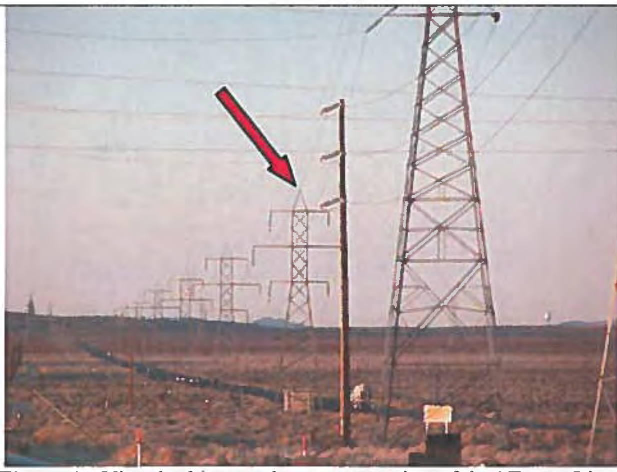


Figure 1: View looking northeast at a portion of the "Tower Line" located north of the evaluated segment along U. S. Highway 395. This segment is today known as Inyokern-Kramer–Randsburg No. 1 and still has its original towers (the red arrow points to the original tower that is located furthest south)

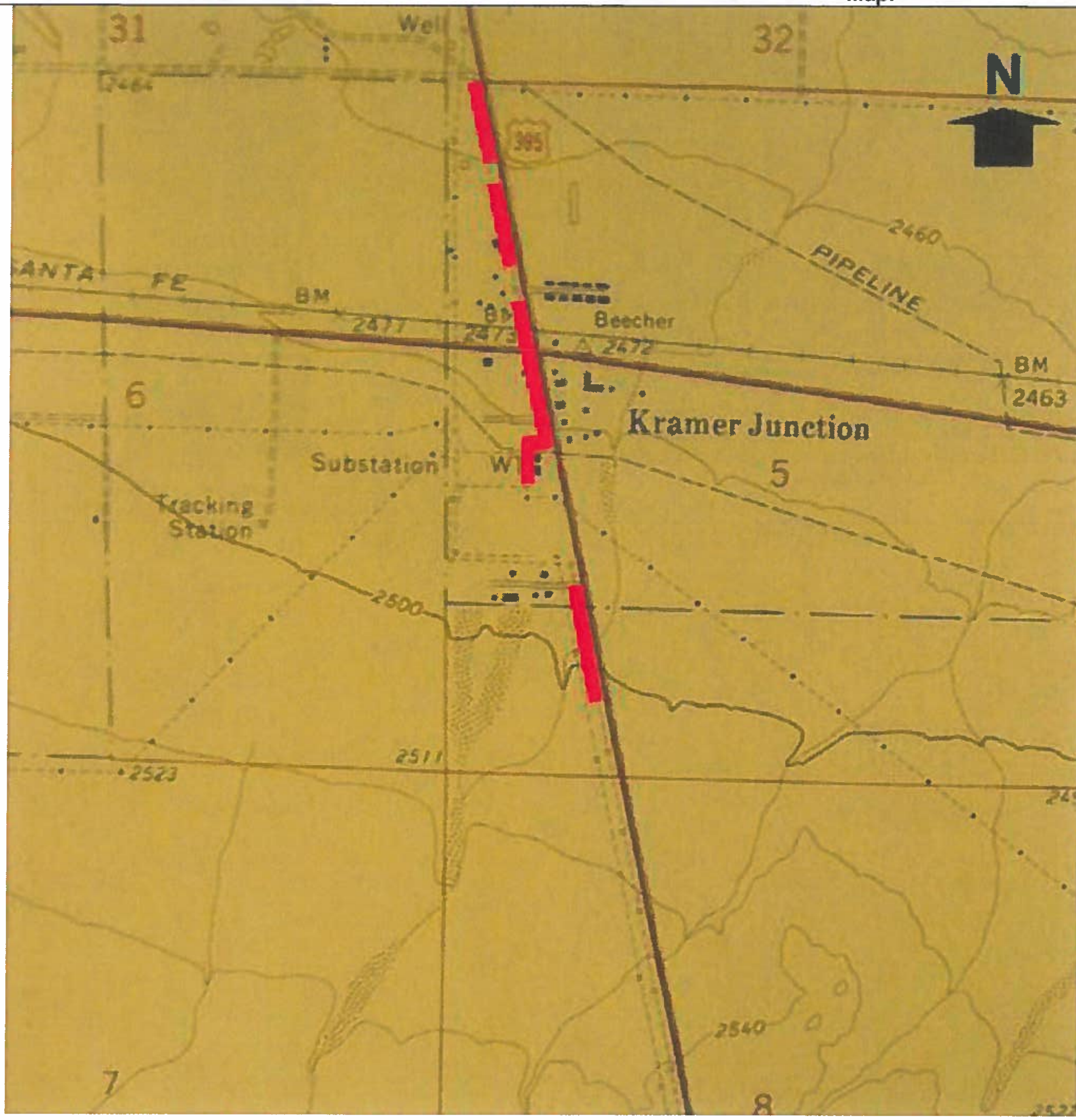
Figure 2: 1914 view of a tower from the "Tower Line" (C. O. Poole, "Hydroelectric Development on Bishop Creek, Cal. – IX," *Electrical World*, vol. 64, no. 24, December 12, 1914, 1143.)

State of California--- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI
Trinomial

***Resource Name or #** (Assigned by recorder) "Tower Line" segment (CA-SBR-10316H, formerly CA-SBR-39H); Map Reference 9

***Map Name:** Kramer Junction ***Scale:** 1:24,000 ***Date of Map:** 1973



The Inyokern-Kramer–Randsburg No. 1 segment for this study indicated by red lines.

1065466

7/12

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 36-010316 (Update)
HRI #
Trinomial CA-SBR-10316H (Update)

Resource name or # (Assigned by recorder)

Recorded by Daniel Ballester ***Date** May 2007 ___ Continuation √ Update
Affiliation: CRM TECH, Colton **Project No:** CRM TECH 2067A

A small portion of Site CA-SBR-10316H was re-visited on May 8-9, 2007, during a historical/archaeological resources survey for a proposed underground pipeline project (see p. 2). No notable changes in site condition were observed. Entailing only subsurface trenching for the installation of the pipeline at this location, the proposed project has no potential to affect the physical components, appearance, or function of the transmission line.

Report Citation:

Tang, Bai "Tom," Josh Smallwood, Daniel Ballester, and Laura H. Shaker
2007 Historical/Archaeological Resources Survey Report, Victor Valley Water District Pipeline Project, City of Victorville, San Bernardino County, California. On file, Archaeological Information Center, San Bernardino County Museum, Redlands.

USGS HESPERIA

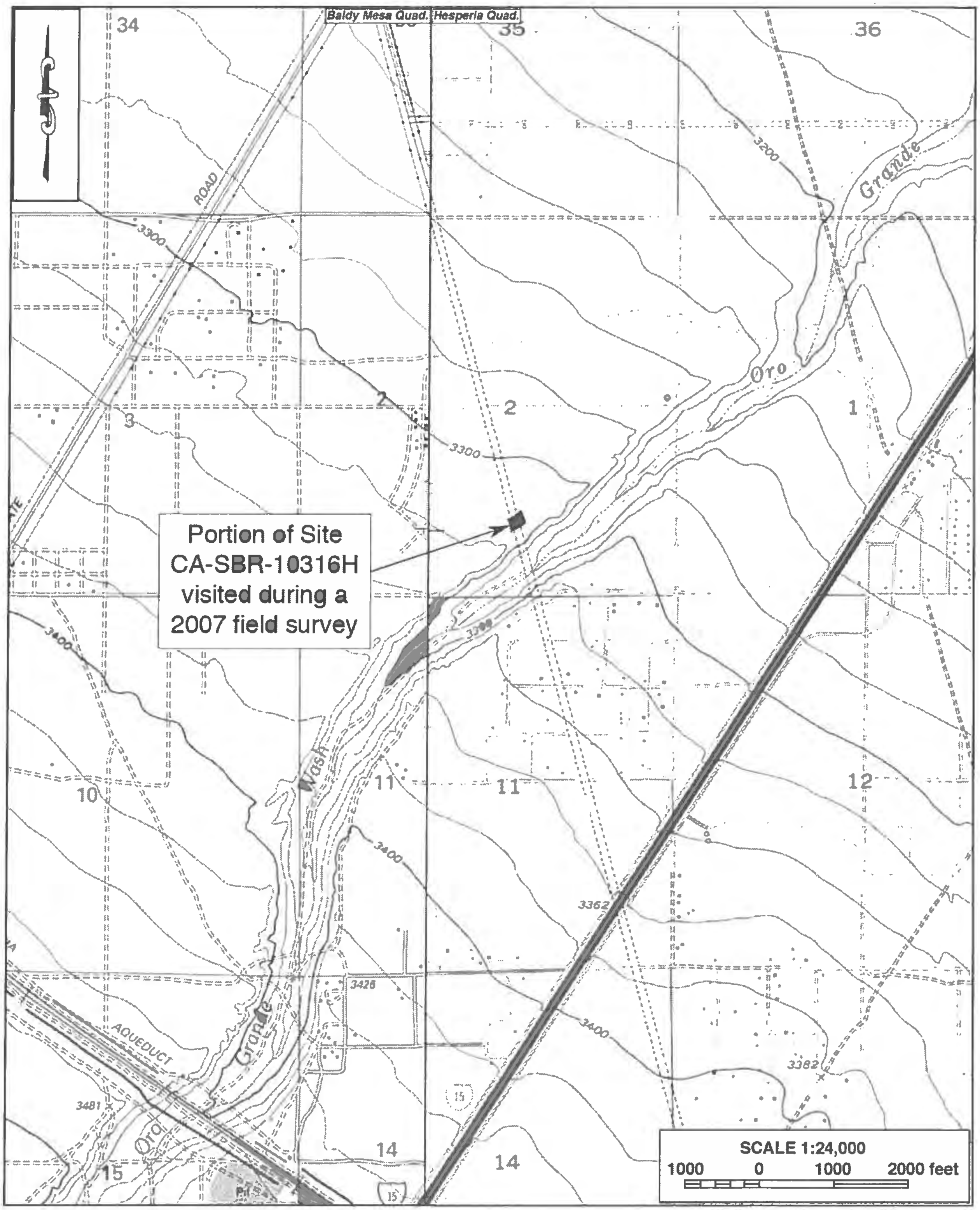
DB

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 36-010316 (Update)
HRI #
Trinomial CA-SBR-10316H (Update)

Page 2 of 2 *Resource Name or # (Assigned by recorder)

*Map Name: Baldy Mesa and Hesperia, Calif. *Scale: 1:24,000 *Date of Map: 1980/1996



DPR 523J (1/95) *Required information

1065698 2/12

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 36-010316 (Update)
HRI #
Trinomial CA-SBR-10316H (Update)

Resource name or # (Assigned by recorder)

Recorded by Daniel Ballester *Date March, 2007 Continuation √ Update
Affiliation: CRM TECH, Riverside Project No: CRM TECH 1949A

A segment of Site CA-SBR-10316H was re-visited in March 2007, during a historical/archaeological resources survey for a proposed road realignment project (see p. 2). No notable changes in site condition were observed.

Report Citation:

Smallwood, Josh, Daniel Ballester, and Laura H. Shaker
2007 Historical/Archaeological Resources Survey Report, U.S. Highway 395 Realignment EIR, Victor Valley Area, San Bernardino County, California. On file, Archaeological Information Center, San Bernardino County Museum, Redlands.

USGS VICTORVILLE NW

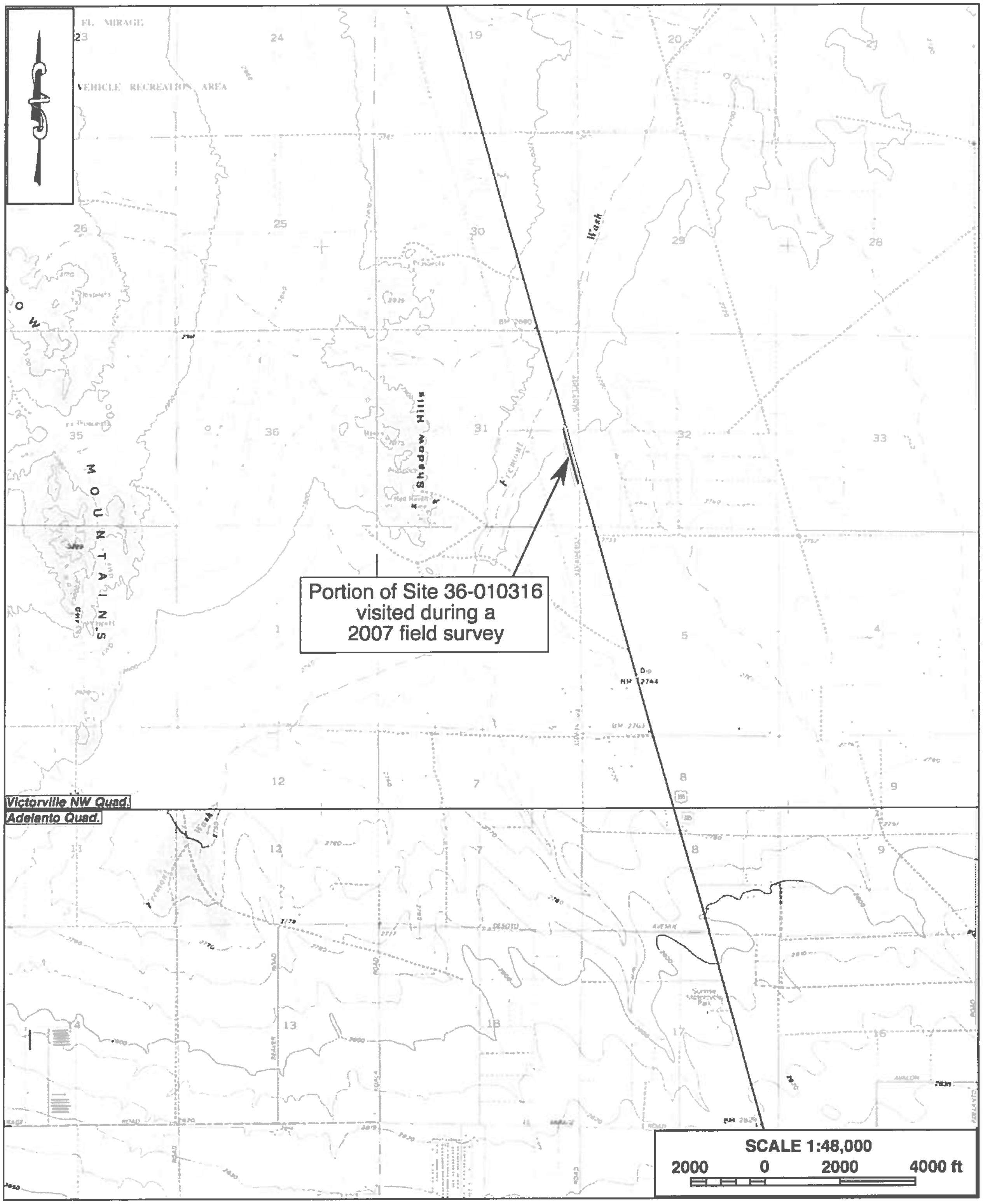
DB

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 36-010316 (Update)
HRI #
Trinomial CA-SBR-10316H (Update)

Page 2 of 2 *Resource Name or # (Assigned by recorder)

*Map Name: Victorville NW, Calif. *Scale: 1:24,000 (reduced) *Date of Map: 1993



DPR 523J (1/95) *Required information

10652222 pp 2+3 missing 4/12 Update 7/06

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-010316
HRI #
Trinomial CA-SBR-10316H
NRHP Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** (Assigned by recorder) Æ-Shapiro-2H

P1. Other Identifier:

***P2. Location: *a. County** San Bernardino, CA ☒Not for Publication ☐ Unrestricted

***b. USGS 7.5' Quad** Silverwood Lake, CA **Date** 1996

T 2 N; **R** 4 W; NE **¼ of the** NW **¼ of Sec** 18; **S.B.B.M.**

c. Address: None **City** **Zip**

d. UTM Zone 11 468606 **mE/** 3791167 **mN**

e. Other Locational Data (e.g., parcel #, legal description, directions to resource, additional UTMs, etc., when appropriate): This historical transmission line represents a stretch of power line running 238 miles between Bishop (CA) and San Bernardino (CA). The section that is described here runs north to south through Sawpit Canyon, adjacent to Sawpit Creek Rd. and continues south into San Bernardino (CA) via Devil Canyon.

***P3a. Description** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): This resource represents a portion of the 238-mile "Tower Line" built in 1911 by the South Sierra Power Company to bring electricity from Bishop (CA) to San Bernardino (CA). At the time of construction it was considered the world's longest power line. Construction techniques included the raising of 60-feet tall towers, measuring 15-feet 6-inches square at ground level. The towers are constructed of 4-inch galvanized angle iron vertical and corner supports, with 1.5-inch galvanized angle iron reinforcement "x" braces. Three parallel horizontal 4-inch galvanized angle iron arms are used to support the insulators and cables; the only aspects of these towers not of original construction are the insulators. The transmission line is currently used and maintained. More detailed information is provided with this primary record, information obtained by Applied EarthWorks, Inc. personnel from a private property owner (name unknown) during the survey of the Shapiro project area for the NRCS.

***P3b. Resource Attributes** (List all attributes and codes): HP11: Engineering Structure

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.) Not applicable.

***P6. Date Constructed/Age and Source:** ☐ Prehistoric ☒ Historic ☐ Both

***P7. Owner and Address:** Unknown.

***P8. Recorded by** (Name, affiliation, address): B. Sheets, M. Linder, Applied EarthWorks, Inc., 3292 E. Florida Ave., Suite A, Hemet, CA 92544.

P9. Date Recorded: 23 November 2005

***P10. Type of Survey:** ☐ Intensive ☐ Reconnaissance ☒ Other: Intuitive
Describe: National Resource and Conservation Service (NRCS) intuitive emergency survey

***P11. Report Citation** (Provide full citation or enter "none"): None.

Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

update 4/10

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 36-010316
HRI#
Trinomial: SBR-10316 H

Page 1 of 1 *Resource Name or # (Assigned by Recorder): CA-SBR-10316H

*Recorded by: Allen Estes, William Self Associates, Inc. **Date:** 12/9/04 ☐Continuation ☑Update

***P3a.** Description:

CA-SBR-10316H consists of historic ~~Hoover~~ Kramer 115 kV power transmission line. A 10-mile segment traverses the Victorville 2 Project alignment. Since its initial construction, in 1913, the line has gone through upgrades, and many of the towers have been rebuilt, often times on the same footprint as the original towers. A series of the 115 kV towers will be replaced by the VV2 Project with new towers along this alignment. WSA relocated, but did not rerecord the resource. This update is prepared in order to state that the portion of T-Line, Segment 3 from Tower #7000540 through Tower #7000668, a total of 76 towers, will be replaced by the Project.

P5. Photo or Drawing (Photo required for buildings, structures, and objects.)

***P5b.** Description of Photo (view, date, accession #) View of CA-SBR-10316H, facing SE.

Quad: Hesperia

update 6/02

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ~~P-36-000039~~ P36-010316
HRI #
Trinomial ~~CA-SBR-39H~~ Update CA-SBR-10316H
NRHP Status Code
Other Listings
Review Code Reviewer Date

*Resource Name or #: (Assigned by recorder)

P1. Other Identifier: Kramer-Victorville Transmission Line

***P2. Location:** ☒ Not for Publication ☐ Unrestricted

*a. County San Bernardino and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

*b. USGS 7.5' Quad Kramer Junction Date 1973 T 10 N; R 6 W: NW ¼ of SW ¼ of Sec 5 ; SB B.M.

c. Address City Zip

d. UTM: (Give more than one for large and/or linear resources) Zone: 11 ; 450780 mE / 3871530 mN

*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.) Kramer Junction. The transmission line roughly parallels Highway 395, and crosses the current All American Pipeline survey corridor of 100' approximately 650 m southeast of the intersection of Highway 395 and Highway 58. The UTMs listed above reflect this point.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.) This is the Southern California Edison Company's Kramer-Victor 115 kv Transmission line, which was originally part of the Southern Sierra Power Company's Control-San Bernardino Transmission Line completed in 1913. The line has been upgraded and rebuilt virtually tower for tower, frequently on the same footprint. The current survey relocated and photographed this transmission line, which intersects with the 100' All American Pipeline utility corridor at a point approximately 650 m southeast of the junction of Highways 395 and 58, near Kramer Junction. The graded dirt access road is approximately 20 feet wide in this area.

***P3b. Resource Attributes:** (See attributes and codes) HP 39. Other (Transmission Line)

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Roll AAPL-SR-2, Frame 23, view to the southeast.

***P6. Date Constructed / Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both

***P7. Owner and Address:** Southern California Edison Co.

***P8. Recorded by:** (Name, affiliation, and address) Dr. J. Underwood, S. Rose
KEA Environmental, Inc.
1420 Kettner Blvd., Ste. 620
San Diego, CA 92101

***P9. Date Recorded:** 12/14/00

***P10. Survey Type:** (Describe) Intensive pedestrian survey

***P11. Report Citation:** (Cite Survey report and other sources, or enter "none.") *Cultural Resources Survey of the All American Pipeline Conversion Project from Mettler, Kern County, California to Daggett, San Bernardino County, California.*

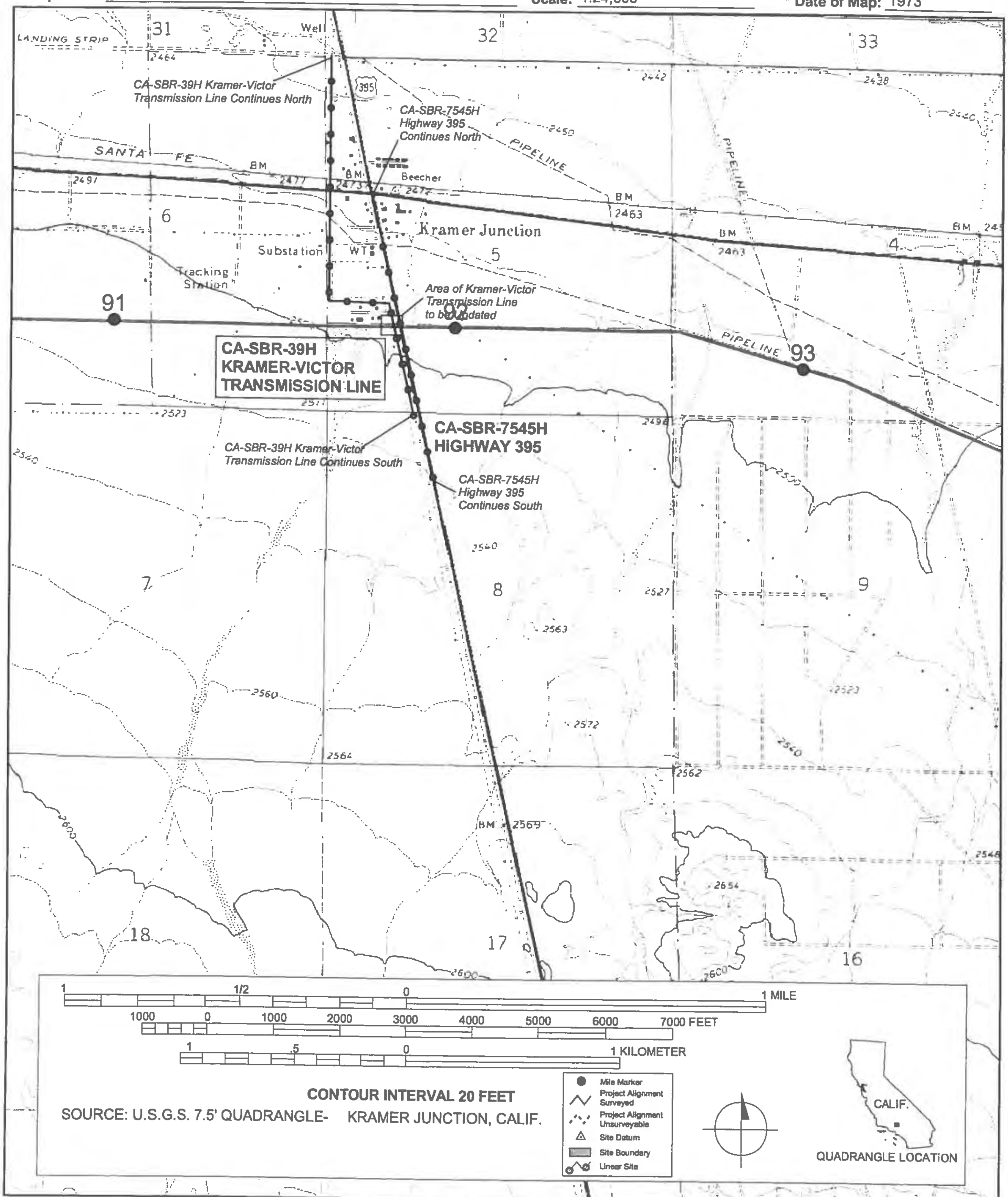
*Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # ~~P-36-000039~~ 36-010316
HRI #
Trinomial ~~CA-SBR-39H Update~~ SBR-10316H

Page 2 of 2 * Resource Name or # (Assigned by recorder)

* Map Name: KRAMER JUNCTION * Scale: 1:24,000 * Date of Map: 1973



DPR 523J (1/95) *Required Information

BR 10,316H

Report 89-7.8
NADB - 1061908

PSBR - 39 - H

Determined Eligible For NR 1995 NRHP-E-95-30

HISTORIC DOCUMENTATION AND EVALUATION SOUTHERN CALIFORNIA EDISON COMPANY KRAMER-VICTOR 115KV TRANSMISSION LINE

BACKGROUND

The Southern California Edison Company's Kramer-Victor 115kv Transmission Line represents an approximately thirty four mile portion of what was originally the Southern Sierras Power Company's Control-San Bernardino 140kv Tramsmission Line. This line was acquired by the Southern California Edison Company as a result of a merger between Edison and the California Electric Power Company in 1964. (The California Electric Power Company was the subsequent owner of the facilities of the Southern Sierras Power Company). Many changes have occurred to the original transmission system of the Southern Sierras Power Company over the years. The proposed undertaking, for which this assessment has been prepared, is an extension of these ongoing changes to meet current system needs. In essence, the present Kramer-Victor 115kv Transmission Line will be rebuilt nearly tower for tower (in some areas virtually on the "footprint" of the old towers) with structures capable of supporting conductors of larger size and capacity.

An article published in the Journal of Electricity, Power and Gas (Van Norden 1913) describes in detail the electric power system of the Southern Sierras Power Company. This article was written primarily as a promotional piece, describing the Company and its facilities in terms conveying a message of a modern, innovative and successful enterprise. Among those facilities described is the transmission line between the Southern Sierras Power Company's Control Substation near Bishop and its Auxiliary Steam Plant at San Bernardino.

Prior to 1911, the Southern Sierras Power Company was known as the Nevada-California Power Company and served primarily mining districts in the Owens Valley and adjacent parts of Nevada. Wishing to compete for what was considered a growing electrical market in San Bernardino Valley, the Company reorganized as the Southern Sierras Power Company and undertook a construction project to bring Bishop Creek hydroelectric power to this area.

By 1911, long distance transmission of electrical power was a proven technology. Hence, construction of a transmission line from the Bishop area to San Bernardino could be accomplished utilizing essentially "off the shelf" components. The transmission line towers were purchased from the Milliken Brothers of New York "...and conform in general with a type supplied for many systems by this company" (ibid:27). These were a lattice-steel type, which by this time had come into standard use in the industry and are of essentially modern design. As originally constructed, these towers deviated from present lattice-steel construction methods only in that they were first erected without concrete footings, undoubtedly to trim costs. Concrete footing were retrofitted to most of the line almost immediately, however, when it became clear that without them the line would not withstand the high seasonal winds common to the desert region. Fittings for wire connections to towers and insulators were steel and cast aluminum. The conductors were aluminum-steel.

The original configuration of the Control-San Bernardino Transmission Line included substations at Lone Pine, Inyokern, Randsberg, and Victorville. These substations utilized the then state of the art Bowie air break circuit breakers. The line was designed to operate at 140kv.

Understandably, the Van Norden article (ibid) trumpets the Southern Sierras Power Company in every way possible. In particular, the Control-San Bernardino Transmission Line is showcased, labeling it the "Tower Line". During this timeframe, new long distance records for electrical transmission were set and broken with some frequency. Completed in 1913, the Control-San Bernardino Transmission Line set a new long distance transmission record of two hundred thirty eight miles. This record was superceded that same year by the Big Creek Transmission Lines of Henry Huntington's Pacific Power and Light Company (Myers 1983).

In terms of regional importance in the Mojave Desert area, the most salient feature of the Control-San Bernardino transmission line was its supply and patrol road. Prior to construction of the line and the road, vehicle traffic proceeding north from San Bernardino to the Randsberg mining district traveled by way of the Helendale Highway. The transmission line supply and patrol road presented a much more direct route to Randsberg and was immediately adopted as the preferred course. Improved by the County in 1919, what became known as the San Bernardino-Randsberg road was purchased by the federal government and reconstructed as modern U.S. Highway 395 in 1950.

This road was an important development with regard to the communities of Adelanto and Kramer Junction. It also contributed to several small and ephemeral ranching developments established adjacent to its route. During a brief boom in the Kramer Hills mining district in the 1920s, this road provided better transportation access than was afforded during the initial heyday of this district in the late 1800s. Today, the portion of Highway 395 between Adelanto and Kramer Junction is best known as the most direct route between the eastern Los Angeles metropolitan basin and the ski resorts of Mammoth/June Mountain. The reader is directed to the report <u>Cultural Resource Assessment: Kramer-Victor 115kv Transmission Line Project</u> prepared by Greenwood and Associates for additional detail regarding the early history of this region and its relationship to the transmission line.

Report 89-8.2
NADB 1061909
PSBR-39-H

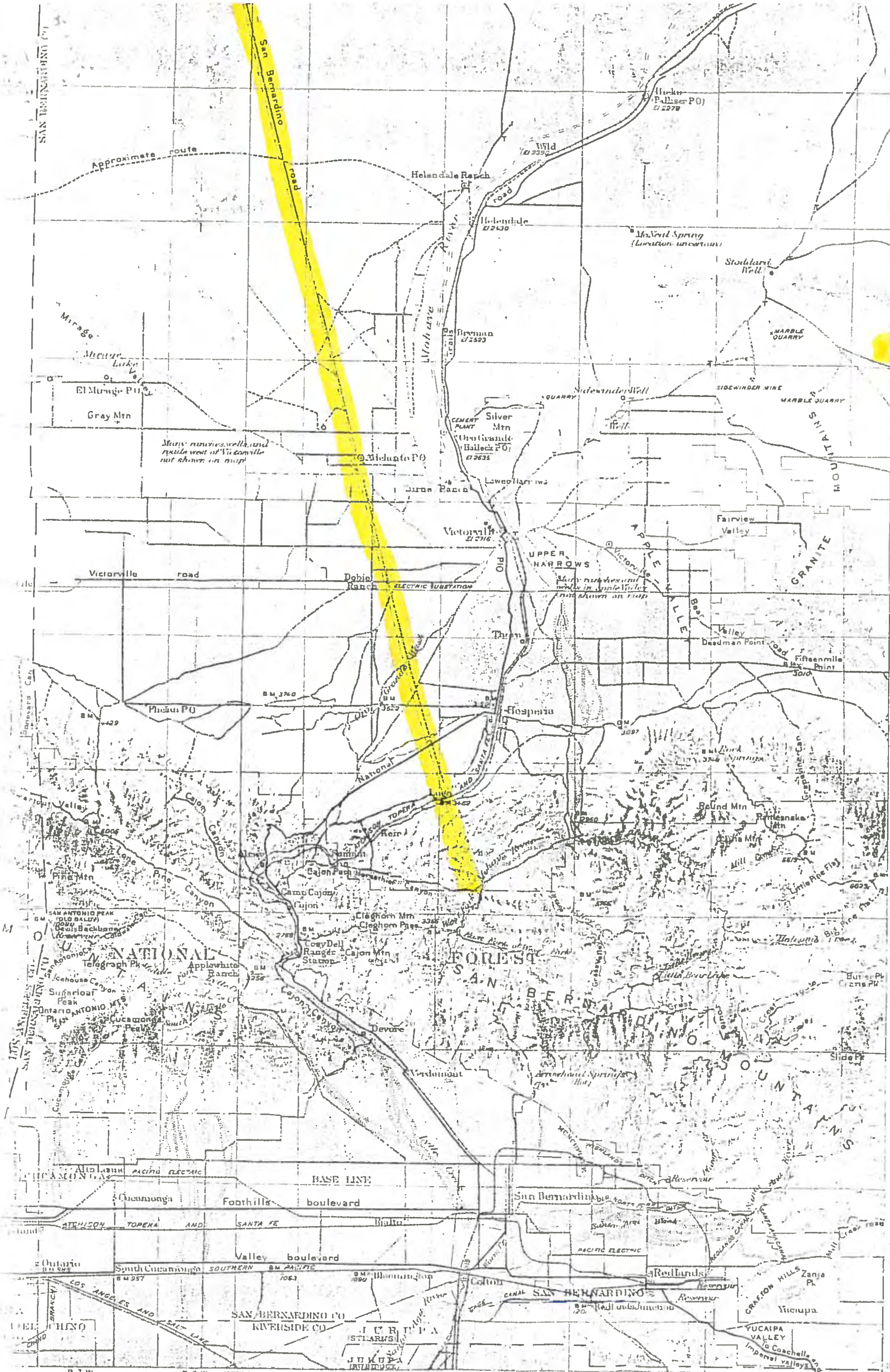
below the surface (at STP-A), and ground stone artifact(s) are present (one mano was found; additional materials possible).

Historical Cultural Resources

The Southern California Edison Company power line from Kramer Junction to Victorville was originally installed ca 1911-1913. What is now Highway 395 was constructed in conjunction with installation of the power line. The property containing Highway 395 was never deeded to the county, a situation which continues to complicate improvements and realignments to this day. This situation may also be responsible for restricted access and private fencing of the project right of way in the vicinity of Adelanto. Prior to installation of the power line, there was no development between Kramer Junction and Adelanto except for mines in the Kramer Hills. While the line built by the Southern Sierras Power Company had a profound influence upon transportation, settlement, and related developments of irrigation, agriculture, and local communities and services, this particular segment of the system has not been recorded as a historical resource. Along the corridor surveyed for this study, the line does not represent the original system configuration; reconstruction of the substations at Bishop, Inyokern, Randsburg, and Victor resulted in system realignments. Construction of an entirely new substation at Kramer Junction isolated the southern section of the transmission line between Randsburg and Victor substation. In this study area, the hardware has been updated, and the lattice steel towers are not the oldest examples of this type or otherwise unique (T. Taylor, personal communication 1989). Forty-six historical isolates were recorded during this study. Two clusters of isolates were identified: 1) in the general vicinity of Adelanto and to the south, an area which includes all of the recorded historical sites; and 2) in the vicinity of Astley Rancho. Additional isolates were encountered over the project alignment with some on the base and south slope of the Kramer Hills and are typically composed of clear sun colored amethyst glass fragments

PSBR-39H

IDENTIFIED FURTHER NORTH ON MAP AS: "SOUTHERN SIERRAS POWER CO. TRANSMISSION LINE"

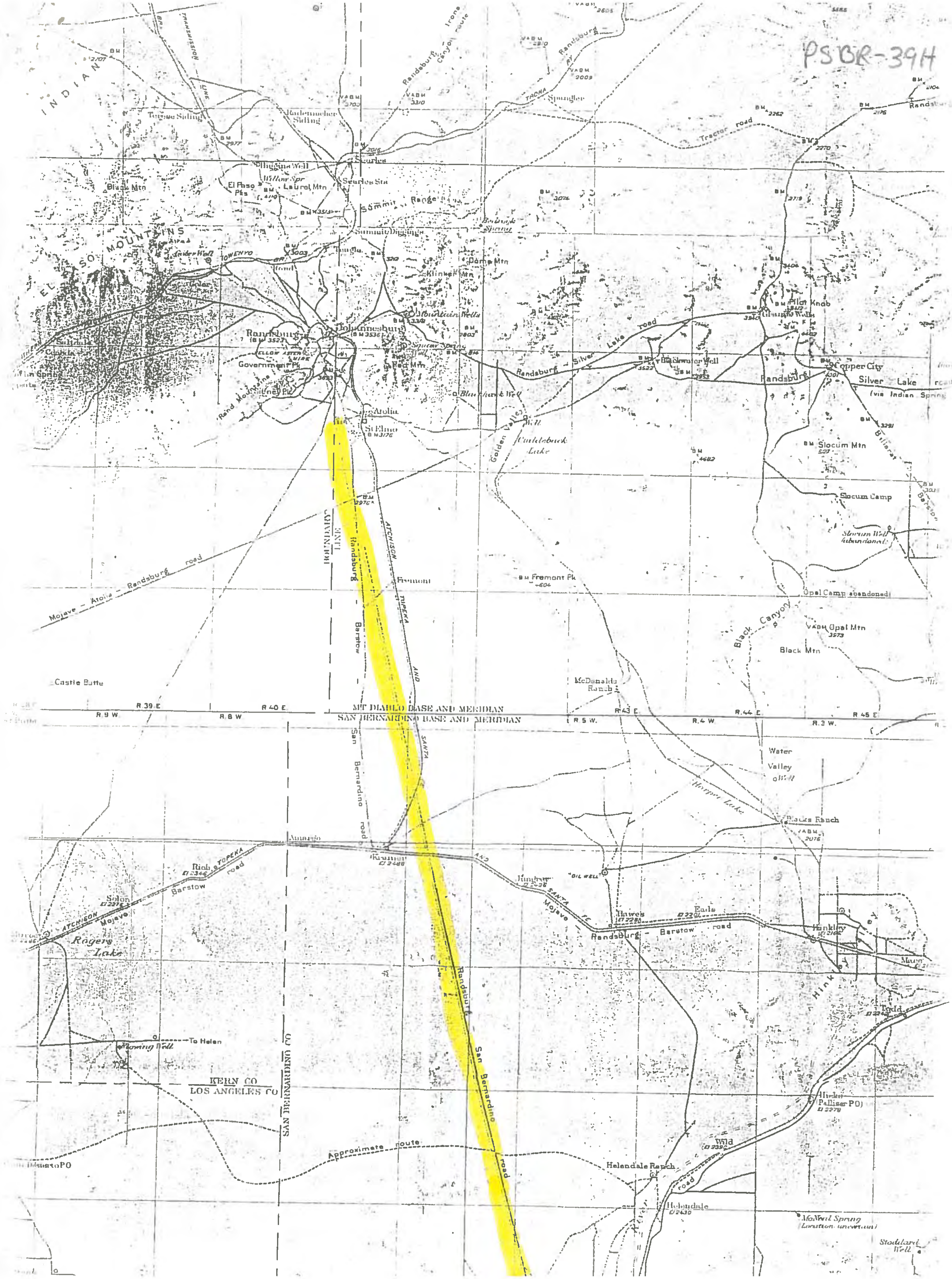


P OF PART OF MOHAVE DESERT REGION, CALIFORNIA
SHOWING DESERT WATERING PLACES (SHEET II)

Scale

Watering-place survey by David G. Thompson
Surveyed in 1917-1920

PSBR-39H



INDIAN
TRANSMISSION LINE
Randsburg Irone Canyon route
Randsburg Trona Ry
Spangler
Tractor road
Randsburg
Teagle Siding
Rademacher Siding
Searles
Digging Well
Searles Sta
Black Mtn
El Paso Pks
Willow Spr
Laurel Mtn
Summit Range
Summit Diggings
EL PASO MOUNTAINS
Garlock
Dome Mtn
Klinker Mtn
Pilot Knob
Mountain Wells
Randsburg
Johannesburg
Government Pk
Red Mtn
Randsburg - Silver Lake road
Blackwater Well
Copper City
Silver Lake
(via Indian Spring)
Rand Mountains
Atolia
St Elmo
Golden Valley
Cuddeback Lake
Slocum Mtn
Slocum Camp
Slocum Well (abandoned)
BOUNDARY LINE
Randsburg - Barstow road
ATCHISON TOPEKA AND SANTA FE
Fremont
BM Fremont Pk
Mojave - Atolia - Randsburg road
Opal Camp abandoned
Black Canyon
Opal Mtn
Black Mtn
Castle Butte
McDonalds Ranch
R.39 E.
R.40 E.
R.43 E.
R.44 E.
R.45 E.
R.9 W.
R.8 W.
R.5 W.
R.4 W.
R.3 W.
MT DIABLO BASE AND MERIDIAN
SAN BERNARDINO BASE AND MERIDIAN
San Bernardino road
Water Valley
Harper Lake
Blacks Ranch
Amargo
Kramer
Kingtree
OIL WELL
Rich
Solon
Mojave Barstow road
Rogers Lake
Hawes
Eads
Randsburg - Barstow road
Hinkley
Randsburg - San Bernardino road
To Helen
Mooring Well
KERN CO
LOS ANGELES CO
SAN BERNARDINO CO
Hicks (Palliser PO)
Wild
Approximate route
Helendale Ranch
Helendale
McNeil Spring (Location uncertain)
Stoddard Well

Resource Name or # Baseline Road

Recorded by: Josh Smallwood **Date** April 16, 2014 □ **Continuation** ☒ **Update**

36-015497 is Baseline Road, constructed on the Southern California Baseline, which was surveyed by Col. Henry Washington in 1853. It is registered as California Point of Historical Interest No. 12 (Kaiser 1973). From a survey monument on top of Mt. San Bernardino, Washington mapped two survey lines, one being a north-south Meridian, and the other an east-west Baseline. From these two lines the grid of townships and sections was formed to accurately map the Southern California region. The road itself was built in the 1850s following the mapped Baseline, although it began as a simple dirt freight road for wagons to haul goods to and from Los Angeles.

While Baseline Road is historically associated with the Southern California Baseline of 1853, the survey line itself is an imaginary map line, with no physical manifestation of it or the survey markers located within or adjacent to the Project alignment (George and Smallwood 2014). Baseline Road began as a dirt wagon road for freight traffic, and is today a modern, six-lane asphalt-concrete roadway with a landscaped center median (Figure 1). The pavement measures 90 ft wide at this location. The roadway is completely modern in its appearance, design, construction, and materials. The proposed Project involves lining of the existing buried pipeline, which travels beneath the roadway and has no potential, directly or indirectly, to alter, destroy, relocate, or remove any features that contribute to the historical integrity or significance of Baseline Road or the Southern California Baseline.

Figure 1 Baseline Road adjacent to the Project alignment (view to the west).

References

George, Joan, and Josh Smallwood
2014 Phase I Cultural Resources Assessment for the Etiwanda Pipeline North Liner Repair Project, Cities of Fontana and Rancho Cucamonga, San Bernardino County, California. Prepared for Helix Environmental Planning, La Mesa, CA. On file, San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands.

Kaiser, Kathryn H.
1973 Point of Historical Interest, "Baseline Road". On file, San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands.

STATE OF CALIFORNIA—RESOURCES AGENCY
DEPARTMENT OF PARKS AND RECREATION

POINT OF HISTORICAL INTEREST

DO NOT WRITE IN THIS BLOCK
Reg. No. SBr-012
Date 1-31-73
By

County San Bernardino | Name Baseline ~~Xxxxxxx~~ Road

Location A highway running parallel to & between Highland Ave. & Foothill Blvd., and extending from Highland to Claremont in San Bernardino County.

Historical Significance: Baseline ~~xxxxxx~~ Road runs through San Bernardino County, from Highland across San Bernardino Valley and a number of communities, continuing west as far as Azusa in Los Angeles County. It was constructed on the southern California Base Line, surveyed by Col. Henry Washington in 1853. A monument was erected on the summit of Mt. San Bernardino, and the line was laid out east and west from it. It became the basis for land titles then being established by California courts. For many years the county road has served as a through route joining the San Bernardino area with other communities along the foothills of the San Gabriel Mountains.

THIS POINT OF HISTORICAL INTEREST IS NOT A STATE REGISTERED HISTORICAL LANDMARK.

RECOMMENDED:	APPROVED: Kathryn H. Kaiser
Signature—Chairman, County Board of Supervisors	Signature—Chairman, Historical Landmarks Advisory Committee
Date December 4, 1972	Date January 26, 1973

DPR-147 (4-66)

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Redlands, California 92373

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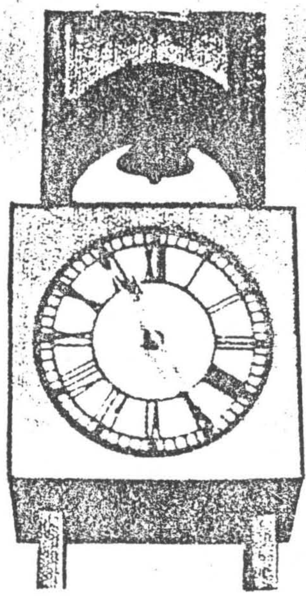

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THE BASE LINE ROAD

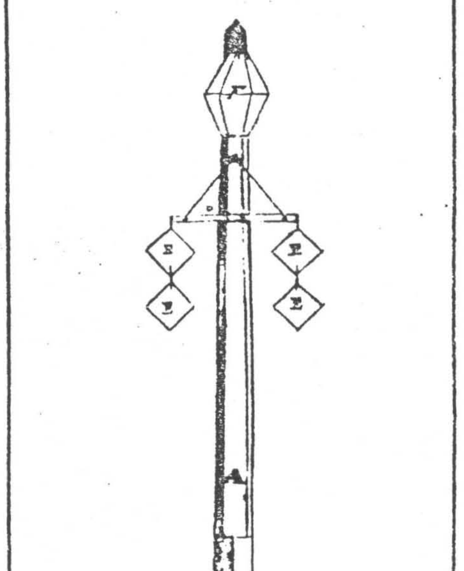
By ARDA M. HAENSZEL

BASE LINE is a curious name for a city street. It corresponds to 12th Street in San Bernardino, and is located beyond the northern limits of the original town of 1853, and almost a mile from its center. Eventually it became the nucleus for a satellite business district as the city grew and spread toward the mountains.

But Base Line Street doesn't belong exclusively to San Bernardino. Actually a secondary boulevard, along with Highland Avenue, Foothill Boulevard, Arrow Highway, and Valley Boulevard, in pre-freeway days it carried traffic all the way across the valley and beyond. It still serves a great deal of local and inter-city travel of personal and commercial nature. Beginning at the foot of the San Bernardino Mountains at East Highlands, it runs through the communities of Highland, San Bernardino, Rialto, Fontana, Etiwanda, Alta Loma, and Claremont, to San Dimas, where it joins Foothill Boulevard.

It doesn't even have a single designation, for signs refer to it as Base Line Street, Base Line Avenue, Base Line Road, or simply Base Line. Here and there it also becomes Baseline. It has been incorporated into the names of a number of business establishments along it, such as Base Line Laundry, at the site of the former Rabel Hot Springs resort in Highland, and Baseline Furniture Company in San Bernardino. An early real estate development of one-acre farms east of Waterman Avenue was called Baseline Gardens.

(Continued on Page 31)



Col. Washington's original survey monument.

3pp

BASE LINE

(Continued from Pg. 29)

But what is the origin of the name? After the Americans took over California, there began the long and complicated process in the courts of establishing titles to land according to the U. S. legal system. It was necessary to lay out the new state in a grid of townships and sections in order to determine boundaries. Accordingly, the survey was begun.

In southern California, the initial point chosen was the summit of Mt. San Bernardino, and in the fall of 1852, surveyor Col. Henry Washington arrived in the San Bernardino area. With the approach of winter imminent, he had to work quickly. His crew erected a pole or monument at the summit, and braced it with stones at the base and chains attached to sturdy nearby trees. At first there were shiny metal discs fastened to the top of the pole to catch the light for the surveyors' transits, but these soon blew off in the wind. Ten reference points were established to define the location of the monument, nine to natural landmarks, such as the summit of Cajon Pass, and two to buildings, the Asistencia in Old San Bernardino, and the Mormon stockade in the new settlement. Mormon accounts record seeing the campfires of the party on the mountain at night.

From the monument on Mt. San Bernardino two lines were laid out, the meridian running directly north-south, and the base line running east-west. From these two lines the grid of townships and sections was formed. Rancho boundaries were determined, and, in the communities, the blocks and lots were defined for the confirmation of land titles.

And what is the origin of the road? In the 1850's there was no direct road from San Bernardino to Los Angeles, for the area below the foothills of the San Gabriel Range was covered with a thick, impenetrable growth of chaparral. A traveler took either the southern route via Agua Mansa, Pomona and Spadra, or the devious northern route to the mouth of Cajon Pass, turning left at Devore and following the route of the ancient Mojave Trail turned wagon road along the foothills via Cucamonga.

Captain Jefferson Hunt

In an interview for the San Bernardino Sun around 1944, at a time when the San Bernardino City Council was debating whether to pave Base Line to the western city limits, one of the property owners, Jeff Daley, told the history of the building of the road along the base line.

In 1856, he said, his grandfather, after whom he was named, Capt. Jefferson Hunt, saw the need for a more direct route to Los Angeles. The Mormons were astute businessmen. Many, including Hunt, were engaged in wagon freighting. Members of the colony were also working hard on two money-making ventures to pay off the mortgage on the rancho, the production of wheat and flour in the valley and lumber in the mountains. These had to be taken to the fast-growing, fast-building Los Angeles area.

When those hardy pioneers recognised a need, they did something about it. Hunt soon had a road built as far as Cucamonga, where it joined the existing road. Participating in the project were well-known pioneers Joseph Hancock, John Mayfield and the seven Bemis brothers. The Base Line Road was the favorite one until the Southern Pacific Railroad came in 1874.

Appendix E – Energy Analysis

State Street Extension

ENERGY ANALYSIS

CITY OF SAN BERNARDINO

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JULY 12, 2019

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APPENDICES

LIST OF EXHIBITS

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LIST OF ABBREVIATED TERMS

(1)	Reference
AQIA	Air Quality Impact Analysis
ARB	Air Resources Board
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
EIR	Environmental Impact Report
EMFAC	Emissions Factor
EVs	Electric Vehicles
FERC	Federal Energy Regulatory Commission
GPA	General Plan Amendment
GWh	Gigawatt Hour
HHD	Heavy-Heavy Duty
ISO	Independent Service Operator
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
LHD	Light-Heavy Duty
MHD	Medium-Heavy Duty
MPG	Miles Per Gallon
MPO	Metropolitan Planning Organization
Project	State Street Extension
SCE	Southern California Edison
SF	Square Feet
SoCalGas	Southern California Gas
SP	Specific Plan
TEA-21	Transportation Equity Act for the 21st Century
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *State Street Extension Energy Analysis* is summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the California Environmental Quality Act (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: 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: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	5.0	*Less Than Significant*	*n/a*

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1 INTRODUCTION

This report presents the results of the energy analysis prepared by Urban Crossroads, Inc., for the proposed State Street Extension (referred to as Project). The purpose of this report is to ensure that energy implication is considered by the City of San Bernardino, as the lead agency, and to quantify anticipated energy usage associated with construction 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

The Project is located in the City of San Bernardino, on State Street between 16th Street and Baseline Street, and includes five proposed segments, as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The Project proposes to construct a new, approximately one-half mile segment of State Street between 16th Street and Baseline Street in approximately 2020 and includes five proposed segments.

EXHIBIT 1-A: LOCATION MAP

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2 EXISTING CONDITIONS

This section provides an overview of the existing energy conditions in the Project area and region.

2.1 OVERVIEW

The most recent data for California's estimated annual energy use is from 2016 and included:

- Approximately 7,830 trillion British Thermal Unit (BTU) of energy was consumed; (2);
- Approximately 2,115 billion cubic feet of natural gas (2); and
- Approximately 15.8 billion gallons of transportation fuel (for the year 2017) (3)

The most recent data provided by the United States Energy Information Administration (EIA) is from 2016 and illustrates energy use in California by demand sector as follows:

- Approximately 39.8 percent transportation;
- Approximately 23.7 percent industrial;
- Approximately 17.7 percent residential; and
- Approximately 18.9 percent commercial (4)

In 2017, total system electric generation for California was 292,039 gigawatt-hours (GWh). California's massive electricity in-state generation system generated approximately 206,336 GWh which accounted for approximately 71% of the electricity it uses; the rest was imported from the Pacific Northwest (14%) and the U.S. Southwest (16%) (5). Natural gas is the main source for electricity generation at 50% of the total in-state electric generation system power as shown in Table 2-1.

TABLE 2-1: TOTAL ELECTRICITY SYSTEM POWER (CALIFORNIA 2017)

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	California Power Mix (GWh)	Percent California Power Mix
Coal	302	0.15%	409	11,364	12,075	4.13%
Large Hydro	36,920	17.89%	4531	1,536	42,987	14.72%
Natural Gas	89,564	43.40%	46	8,705	98,315	33.67%
Nuclear	17,925	8.69%	0	8,594	26,519	9.08%
Oil	33	0.02%	0	0	33	0.01%
Other	409	0.20%	0	0	409	0.14%
Renewables	61,183	29.65%	12,502	10,999	84,684	29.00%
Biomass	5,827	2.82%	1,015	32	6,874	2.35%
Geothermal	11,745	5.69%	23	937	12,705	4.35%
Small Hydro	6,413	3.11%	1449	5	7,867	2.70%
Solar	24,331	11.79%	0	5,465	29,796	10.20%
Wind	12,867	6.24%	10,015	4,560	27,442	9.40%
Unspecified Sources of Power	N/A	N/A	22,385	4,632	27,017	9.25%
Total	**206,336**	**100%**	**39,873**	**45,830**	**292,039**	**100%**

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

A 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 fourth-largest producer of crude oil among the 50 states in 2017, after Texas, North Dakota, and Alaska, and, as of January 2018, third in oil refining capacity after Texas and Louisiana.

- 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 2016.

- California's total energy consumption is second-highest in the nation, but, in 2016, the state's per capita energy consumption ranked 48th, due in part to its mild climate and its energy efficiency programs.

- In 2017, California ranked second in the nation in conventional hydroelectric generation and first as a producer of electricity from solar, geothermal, and biomass resources.

- In 2017, solar PV and solar thermal installations provided about 16% of California's net electricity generation (6).

As indicated above, California is one of the nation's leading energy-producing states, and California per capita energy use is among the nation's most efficient. Given the nature of the proposed Project being industrial uses, 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 industrial uses planned for the Project.

2.2 ELECTRICITY

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 (San Onofre). 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 had revealed the extent to which the Southern 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 (2013 IEPR) after a collaborative process with other energy agencies, utilities, and air districts (7). If the resource development outlined in the preliminary plan continues as detailed, reliability in Southern California would likely be assured; however, tight resource margins have led energy agencies and the ARB to develop a contingency plan. This contingency plan was discussed at a public workshop in Los Angeles on August 20, 2014 and is detailed within this Section (8).

Electricity is provided to the Project by Southern California Edison (SCE). SCE provides electric power to more than 14 million persons in 15 counties and in 180 incorporated cities, within a service area encompassing approximately 50,000 square miles. 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 (9).

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 sufficient 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 (10).

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 2017. As indicated in Table 2-2, the 2017 SCE Power Mix has renewable energy at 32% of the overall energy resources. Geothermal resources are at 8%, wind power is at 10%, large hydroelectric sources are at 8%, solar energy is at 13%, and coal is at 0%. Biomass and waste sources have decreased to 0% from 1% in 2016. Natural gas is at 20% having decreased from 19% in 2016 (11).

TABLE 2-2: SCE 2017 POWER CONTENT MIX

Energy Resources	2017 SCE Power Mix
Eligible Renewable	**32%**
Biomass & waste	0%
Geothermal	8%
Small Hydroelectric	1%
Solar	13%
Wind	10%
Coal	**0%**
Large Hydroelectric	**8%**
Natural Gas	**20%**
Nuclear	**6%**
Other	**0%**
Unspecified Sources of power*	34%
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 model. The following summary of natural gas resources and service providers, delivery systems, and associated regulation is excerpted from information provided by the California Public Utilities Commission (CPUC).

> "The California Public Utilities Commission (PUC) 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.
>
> The vast majority of California's natural gas customers are residential and small commercial customers, referred to as "core" customers, who accounted for approximately 32% of the natural gas delivered by California utilities in 2012. Large

consumers, like electric generators and industrial customers, referred to as “noncore” customers, accounted for approximately 68% of the natural gas delivered by California utilities in 2012.

The PUC regulates the California utilities’ natural gas rates and natural gas services, including in-state transportation over the utilities’ transmission and distribution pipeline systems, storage, procurement, metering and billing. Most of the natural gas used in California comes from out-of-state natural gas basins. In 2012, California customers received 35% of their natural gas supply from basins located in the Southwest, 16% from Canada, 40% from the Rocky Mountains, and 9% from basins located within California. California gas utilities may soon also begin receiving biogas into their pipeline systems.

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 consumers are the Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Questar Southern Trails and Mojave Pipeline. 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, the PUC often participates in FERC regulatory proceedings to represent the interests of California natural gas consumers.

Most of the natural gas transported via the interstate pipelines, as well as some of the California-produced natural gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipeline systems (commonly referred to as California’s “backbone” natural gas pipeline system). Natural gas on the utilities’ backbone pipeline systems is then delivered into the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large noncore customers take natural gas directly off the high-pressure backbone pipeline systems, while core customers and other noncore customers take natural gas off the utilities’ distribution pipeline systems. The PUC has regulatory jurisdiction over 150,000 miles of utility-owned natural gas pipelines, which transported 82% of the total amount of natural gas delivered to California’s gas consumers in 2012.

SDG&E and Southwest Gas’ southern division are wholesale customers of SoCalGas, and currently receive all of their natural gas from the SoCalGas system (Southwest Gas also provides natural gas distribution service in the Lake Tahoe area). Some other municipal wholesale customers are the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC.

Some of the natural gas delivered to California customers may be delivered directly to them without being transported over the regulated utility systems. For example, the Kern River/Mojave pipeline system can deliver natural gas directly to some large customers, “bypassing” the utilities’ systems. Much of California-produced natural gas is also delivered directly to large consumers.

> PG&E and SoCalGas own and operate several natural gas storage fields that are located in northern and southern California. 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 natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently. (A portion of the Gill Ranch facility is owned by PG&E).
>
> California's regulated utilities do not own any natural gas production facilities. All of the natural gas sold by these utilities must be purchased from suppliers and/or marketers. The price of natural gas sold by suppliers and marketers was deregulated by the FERC in the mid-1980's and is determined by "market forces." However, the PUC decides whether California′s utilities have taken reasonable steps in order to minimize the cost of natural gas purchased on behalf of their core customers." (12)

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 PUC 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 2018, the Department of Motor Vehicles (DMV) identified 35 million registered vehicles in California (13), and those vehicles (as noted previously) consume an estimated 19 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 170,000 miles of highways and major roadways, more than 27 million passenger vehicles and light trucks, and almost 8 million medium- and heavy-duty vehicles (13). While gasoline consumption has been declining since 2008 it is still by far the dominant fuel. Petroleum comprises about 92 percent of all transportation energy use, excluding fuel consumed for aviation and most marine vessels (14). Nearly 19 billion gallons of on-highway fuel are burned each year, including 15.1 billion gallons of gasoline (including ethanol) and 3.9 billion gallons of diesel fuel (including biodiesel and renewable diesel). In 2016, Californians also used 194 million therms of natural gas as a transportation fuel (15), or the equivalent of 155 million gallons of gasoline.

[1] Fuel consumptions estimated utilizing information from EMFAC2017.

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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 Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. On the state level, the PUC and the California Energy Commissions (CEC) are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below. Project consistency with applicable federal and state regulations is also presented in *italicized* text.

3.1 FEDERAL REGULATIONS

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

The Intermodal Surface Transportation Efficiency Act of 1991 (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. *Transportation and access to the Project site is provided primarily 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.*

The Transportation Equity Act for the 21st Century (TEA-21)

The Transportation Equity Act for the 21st Century (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. *The Project site is located along major transportation corridors with proximate access to the Interstate freeway system and 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.*

3.2 CALIFORNIA REGULATIONS

Integrated Energy Policy Report

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the California Energy Commission 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 2018 Integrated Energy Policy Report (2018 IEPR) was adopted February 20, 2019, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2018 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 (16). *Electricity would be provided to the Project by Southern California Edison (SCE). SCE's Clean Power and Electrification Pathway (CPEP) white paper 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 2018 IEPR*.

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 a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access. *The Project site is located along major transportation corridors with proximate access to the Interstate freeway system. The Project does not propose a land use development but rather the widening of a road segment. Therefore the Project 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.*

California Code Title 24, Part 6, Energy Efficiency Standards

California Code of Regulations 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 GHG emissions. The 2019 version of Title 24 was adopted by the California Energy Commission (CEC) and will become effective on January 1, 2020. The 2019 Title 24 standards go into effect on January 1, 2020 and are applicable to building permit applications submitted on or after that date. The 2019 Title 24 standards require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, update indoor and outdoor lighting for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7 percent less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will about 53 percent less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30 percent less energy due to lighting upgrades (17). *As a conservative measure, the analysis herein assumes compliance with the 2016 Title 24 Standards and no additional reduction for compliance with the 2019 standards have been taken.*

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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 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

In addition, Appendix F of the *State CEQA Guidelines* (18), states that the means of achieving the goal of energy conservation includes the following:

- 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.

4.2 METHODOLOGY

Information from the CalEEMod 2016.3.2 outputs for the *State Street Extension Air Quality Impact Analysis* (AQIA) (Urban Crossroads, Inc., 2019) (19) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands. These outputs can be referenced in Appendix 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 2017 National Construction Estimator, Richard Pray (2017) (20), the typical power cost per 1,000 square feet of construction per month is estimated to be $2.32. For the State Street Extension development, the Project plans to develop 300,960 square feet of road segment over the course of 12 months. Based on Table 4-1, the total power cost of the on-site electricity usage during the construction of the proposed Project is estimated to be approximately $8,378.73. Additionally, as of June 1, 2018, SCE's general service rate schedule (GS-1) for an general uses are $0.07 per kWh of electricity (21). As shown on Table 4-2, the total electricity usage from on-site Project construction related activities is estimated to be approximately 119,696 kWh.

TABLE 4-1: PROJECT CONSTRUCTION POWER COST

Power Cost (per 1,000 SF of construction area per month)	**Total Construction Area Size** (1,000 SF)	**Construction Duration** (months)	**Project Construction Power Cost**
$2.32	300.960	12	$8,378,73
TOTAL PROJECT CONSTRUCTION POWER COST			***$8,378.73***

TABLE 4-2: PROJECT CONSTRUCTION ELECTRICITY USAGE

Cost per kWh	**Project Construction Electricity Usage (kWh)**
$0.07	119,696
TOTAL PROJECT CONSTURCTION ELECTRICTY	***119,696***

[1]Assumes the Project will be under the GS-1 General Industrial service rate under SCE

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 4-3.

Eight-hour daily use of all equipment is assumed. The aggregate fuel consumption rate for all equipment is estimated at 18.5 hp-hr-gal., obtained from California Air Resources Board (CARB) 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (22). For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is standard practice consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the City and region.

As presented in Table 4-3, Project construction activities would consume an estimated 38,156 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 4-3: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Activity/Duration	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Demolition (65 days)	Concrete/Industrial Saws	81	1	8	0.73	473	1,662
	Excavators	158	3	8	0.38	1,441	5,063
	Rubber Tired Dozers	247	2	8	0.40	1,581	5,554
Earthwork (65 days)	Excavators	158	1	8	0.38	480	1,688
	Graders	187	1	8	0.41	613	2,155
	Rubber Tired Dozers	247	2	8	0.40	1,581	5,554
	Scrapers	367	1	8	0.48	1,409	4,952
	Tractors/Loaders/Backhoes	97	3	8	0.37	861	3,026
Paving (65 days)	Pavers	130	2	8	0.42	874	3,069
	Paving Equipment	132	2	8	0.36	760	2,671
	Rollers	80	2	8	0.38	486	1,709
Traffic Installations (65 days)	Air Compressors	78	1	8	0.48	300	1,052
CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)							***38,156***

4.3.3 CONSTRUCTION WORKER FUEL ESTIMATES

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the construction worker trips would generate an estimated 71,663 VMT (19). Data regarding Project related construction worker trips were based on CalEEMod 2016.3.2 model defaults utilized within the AQIA.

Vehicle fuel efficiencies for LDA were estimated using information generated within the 2014 version of the Emissions FACtor model (EMFAC) developed by the CARB. EMFAC 2014 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 ARB to project changes in future emissions from on-road mobile sources (23). EMFAC 2014 was run for the LDA vehicle class within the California sub-area for a 2022 calendar year. Data from EMFAC 2014 is shown in Appendix 3.2.

As generated by EMFAC 2014, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2022 are estimated to have a fuel efficiency of 32.58 miles per gallon (mpg). Table 4-4 provides an estimated annual fuel consumption resulting from the Project generated by LDAs related to construction worker trips. Based on Table 4-4, it is estimated that 2,199 gallons of fuel will be consumed related to construction worker trips during full construction of the proposed Project. Project 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.

TABLE 4-4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES

Construction Activity	Worker Trips / Day	Trip Length	Vehicle Miles	Average Vehicle Fuel Economy	Estimated Fuel Consumption
Demolition (65 days)	15	14.7	14,333	32.58	440
Earthwork (65 days)	20	14.7	19,110	32.58	586
Paving (65days)	15	14.7	14,333	32.58	440
Traffic Installations (65 days)	25	14.7	23,888	32.58	733
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION					***2,199***

4.3.4 CONSTRUCTION HAULING FUEL ESTIMATES

With respect to estimated VMT, the construction hauling trips would generate an estimated 163,220 VMT along area roadways (19). It is assumed that 100% of all hauling trips are from heavy-heavy duty trucks (HHD). These assumptions are consistent with the 2016.3.2 CalEEMod defaults utilized within the within the AQIA (19). Vehicle fuel efficiencies for HHD trucks were estimated using information generated within EMFAC 2014. For purposes of this analysis, EMFAC

2014 was run for the HHD vehicle class within the California sub-area for a 2022 calendar year. Data from EMFAC 2014 is shown in Appendix 3.5.

As generated by EMFAC 2014, an aggregated fuel economy of HHD trucks ranging from model year 1974 to model year 2022 are estimated to have a fuel efficiency of 6.38 mpg. Based on Table 4-5, it is estimated that 9,902 gallons of fuel will be consumed related to construction hauling trips during full construction of the proposed Project.

TABLE 4-5: CONSTRUCTION HAULING FUEL CONSUMPTION ESTIMATES

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Hauling					
Demolition (65 days)	495	20	9,900	6.38	1,551
Earthwork (65 days)	2,666	20	53,320	6.38	8,351
PROJECT HAULING HEAVY DUTY TRUCK TOTAL					***9,902***

4.3.5 CONSTRUCTION ENERGY EFFICIENCY/CONSERVATION MEASURES

The equipment used for Project construction would conform to CARB regulations and CA emissions standards. 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.

The Project would utilize construction contractors which practice compliance with applicable CARB regulation 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.

Additionally, certain incidental construction-source energy efficiencies would likely accrue through implementation of California regulations and best available control measures (BACM). More specifically, California Code of Regulations 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. To this end, "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 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.

Indirectly, construction energy efficiencies and energy conservation would be achieved for the proposed development through energy efficiencies realized from bulk purchase, transport and use of construction materials.

A full analysis related to the energy needed to form construction materials is not included in this analysis due to a lack of detailed Project-specific information on construction materials. At this time, an analysis of the energy needed to create Project-related construction materials would be extremely speculative and thus has not been prepared.

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.

4.5 SUMMARY

4.5.1 CONSTRUCTION ENERGY DEMANDS

The estimated power cost of on-site electricity usage during the construction of the proposed Project is assumed to be around $8,378.73. 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 around 119,696 kWh.

Construction equipment used by the Project would result in single event consumption of approximately 38,156 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. Best available control measures 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 proposed Project would result in the estimated fuel consumption of 2,199 gallons of fuel. Additionally, fuel consumption from construction hauling trips will total approximately 9,902 gallons. Diesel fuel would be supplied by City and regional commercial vendors. Indirectly, construction energy efficiencies and energy conservation would be achieved through the use of bulk purchases, transport and use of construction materials. The 2018 IEPR released by the California Energy Commission has shown that fuel efficiencies are getting better within on and off-road vehicle engines due to more stringent government requirements (16). As supported by the preceding discussions, Project construction energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

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5 CONCLUSION

Impact Energy-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 would not result in the inefficient, wasteful or unnecessary consumption of energy. Further, the energy demands of the Project can be accommodated within the context of available resources and energy delivery systems. 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 of California.

Impact Energy-2: ***Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.***

The Project includes an extension of State Street and would not result in the inefficient, wasteful, or unnecessary consumption of energy. In fact, extending State Street to the south will help reduce traffic congestion and consequently reduce a wasteful use of fuel (energy). Further, the Project would not cause or result in the need for additional energy producing facilities or energy delivery systems.

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7 CERTIFICATION

The contents of this energy report represent an accurate depiction of the environmental impacts associated with the proposed State Street Extension Project. The information contained in this energy report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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Master of Science in Environmental Studies
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PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June, 2013
Planned Communities and Urban Infill – Urban Land Institute • June, 2011
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APPENDIX 3.1:

CALEEMOD ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

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APPENDIX 3.2:

EMFAC 2014 MODEL OUTPUTS

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Appendix F – Greenhouse Gas Analysis

State Street Extension

GREENHOUSE GAS ANALYSIS

CITY OF SAN BERNARDINO

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JULY 12, 2019

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LIST OF ABBREVIATED TERMS

(1)	Reference
AB	Assembly Bill
APA	Administrative Procedure Act
APS	Alternative Planning Organizations
AQIA	Air Quality Impact Analysis
AR5	IPCC's 5th Assessment Report
ARB	California Air Resources Board
BAU	Business As Usual
C_2F_6	Hexafluoroethane
C_2H_6	Ethane
$C_2H_2F_4$	Tetrafluroethane
$C_2H_4F_2$	Ethylidene Fluoride
CAA	Federal Clean Air Act
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGAPS	California LBNL GHG Analysis of Policies Spreadsheet
CALGreen	California Green Building Standards Code
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CAP	Climate Action Plan
CAT	Climate Action Team
CBSC	California Building Standards Commission
CEC	California Energy Commission
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CF_4	Tetrafluoromethane
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH_4	Methane
CHF_3	Carbon Trifluoride
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COP	Conference of the Parties
CPUC	California Public Utilities Commission
EPA	Environmental Protection Agency

EPS	Emission Performance Standard
EVSE	Electric Vehicle Supply Equipment
FED	Functional Equivalent Document
GCC	Global Climate Change
GHGA	Greenhouse Gas Analysis
GPD	Gallons Per Day
GPY	Gallons Per Year
GWP	Global Warming Potential
H_2O	Water
HFC	Hydrofluorocarbons
HP	Horsepower
IPCC	Intergovernmental Panel on Climate Change
ISO	Independent System Operator
LBNL	Lawrence Berkeley National Laboratory
LCA	Life-Cycle Analysis
LCFS	Low Carbon Fuel Standard
LEV	Low-Emission Vehicle
MMR	Mandatory Reporting Rule
$MMTCO_2e$	Million Metric Ton of Carbon Dioxide Equivalent
MPG	Miles Per Gallon
MPOs	Metropolitan Planning Organizations
$MTCO_2e$	Metric Ton of Carbon Dioxide Equivalent
MWELO	Model Water Efficient Landscape Ordinance
MY	Model Year
NHTSA	National Highway Traffic Safety Administration
N_20	Nitrogen Dioxide/Nitrous Oxide
NCHRP	National Cooperative Highway Research Program
NDC	Nationally Determined Contributions
NF_3	Nitrogen Trifluoride
NIOSH	National Institute for Occupational Safety and Health
NO_X	Oxides of Nitrogen
PFC	Perfluorocarbons
PM_{10}	Particulate Matter 10 microns in diameter or less
$PM_{2.5}$	Particulate Matter 2.5 microns in diameter or less
PPM	Parts Per Million
PPT	Parts Per Trillion
Project	State Street Extension
RPS	Renewable Portfolio Standard

RTP	Regional Transportation Plan
SAR	Second Assessment Report
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategies
SF_6	Sulfur Hexaflouride
SLPS	Short-Lived Climate Pollutant Strategy
UNFCCC	United Nations' Framework Convention on Climate Change
URBEMIS	Urban Emissions
UTR	Utility Tractors
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WRI	World Resources Institute
WSA	Water Supply Assessment
ZE/NZE	Zero and Near-Zero Emissions

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *State Street Extension Greenhouse Gas Analysis* is summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines (1). Table ES-1 shows the findings of significance for potential greenhouse gas impacts under CEQA.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
GHG Impact #1: The Project would not generate direct or indirect greenhouse gas emission that would result in a significant impact on the environment.	4.0	*Less Than Significant*	*n/a*
GHG Impact #2: The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.	4.0	*Less Than Significant*	*n/a*

ES.2 REGULATORY REQUIREMENTS

The Project would be required to comply with regulations imposed by the State of California and the South Coast Air Quality Management District (SCAQMD) aimed at the reduction of air pollutant emissions. Those that are directly and indirectly applicable to the Project and that would assist in the reduction of greenhouse gas emissions include:

- Global Warming Solutions Act of 2006 (AB32) (2).
- Regional GHG Emissions Reduction Targets (2)/Sustainable Communities Strategies (SB 375) (3).
- Pavley Fuel Efficiency Standards (AB1493). Establishes fuel efficiency ratings for new vehicles (4).
- Title 24 California Code of Regulations (California Building Code). Establishes energy efficiency requirements for new construction (5).
- Title 20 California Code of Regulations (Appliance Energy Efficiency Standards). Establishes energy efficiency requirements for appliances (6).
- Title 17 California Code of Regulations (Low Carbon Fuel Standard). Requires carbon content of fuel sold in California to be 10% less by 2020 (7).
- California Water Conservation in Landscaping Act of 2006 (AB1881). Requires local agencies to adopt the Department of Water Resources updated Water Efficient Landscape Ordinance or equivalent by January 1, 2010 to ensure efficient landscapes in new development and reduced water waste in existing landscapes (8).

- Statewide Retail Provider Emissions Performance Standards (SB 1368). Requires energy generators to achieve performance standards for GHG emissions (9).
- Renewable Portfolio Standards (SB 1078). Requires electric corporations to increase the amount of energy obtained from eligible renewable energy resources to 20 percent by 2010 and 33 percent by 2020 (10).
- Senate Bill 32 (SB 32). Requires the state to reduce statewide greenhouse gas emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15 (11).

Promulgated regulations that will affect the Project's emissions are accounted for in the Project's GHG calculations provided in this report. In particular, the Pavley Standards, Low Carbon Fuel Standards, and Renewable Portfolio Standards (RPS) will be in effect for the AB 32 target year of 2020, and therefore are accounted for in the Project's emission calculations.

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1 INTRODUCTION

This report presents the results of the greenhouse gas analysis (GHGA) prepared by Urban Crossroads, Inc., for the State Street Extension (Project). The purpose of this GHGA is to evaluate Project-related construction emissions and determine the level of greenhouse gas (GHG) impacts as a result of constructing the proposed Project.

1.1 SITE LOCATION

The Project is located in the City of San Bernardino, on State Street between 16th Street and Baseline Street, and includes five proposed segments, as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The Project proposes to construct a new, approximately one-half mile segment of State Street between 16th Street and Baseline Street in approximately 2020 and includes five proposed segments.

EXHIBIT 1-A: LOCATION MAP

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2 CLIMATE CHANGE SETTING

2.1 INTRODUCTION TO GLOBAL CLIMATE CHANGE

Global Climate Change (GCC) is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. GCC is currently one of the most controversial environmental issues in the United States, and much debate exists within the scientific community about whether or not GCC is occurring naturally or as a result of human activity. Some data suggests that GCC has occurred in the past over the course of thousands or millions of years. These historical changes to the earth's climate have occurred naturally without human influence, as in the case of an ice age. However, 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 Project evaluated in this GHGA cannot generate enough greenhouse gas emissions to affect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of greenhouse gases combined with the cumulative increase of all other sources of greenhouse gases, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, Section 3.0 will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

2.2 GLOBAL CLIMATE CHANGE DEFINED

GCC refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO_2 (carbon dioxide), N_2O (nitrous oxide), CH_4 (methane), hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the earth's atmosphere, but prevent radioactive heat from escaping, thus warming the earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages.

Gases that trap heat in the atmosphere are often referred to as greenhouse gases. Greenhouse gases are released into the atmosphere by both natural and anthropogenic (human) activity. Without the natural greenhouse gas effect, the earth's average temperature would be approximately 61° Fahrenheit (F) cooler than it is currently. The cumulative accumulation of these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

2.3 GREENHOUSE GASES

GREENHOUSE GASES AND HEALTH EFFECTS

Greenhouse gases trap heat in the atmosphere, creating a greenhouse gas effect that results in global warming and climate change. Many gases demonstrate these properties and as discussed in Table 2-1. For the purposes of this analysis, emissions of CO_2, CH_4, and NO_2 were evaluated (see Table 3-1 later in this report) because these gases are the primary contributors to GCC from development projects. Although there are other substances such as fluorinated gases that also contribute to GCC, these fluorinated gases were not evaluated as their sources are not well-defined and do not contain accepted emissions factors or methodology to accurately calculate these gases.

TABLE 2-1: GREENHOUSE GASES

Greenhouse Gases	Description	Sources	Health Effects
Water Vapor (H_2O)	H_20 is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to 'hold' more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of	The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.	There are no known direct health effects related to water vapor at this time. It should be noted however that when some pollutants react with water vapor, the reaction forms a transport mechanism for some of these pollutants to enter the human body through water vapor.

Greenhouse Gases	Description	Sources	Health Effects
	water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the earth's surface and heat it up) (12).		
Carbon Dioxide (CO_2)	CO_2 is an odorless and colorless GHG. Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, CO_2 concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30 percent. Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (13).	Carbon dioxide is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. Carbon dioxide is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering	Outdoor levels of carbon dioxide are not high enough to result in negative health effects. According to the National Institute for Occupational Safety and Health (NIOSH) high concentrations of carbon dioxide can result in health effects such as: headaches, dizziness, restlessness, difficulty breathing, sweating, increased heart rate, increased cardiac output, increased blood pressure, coma, asphyxia, and/or convulsions. It should be noted that current concentrations of carbon dioxide in the earth's atmosphere are estimated to be approximately 370 parts per million (ppm), the actual reference exposure

Greenhouse Gases	Description	Sources	Health Effects
		of carbonate rocks (14).	level (level at which adverse health effects typically occur) is at exposure levels of 5,000 ppm averaged over 10 hours in a 40-hour workweek and short-term reference exposure levels of 30,000 ppm averaged over a 15 minute period (15).
Methane (CH_4)	CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs.	Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning (16).	Methane is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Exposure to high levels of methane can cause asphyxiation, loss of consciousness, headache and dizziness, nausea and vomiting, weakness, loss of coordination, and an increased breathing rate.
Nitrous Oxide (N_2O)	N_2O, also known as laughing gas, is a colorless greenhouse gas. Concentrations of nitrous oxide also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb).	Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources,	Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage) (17).

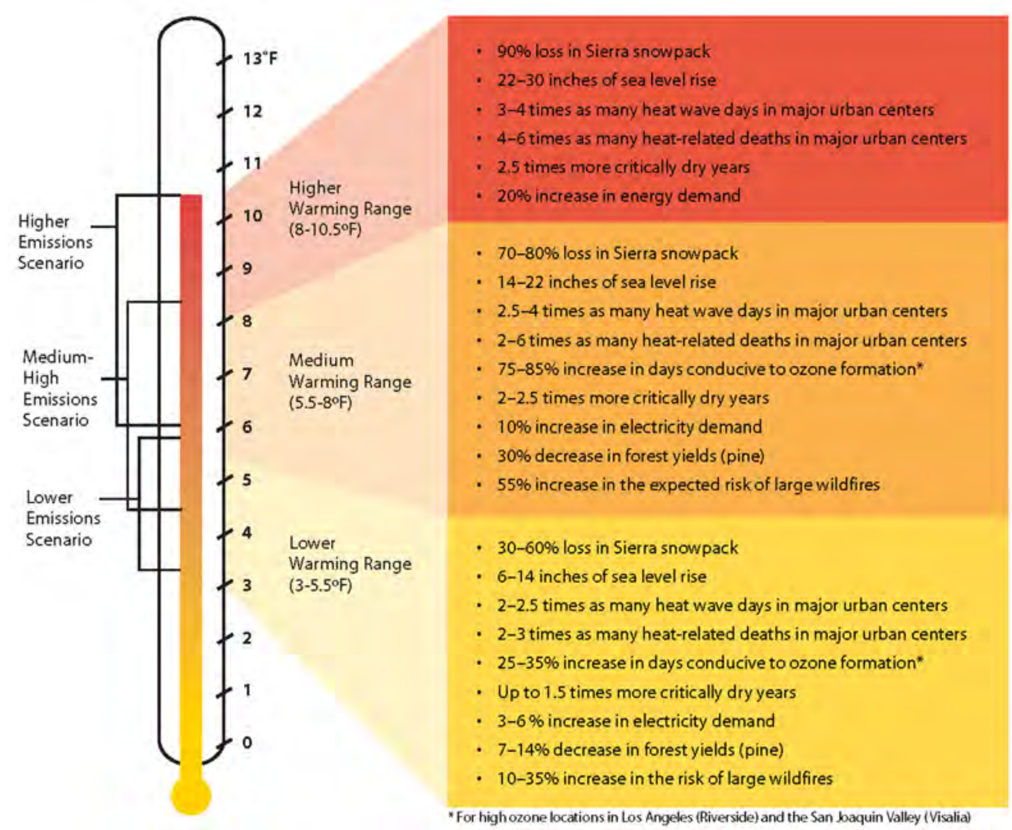
Greenhouse Gases	Description	Sources	Health Effects
		some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, i.e., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars. Nitrous oxide can be transported into the stratosphere, be deposited on the earth's surface, and be converted to other compounds by chemical reaction (17).	
Chlorofluorocarbons (CFCs)	CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the earth's surface).	CFCs have no natural source but were first synthesized in 1928. They were used for refrigerants, aerosol propellants and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that	In confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

Greenhouse Gases	Description	Sources	Health Effects
		some of the CFCs will remain in the atmosphere for over 100 years (18).	
Hydrofluorocarbons (HFCs)	HFCs are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF_3), HFC-134a (CH_2FCF), and HFC-152a (CH_3CF_2). Prior to 1990, the only significant emissions were of HFC-23. HFC-134a emissions are increasing due to its use as a refrigerant.	HFCs are manmade for applications such as automobile air conditioners and refrigerants.	No health effects are known to result from exposure to HFCs.
Perfluorocarbons (PFCs)	PFCs have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). The U.S. EPA estimates that concentrations of CF_4 in the atmosphere are over 70 ppt.	The two main sources of PFCs are primary aluminum production and semiconductor manufacture.	No health effects are known to result from exposure to PFCs.
Sulfur Hexafluoride (SF_6)	Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest global warming potential (GWP) of any gas evaluated (23,900) (19). The U.S. EPA indicates that concentrations in the 1990s were about 4 ppt.	Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.	In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Greenhouse Gases	Description	Sources	Health Effects
Nitrogen Trifluoride (NF_3)	NF_3 is a colorless gas with a distinctly moldy odor. The World Resources Institute (WRI) indicates that NF_3 has a 100-year GWP of 17,200 (20).	NF_3 is used in industrial processes and is produced in the manufacture of semiconductors and LCD (Liquid Crystal Display) panels, and types of solar panels and chemical lasers.	Long-term or repeated exposure may affect the liver and kidneys and may cause fluorosis (21).

The potential health effects related directly to the emissions of CO_2, CH_4, and N_2O as they relate to development projects such as the proposed Project are still being debated in the scientific community. Their cumulative effects to global climate change have the potential to cause adverse effects to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also purport that higher ambient temperatures would increase disease survival rates and result in more widespread disease. Climate change will likely cause shifts in weather patterns, potentially resulting in devastating droughts and food shortages in some areas (22). Exhibit 2-A presents the potential impacts of global warming (23).

EXHIBIT 2-A: SUMMARY OF PROJECTED GLOBAL WARMING IMPACT, 2070-2099 (AS COMPARED WITH 1961-1990)



Source: Barbara H. Allen-Diaz. "Climate change affects us all." *University of California, Agriculture and Natural Resources*, 2009.

2.4 GLOBAL WARMING POTENTIAL

Greenhouse gases have varying global warming potential (GWP) values. GWP of a greenhouse gas indicates the amount of warming a gas causes over a given period of time and represents the potential of a gas to trap heat in the atmosphere. Carbon dioxide is utilized as the reference gas for GWP, and thus has a GWP of 1. Carbon dioxide equivalent (CO_2e) is a term used for describing the difference greenhouse gases in a common unit. CO_2e signifies the amount of CO_2 which would have the equivalent GWP.

The atmospheric lifetime and GWP of selected greenhouse gases are summarized at Table 2-2. As shown in the table below, GWP for the Second Assessment Report (SAR), the Intergovernmental Panel on Climate Change (IPCC)'s scientific and socio-economic assessment on climate change, range from 1 for carbon dioxide to 23,900 for sulfur hexafluoride and GWP for the IPCC's 5th Assessment Report (AR5) range from 1 for CO_2 to 23,500 for SF_6 (24).

TABLE 2-2: GLOBAL WARMING POTENTIAL AND ATMOSPHERIC LIFETIME OF SELECT GHGS

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)	
		Second Assessment	5th Assessment Report
CO_2	See*	1	1
CH_4	12 .4	21	28
N_2O	121	310	265
HFC-23	222	11,700	12,400
HFC-134a	13.4	1,300	1,300
HFC-152a	1.5	140	138
SF_6	3,200	23,900	23,500

*As per Appendix 8.A. of IPCC's 5th Assessment Report (AR5), no single lifetime can be given.
Source: Table 2.14 of the IPCC Fourth Assessment Report, 2007

2.5 GREENHOUSE GAS EMISSIONS INVENTORIES

Global

Worldwide anthropogenic (human) GHG emissions are tracked by the Intergovernmental Panel on Climate Change for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Human GHG emissions data for Annex I nations are available through 2016. For the Year 2016, the sum of these emissions totaled approximately 28,747,554 Gg CO_2e[1] (25) (26). The GHG emissions in more recent years may differ from the inventories presented in Table 2-3; however, the data is representative of currently available inventory data.

[1] The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2016 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," The most recent GHG emissions for China were taken in 2012, while the most recent GHG emissions for India were taken in 2010.

United States

As noted in Table 2-3, the United States, as a single country, was the number two producer of GHG emissions in 2016. The primary greenhouse gas emitted by human activities in the United States was CO_2, representing approximately 81.6 percent of total greenhouse gas emissions in the US. Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 93.5 percent of the CO_2 emissions (27).

TABLE 2-3: TOP GHG PRODUCER COUNTRIES AND THE EUROPEAN UNION [2]

Emitting Countries	GHG Emissions (Gg CO_2e)
China	11,895,765
United States	6,511,302
European Union (28-member countries)	4,291,252
India	2,643,817
Russian Federation	2,100,850
Japan	1,304,568
Total	**28,747,554**

State of California

California has significantly slowed the rate of growth of greenhouse gas emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls but is still a substantial contributor to the U.S. emissions inventory total (28). CARB compiles GHG inventories for the State of California. Based upon the 2018 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2016 greenhouse gas emissions inventory, California emitted 429.4 million metric tons of CO_2e ($MMTCO_2e$) including emissions resulting from imported electrical power in 2015 (29).

2.6 EFFECTS OF CLIMATE CHANGE IN CALIFORNIA

Public Health

Higher temperatures may increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation could increase from 25 to 35 percent under the lower warming range to 75 to 85 percent under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances, depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

[2] Used http://unfccc.int data for Annex I countries. Consulted the CAIT Climate Data Explorer in http://www.wri.org site to reference Non-Annex I countries such as China and India.

In addition, under the higher warming range scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures could increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Water Resources

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If temperatures continue to increase, more precipitation could fall as rain instead of snow, and the snow that does fall could melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. Under the lower warming range scenario, snowpack losses could be only half as large as those possible if temperatures were to rise to the higher warming range. How much snowpack could be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack could pose challenges to water managers and hamper hydropower generation. It could also adversely affect winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater could degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta – a major fresh water supply.

Agriculture

Increased temperatures could cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25 percent of the water supply needed. Although higher CO_2 levels can stimulate plant production and increase plant water-use efficiency, California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate O_3 pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts.

In addition, continued global climate change could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued global climate change could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

Forests and Landscapes

Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In contrast, wildfires in northern California could increase by up to 90 percent due to decreased precipitation.

Moreover, continued global climate change has the potential to alter natural ecosystems and biological diversity within the state. For example, alpine and subalpine ecosystems could decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests has the potential to decrease as a result of global climate change.

Rising Sea Levels

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Under the higher warming range scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate low-lying coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. Under the lower warming range scenario, sea level could rise 12-14 inches.

2.7 REGULATORY SETTING

INTERNATIONAL

Climate change is a global issue involving GHG emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce GHGs.

Intergovernmental Panel on Climate Change. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

United Nations Framework Convention on Climate Change (Convention). On March 21, 1994, the U.S. joined a number of countries around the world in signing the Convention. Under the

Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

International Climate Change Treaties. The Kyoto Protocol is an international agreement linked to the Convention. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at an average of five percent against 1990 levels over the five-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. The UN Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

On September 23, 2014 more than 100 Heads of State and Government and leaders from the private sector and civil society met at the Climate Summit in New York hosted by the United Nations. At the Summit, heads of government, business and civil society announced actions in areas that would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience.

Parties to the U.N. Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12, 2015 in Paris, charting a fundamentally new course in the two-decade-old global climate effort. Culminating a four-year negotiating round, the new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts and undergo international review.

The agreement and a companion decision by parties were the key outcomes of the conference, known as the 21st session of the UNFCCC Conference of the Parties (COP) 21. Together, the Paris Agreement and the accompanying COP decision:

- Reaffirm the goal of limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees;

- Establish binding commitments by all parties to make "nationally determined contributions" (NDCs), and to pursue domestic measures aimed at achieving them;
- Commit all countries to report regularly on their emissions and "progress made in implementing and achieving" their NDCs, and to undergo international review;
- Commit all countries to submit new NDCs every five years, with the clear expectation that they will "represent a progression" beyond previous ones;
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;
- Extend the current goal of mobilizing $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;
- Extend a mechanism to address "loss and damage" resulting from climate change, which explicitly will not "involve or provide a basis for any liability or compensation;"
- Require parties engaging in international emissions trading to avoid "double counting;" and
- Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country's NDC (C2ES 2015a) (30).

On June 2, 2017 President Donald Trump announced his intention to withdraw from the Paris Agreement. It should be noted that under the terms of the agreement, the United Sates cannot formally announce its resignation until November 4, 2019. Subsequently, withdrawal would be effective one year after notification in 2020.

NATIONAL

Prior to the last decade, there have been no concrete federal regulations of GHGs or major planning for climate change adaptation. The following are actions regarding the federal government, GHGs, and fuel efficiency.

GHG Endangerment. In *Massachusetts v. Environmental Protection Agency* 549 U.S. 497 (2007), decided on April 2, 2007, the Supreme Court found that four GHGs, including carbon dioxide, are air pollutants subject to regulation under Section 202(a)(1) of the Clean Air Act. The Court held that the EPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed in the section "Clean Vehicles" below. After a lengthy legal challenge, the U.S. Supreme Court declined to review an Appeals Court ruling that upheld the EPA Administrator's findings (31).

Clean Vehicles. Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the U.S. On April 1, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the U.S.

The first phase of the national program applies to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the National Highway Safety Administration issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012 (EPA 2012c). The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and medium duty passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of carbon dioxide (CO_2) in model year 2025, which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks and buses on September 15, 2011, effective November 14, 2011. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20 percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10-percent reduction for gasoline vehicles and a 15 percent reduction for diesel vehicles by the 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the engine and vehicle standards would achieve up to a 10 percent reduction in fuel consumption and carbon dioxide emissions from the 2014 to 2018 model years.

On April 2, 2018, the USEPA signed the Mid-term Evaluation Final Determination, which finds that the model year 2022-2025 greenhouse gas standards are not appropriate and should be revised (32). This Final Determination serves to initiate a notice to further consider appropriate standards for model year 2022-2025 light-duty vehicles. On August 24, 2018, the USEPA and NHTSA published a proposal to freeze the model year 2020 standards through model year 2026 and to revoke California's waiver under the Clean Air Act to establish more stringent standards (33).

Mandatory Reporting of GHGs. The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of GHGs Rule, which became effective January 1, 2010. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S. and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA.

New Source Review. The EPA issued a final rule on May 13, 2010, that establishes thresholds for GHGs that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the Federal Code of Regulations, the EPA states:

> *This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the Clean Air Act, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to GHG sources, starting with the largest GHG emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for GHG emissions until at least April 30, 2016.*

The EPA estimates that facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities.

Standards of Performance for GHG Emissions for New Stationary Sources: Electric Utility Generating Units. As required by a settlement agreement, the EPA proposed new performance standards for emissions of carbon dioxide for new, affected, fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatts would be required to meet an output-based standard of 1,000 pounds of carbon dioxide per megawatt-hour, based on the performance of widely used natural gas combined cycle technology. It should be noted that on February 9, 2016 the U.S. Supreme Court issued a stay of this regulation pending litigation. Additionally, the current EPA Administrator has also signed a measure to repeal the Clean Power Plan, including the CO2 standards.

Cap and Trade. Cap and trade refers to a policy tool where emissions are limited to a certain amount and can be traded or provides flexibility on how the emitter can comply. Successful examples in the U.S. include the Acid Rain Program and the NO_x Budget Trading Program and

Clean Air Interstate Rule in the northeast. There is no federal GHG cap and trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap and trade.

The Regional GHG Initiative is an effort to reduce GHGs among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Each state caps carbon dioxide emissions from power plants, auctions carbon dioxide emission allowances, and invests the proceeds in strategic energy programs that further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Initiative began in 2008.

The Western Climate Initiative partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15 percent below 2005 levels by 2020. The partners were originally California, British Columbia, Manitoba, Ontario, and Quebec. However, Manitoba and Ontario are not currently participating. California linked with Quebec's cap and trade system January 1, 2014, and joint offset auctions took place in 2015 (C2ES 2015).

SmartWay Program. The SmartWay Program is a public-private initiative between the EPA, large and small trucking companies, rail carriers, logistics companies, commercial manufacturers, retailers, and other federal and state agencies. Its purpose is to improve fuel efficiency and the environmental performance (reduction of both GHG emissions and air pollution) of the goods movement supply chains. SmartWay is comprised of four components (EPA 2014):

1. SmartWay Transport Partnership: A partnership in which freight carriers and shippers commit to benchmark operations, track fuel consumption, and improve performance annually.
2. SmartWay Technology Program: A testing, verification, and designation program to help freight companies identify equipment, technologies, and strategies that save fuel and lower emissions.
3. SmartWay Vehicles: A program that ranks light-duty cars and small trucks and identifies superior environmental performers with the SmartWay logo.
4. SmartWay International Interests: Guidance and resources for countries seeking to develop freight sustainability programs modeled after SmartWay.

SmartWay effectively refers to requirements geared towards reducing fuel consumption. Most large trucking fleets driving newer vehicles are compliant with SmartWay design requirements. Moreover, over time, all heavy-duty trucks will have to comply with the ARB GHG Regulation that is designed with the SmartWay Program in mind, to reduce GHG emissions by making them more fuel-efficient. For instance, in 2015, 53 foot or longer dry vans or refrigerated trailers equipped with a combination of SmartWay-verified low-rolling resistance tires and SmartWay-verified aerodynamic devices would obtain a total of 10 percent or more fuel savings over traditional trailers.

Through the SmartWay Technology Program, the EPA has evaluated the fuel saving benefits of various devices through grants, cooperative agreements, emissions and fuel economy testing, demonstration projects and technical literature review. As a result, the EPA has determined the following types of technologies provide fuel saving and/or emission reducing benefits when used properly in their designed applications, and has verified certain products:

- Idle reduction technologies – less idling of the engine when it is not needed would reduce fuel consumption.
- Aerodynamic technologies minimize drag and improve airflow over the entire tractor-trailer vehicle. Aerodynamic technologies include gap fairings that reduce turbulence between the tractor and trailer, side skirts that minimize wind under the trailer, and rear fairings that reduce turbulence and pressure drop at the rear of the trailer.
- Low rolling resistance tires can roll longer without slowing down, thereby reducing the amount of fuel used. Rolling resistance (or rolling friction or rolling drag) is the force resisting the motion when a tire rolls on a surface. The wheel will eventually slow down because of this resistance.
- Retrofit technologies include things such as diesel particulate filters, emissions upgrades (to a higher tier), etc., which would reduce emissions.
- Federal excise tax exemptions.

CALIFORNIA

Legislative Actions to Reduce GHGs

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation such as the landmark Assembly Bill (AB 32) California Global Warming Solutions Act of 2006 was specifically enacted to address GHG emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

AB 32. The California State Legislature enacted AB 32, which requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. "GHGs" as defined under AB 32 include carbon dioxide, methane, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The California Air Resources Board (ARB) is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

> *Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.*

ARB approved the 1990 GHG emissions level of 427 $MMTCO_2e$ on December 6, 2007 (ARB 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$. Emissions in 2020 in a "business as usual" (BAU) scenario were estimated to be 596 $MMTCO_2e$, which do not account for reductions from AB 32 regulations (ARB 2008). At that level, a 28.4 percent reduction was required to achieve the 427 $MMTCO_2e$ 1990 inventory. In October 2010, ARB prepared an updated 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 $MMTCO_2e$. Therefore, under the updated forecast, a 21.7 percent reduction from BAU is required to achieve 1990 levels (ARB 2010).

Progress in Achieving AB 32 Targets and Remaining Reductions Required

The State has made steady progress in implementing AB 32 and achieving targets included in Executive Order S-3-05. The progress is shown in updated emission inventories prepared by ARB for 2000 through 2012 (ARB 2014a). The State has achieved the Executive Order S-3-05 target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target.

- 1990: 427 $MMTCO_2e$ (AB 32 2020 target)
- 2000: 463 $MMTCO_2e$ (an average 8 percent reduction needed to achieve 1990 base)
- 2010: 450 $MMTCO_2e$ (an average 5 percent reduction needed to achieve 1990 base)

ARB has also made substantial progress in achieving its goal of achieving 1990 emissions levels by 2020. As described earlier in this section, ARB revised the 2020 BAU inventory forecast to account for new lower growth projections, which resulted in a new lower reduction from BAU to achieve the 1990 base. The previous reduction from 2020 BAU needed to achieve 1990 levels was 28.4 percent and the latest reduction from 2020 BAU is 21.7 percent.

- 2020: 545 $MMTCO_2e$ BAU (an average 21.7 percent reduction from BAU needed to achieve 1990 base)

ARB Scoping Plan. ARB's Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 to comply with AB 32 (ARB 2008). The Scoping Plan identifies recommended measures for multiple GHG emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 GHG target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California's climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 GHG limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities for the next several years. The Update does not set new targets for the State but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050 (ARB 2014).

Forecasting the amount of emissions that would occur in 2020 if no actions are taken was necessary to assess the amount of reductions California must achieve to return to the 1990 emissions level by 2020 as required by AB 32. The no-action scenario is known as "business-as-usual" or BAU. The ARB originally defined the BAU scenario as emissions in the absence of any GHG emission reduction measures discussed in the Scoping Plan.

As part of CEQA compliance for the Scoping Plan, ARB prepared a Supplemental Functional Equivalent Document (FED) in 2011. The FED included an updated 2020 BAU emissions inventory projection based on current economic forecasts (i.e., as influenced by the economic downturn) and emission reduction measures already in place, replacing its prior 2020 BAU emissions inventory. ARB staff derived the updated emissions estimates by projecting emissions growth, by sector, from the state's average emissions from 2006–2008. The new BAU estimate includes emission reductions for the million-solar-roofs program, the AB 1493 (Pavley I) motor vehicle GHG emission standards, and the Low Carbon Fuels Standard. In addition, ARB factored into the 2020 BAU inventory emissions reductions associated with 33 percent RPS for electricity generation. The updated BAU estimate of 507 $MMTCO_2e$ by 2020 requires a reduction of 80 $MMTCO_2e$, or a 16 percent reduction below the estimated BAU levels to return to 1990 levels (i.e., 427 $MMTCO_2e$) by 2020.

In order to provide a BAU reduction that is consistent with the original definition in the Scoping Plan and with threshold definitions used in thresholds adopted by lead agencies for CEQA purposes and many climate action plans, the updated inventory without regulations was also included in the Supplemental FED. The ARB 2020 BAU projection for GHG emissions in California was originally estimated to be 596 $MMTCO_2e$. The updated ARB 2020 BAU projection in the Supplemental FED is 545 $MMTCO_2e$. Considering the updated BAU estimate of 545 $MMTCO_2e$ by 2020, ARB estimates a 21.7 percent reduction below the estimated statewide BAU levels is necessary to return to 1990 emission levels (i.e., 427 $MMTCO_2e$) by 2020, instead of the approximate 28.4 percent BAU reduction previously reported under the original Climate Change Scoping Plan (2008).

<u>2017 Climate Change Scoping Plan Update</u>

In November 2017, ARB released the final 2017 Scoping Plan Update, which identifies the State's post-2020 reduction strategy. The 2017 Scoping Plan Update reflects the 2030 target of a 40 percent reduction below 1990 levels, set by Executive Order B-30-15 and codified by Senate Bill

32 (SB 32). Key programs that the proposed Second Update builds upon include the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, and much cleaner cars, trucks and freight movement, utilizing cleaner, renewable energy, and strategies to reduce methane emissions from agricultural and other wastes.

The 2017 Scoping Plan establishes a new emissions limit of 260 $MMTCO_2e$ for the year 2030, which corresponds to a 40 percent decrease in 1990 levels by 2030.

California's climate strategy will require contributions from all sectors of the economy, including the land base, and will include enhanced focus on zero- and near-zero-emission (ZE/NZE) vehicle technologies; continued investment in renewables, including solar roofs, wind, and other distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants (methane, black carbon, and fluorinated gases); and an increased focus on integrated land use planning to support livable, transit-connected communities and conservation of agricultural and other lands. Requirements for direct GHG reductions at refineries will further support air quality co-benefits in neighborhoods, including in disadvantaged communities historically located adjacent to these large stationary sources, as well as efforts with California's local air pollution control and air quality management districts (air districts) to tighten emission limits on a broad spectrum of industrial sources. Major elements of the 2017 Scoping Plan framework include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing ZEV buses and trucks.
- Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030).
- Implementing SB 350, which expands the Renewables Portfolio Standard (RPS) to 50 percent RPS and doubles energy efficiency savings by 2030.
- California Sustainable Freight Action Plan, which improves freight system efficiency, utilizes near-zero emissions technology, and deployment of ZEV trucks.
- Implementing the proposed Short-Lived Climate Pollutant Strategy (SLPS), which focuses on reducing methane and hydroflurocarbon emissions by 40 percent and anthropogenic black carbon emissions by 50 percent by year 2030.
- Continued implementation of SB 375.
- Post-2020 Cap-and-Trade Program that includes declining caps.
- 20 percent reduction in GHG emissions from refineries by 2030.
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

Note, however, that the 2017 Scoping Plan acknowledges that:

> *[a]chieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA.*

In addition to the statewide strategies listed above, the 2017 Scoping Plan also identifies local governments as essential partners in achieving the State's long-term GHG reduction goals and identifies local actions to reduce GHG emissions. As part of the recommended actions, CARB recommends that local governments achieve a community-wide goal to achieve emissions of no more than 6 metric tons of CO_2e ($MTCO_2e$) or less per capita by 2030 and 2 $MTCO_2e$ or less per capita by 2050. For CEQA projects, CARB states that lead agencies may develop evidenced-based bright-line numeric thresholds—consistent with the Scoping Plan and the State's long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible; or, a performance-based metric using a climate action plan or other plan to reduce GHG emissions is appropriate.

According to research conducted by the Lawrence Berkeley National Laboratory and supported by ARB, California, under its existing and proposed GHG reduction policies, is on track to meet the 2020 reduction targets under AB 32 and could achieve the 2030 goals under SB 32. The research utilized a new, validated model known as the California LBNL GHG Analysis of Policies Spreadsheet (CALGAPS), which simulates GHG and criteria pollutant emissions in California from 2010 to 2050 in accordance to existing and future GHG-reducing policies. The CALGAPS model showed that GHG emissions through 2020 could range from 317 to 415 $MTCO_2e$ per year, "indicating that existing state policies will likely allow California to meet its target [of 2020 levels under AB 32]." CALGAPS also showed that by 2030, emissions could range from 211 to 428 $MTCO_2e$ per year, indicating that "even if all modeled policies are not implemented, reductions could be sufficient to reduce emissions 40 percent below the 1990 level [of SB 32]." CALGAPS analyzed emissions through 2050 even though it did not generally account for policies that might be put in place after 2030. Although the research indicated that the emissions would not meet the State's 80 percent reduction goal by 2050, various combinations of policies could allow California's cumulative emissions to remain very low through 2050 (34) (35).

Senate Bill 32. On September 8, 2016, Governor Jerry Brown signed the Senate Bill (SB) 32 and its companion bill, Assembly Bill (AB) 197. SB 32 requires the state to reduce statewide GHG emissions to 40 percent below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide GHG reduction target of 80 percent below 1990 levels by 2050. AB 197 creates a legislative committee to oversee regulators to ensure that ARB not only responds to the Governor, but also the Legislature (11).

Cap and Trade Program. The Scoping Plan identifies a Cap-and-Trade Program as one of the key strategies for California to reduce GHG emissions. According to ARB, a cap-and-trade program will help put California on the path to meet its goal of reducing GHG emissions to 1990 levels by the year 2020 and ultimately achieving an 80 percent reduction from 1990 levels by 2050. Under cap-and-trade, an overall limit on GHG emissions from capped sectors is established, and facilities subject to the cap will be able to trade permits to emit GHGs within the overall limit.

ARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. See Title 17 of the California Code of Regulations (CCR) §§ 95800 to 96023). The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed "covered entities") by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and will decline over time, achieving GHG emission reductions throughout the program's duration.

Covered entities that emit more than 25.000 $MTCO_2e$ per year must comply with the Cap-and-Trade Program. Triggering of the 25.000 $MTCO_2e$ per year "inclusion threshold" is measured against a subset of emissions reported and verified under the California Regulation for the Mandatory Reporting of GHG Emissions (Mandatory Reporting Rule or "MRR").

Under the Cap-and-Trade Program, ARB issues allowances equal to the total amount of allowable emissions over a given compliance period and distributes these to regulated entities. Covered entities are allocated free allowances in whole or part (if eligible), and may buy allowances at auction, purchase allowances from others, or purchase offset credits. Each covered entity with a compliance obligation is required to surrender "compliance instruments" (30) for each $MTCO_2e$ of GHG they emit. There also are requirements to surrender compliance instruments covering 30 percent of the prior year's compliance obligation by November of each year. For example, in November 2014, a covered entity was required to submit compliance instruments to cover 30 percent of its 2013 GHG emissions.

The Cap-and-Trade Program provides a firm cap, ensuring that the 2020 statewide emission limit will not be exceeded. An inherent feature of the Cap-and-Trade program is that it does not guarantee GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are only guaranteed on an accumulative basis. As summarized by ARB in the First Update:

> *The Cap-and-Trade Regulation gives companies the flexibility to trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more have to turn in more allowances or other compliance instruments. Companies that can cut their GHG emissions have to turn in fewer allowances. But as the cap declines, aggregate emissions must be reduced. In other words, a covered entity theoretically could increase its GHG emissions every year and still comply with the Cap-and-Trade Program if there is a reduction in GHG emissions from other covered entities. Such a focus on aggregate GHG emissions is considered appropriate because climate change is a global phenomenon, and the effects of GHG emissions are considered cumulative (ARB 2014).*

The Cap-and-Trade Program works with other direct regulatory measures and provides an economic incentive to reduce emissions. If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program will be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program will be responsible for relatively more emissions reductions. Thus, the Cap-and-Trade Program assures that California will meet its 2020 GHG emissions reduction mandate:

> *The Cap-and-Trade Program establishes an overall limit on GHG emissions from most of the California economy—the "capped sectors." Within the capped sectors, some of the reductions are being accomplished through direct regulations, such as improved building and appliance efficiency standards, the [Low Carbon Fuel Standard] LCFS, and the 33 percent [Renewables Portfolio Standard] RPS. Whatever additional reductions are needed to bring emissions within the cap is accomplished through price incentives posed by emissions allowance prices. Together, direct regulation and price incentives assure that emissions are brought down cost-effectively to the level of the overall cap. The Cap-and-Trade Regulation provides assurance that California's 2020 limit will be met because the regulation sets a firm limit on 85 percent of California's GHG emissions. In sum, the Cap-and-Trade Program will achieve aggregate, rather than site specific or project-level, GHG emissions reductions. Also, due to the regulatory architecture adopted by ARB in AB 32, the reductions attributed to the Cap-and-Trade Program can change over time depending on the State's emissions forecasts and the effectiveness of direct regulatory measures (ARB 2014).*

As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects' electricity usage are covered by the Cap-and-Trade Program.

The Cap-and-Trade Program also covers fuel suppliers (natural gas and propane fuel providers and transportation fuel providers) to address emissions from such fuels and from combustion of other fossil fuels not directly covered at large sources in the Program's first compliance period. While the Cap-and-Trade Program technically covered fuel suppliers as early as 2012, they did not have a compliance obligation (i.e., they were not fully regulated) until 2015. The Cap-and-Trade Program covers the GHG emissions associated with the combustion of transportation fuels in California, whether refined in-state or imported. The point of regulation for transportation fuels is when they are "supplied" (i.e., delivered into commerce). Accordingly, as with stationary source GHG emissions and GHG emissions attributable to electricity use, virtually all, if not all, of GHG emissions from CEQA projects associated with vehicle-miles traveled (VMT) are covered by the Cap-and-Trade Program (ARB 2015) (36).

In addition, the Scoping Plan differentiates between "capped" and "uncapped" strategies. "Capped" strategies are subject to the proposed cap-and-trade program. The Scoping Plan states that the inclusion of these emissions within the Program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. "Uncapped" strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional GHG emission reductions.[3]

SB 375 - the Sustainable Communities and Climate Protection Act of 2008. Passing the Senate on August 30, 2008, Senate Bill (SB) 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40 percent of the total GHG emissions in California. SB 375 states, “Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32.” SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28, states that CEQA findings for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts, or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network, if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the GHG emission reduction targets.
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

AB 1493 Pavley Regulations and Fuel Efficiency Standards. California AB 1493, enacted on July 22, 2002, required ARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA’s denial of an implementation waiver. The EPA subsequently granted the requested waiver in 2009, which was upheld by the U.S. District Court for the District of Columbia in 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22 percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30 percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and

[3] On March 17, 2011, the San Francisco Superior Court issued a final decision in *Association of Irritated Residents v. California Air Resources Board* (Case No. CPF-09-509562). While the Court upheld the validity of the ARB Scoping Plan for the implementation of AB 32, the Court enjoined ARB from further rulemaking under AB 32 until ARB amends its CEQA environmental review of the Scoping Plan to address the flaws identified by the Court. On May 23, 2011, ARB filed an appeal. On June 24, 2011, the Court of Appeal granted ARB’s petition staying the trail court’s order pending consideration of the appeal. In the interest of informed decision-making, on June 13, 2011, ARB released the expanded alternatives analysis in a draft Supplement to the AB 32 Scoping Plan Functional Equivalent Document. The ARB Board approved the Scoping Plan and the CEQA document on August 24, 2011.

improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34 percent from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

SB 350— Clean Energy and Pollution Reduction Act of 2015. 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 renewables portfolio standard (RPS), higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations. Provisions for a 50 percent reduction in the use of petroleum statewide were removed from the Bill because of opposition and concern that it would prevent the Bill's passage. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33 percent to 50 percent by 2030, with interim targets of 40 percent by 2024, and 25 percent by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and local publicly owned utilities.
- Reorganize the Independent System Operator (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).

EXECUTIVE ORDERS RELATED TO GHG EMISSIONS

California's Executive Branch has taken several actions to reduce GHGs through the use of Executive Orders. Although not regulatory, they set the tone for the state and guide the actions of state agencies.

Executive Order B-55-18 and SB 100. Executive Order B-55-18 and SB 100. SB 100 and Executive Order B-55-18 were signed by Governor Brown on September 10, 2018. Under the existing RPS, 25 percent of retail sales are required to be from renewable sources by December 31, 2016, 33 percent by December 31, 2020, 40 percent by December 31, 2024, 45 percent by December 31, 2027, and 50 percent by December 31, 2030. SB 100 raises California's RPS requirement to 50 percent renewable resources target by December 31, 2026, and to achieve a 60 percent target by December 31, 2030. SB 100 also requires that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt hours of those products sold to their retail end-use customers achieve 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030. In addition to targets under AB 32 and SB32, Executive Order B-55-18 establishes a carbon neutrality goal for the state of California by 2045; and sets a goal to maintain net negative emissions thereafter. The Executive Order directs the California Natural Resources Agency, CalEPA, the Department of Food and Agriculture, and CARB to include sequestration targets in the Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal.

Executive Order S-3-05. Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for GHG emissions:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Executive Order S-01-07 – Low Carbon Fuel Standard. The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the Executive Order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

The Low Carbon Fuel Standard was challenged in the U.S. District Court in Fresno in 2011. The court's ruling issued on December 29, 2011, included a preliminary injunction against ARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012, pending final ruling on appeal, allowing ARB to continue to implement and enforce the regulation. The Ninth Circuit Court's decision, filed September 18, 2013, vacated the preliminary injunction. In essence, the court held that Low Carbon Fuel Standards adopted by ARB were not in conflict with federal law. On August 8, 2013, the Fifth District Court of Appeal (California) ruled ARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for Low Carbon Fuel Standards. In a partially published opinion, the Court of Appeal reversed the trial court's judgment and directed issuance of a writ of mandate setting aside Resolution 09-31 and two executive orders of ARB approving Low Carbon Fuel Standards (LCFS) regulations promulgated to reduce GHG emissions. However, the court tailored its remedy to protect the public interest by allowing the LCFS regulations to remain operative while ARB complies with the procedural requirements it failed to satisfy.

To address the Court ruling, ARB was required to bring a new LCFS regulation to the Board for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-carbon intensity (low-CI) fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. On November 16, 2015 the Office of Administrative Law (OAL) approved the Final Rulemaking Package. The new LCFS regulation became effective on January 1, 2016.

Executive Order S-13-08. Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the Order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the ". . . first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order B-30-15. On April 29, 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's executive order aligns California's GHG reduction targets with those of leading international governments ahead of the United Nations Climate Change Conference in Paris late 2015. The Order sets a new interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050 and directs ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of $MMTCO_2e$. The Order also requires the state's climate adaptation plan to be updated every three years, and for the State to continue its climate change research program, among other provisions. As with Executive Order S-3-05, this Order is not legally enforceable for local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is in process in the State Legislature.

CALIFORNIA REGULATIONS AND BUILDING CODES

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

Title 20 Appliance Efficiency Standards. California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. 23 categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

Title 24 Energy Efficiency Standards and California Green Building Standards. California Code of Regulations 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 GHG emissions. The 2019 version of Title 24 was adopted by the California Energy Commission (CEC) and will become effective on January 1, 2020. As a conservative measure, the analysis herein assumes compliance with the 2016 Title 24 Standards and no additional reduction for compliance with the 2019 standards have been taken.

The CEC indicates that the 2019 Title 24 standards may require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, update indoor and outdoor lighting for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7 percent less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will about 53 percent less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30 percent less energy due to lighting upgrades (37).

California Code of Regulations, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2011, and is administered by the California Building Standards Commission. CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2019 California Green Building Code Standards that will be effective January 1, 2020. Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. CALGreen recognizes that many jurisdictions have developed existing construction and demolition ordinances and defers to them as the ruling guidance provided, they establish a minimum 65 percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. The State Building Code provides the minimum standard that buildings must meet in order to be certified for occupancy, which is generally enforced by the local building official.

On May 10, 2019, the Building Standards Commission (BSC) published a *Summary: 2019 New Code and 2016 Supplemental Updates – Nonresidential Mandatory Measures* which provides a summary of the updates and changes in the 2019 CALGreen (38). It should be noted that at the time of this GHGA, the Building Standards Commission has not yet provided the published the updated CALGreen Guidebooks or Checklists. Based on personal communication with staff at the BSC, the published Guidebooks and Checklists will likely be made available just prior to 2020, however no firm timeline has been established at this time (39). Notwithstanding, the 2016 CALGreen standards are still applicable to the Project and require:

- Short-term bicycle parking. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1.1).

- Long-term bicycle parking. For new buildings with 10 or more tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.1.2).
- Designated parking. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling (5.410.1).
- Construction waste. A minimum 65 percent diversion of construction and demolition waste from landfills, increasing voluntarily to 80 percent for new homes and commercial projects (5.408.1, A5.408.3.1 [nonresidential], A5.408.3.1 [residential]). All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled (5.408.3).
- Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:
    - The installation of water-conserving fixtures (5.303.3) or
    - Using nonpotable water systems (5.303.4).
- Water use savings. 20 percent mandatory reduction of indoor water use with voluntary goal standards for 30, 35 and 40 percent reductions (5.303.2, A5303.2.3 [nonresidential]).
- Water meters. Separate water meters for buildings in excess of 50,000 sf or buildings projected to consume more than 1,000 gallons per day (5.303.1).
- Irrigation efficiency. Moisture-sensing irrigation systems for larger landscaped areas (5.304.3).
- Materials pollution control. Low pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard (5.404).
- Building commissioning. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 sf to ensure that all are working at their maximum capacity according to their design efficiencies (5.410.2).

Model Water Efficient Landscape Ordinance. The Model Water Efficient Landscape Ordinance (Ordinance) was required by AB 1881, the Water Conservation Act. The bill required local agencies to adopt a local landscape ordinance at least as effective in conserving water as the Model Ordinance by January 1, 2010. Reductions in water use of 20 percent consistent with (SBX-7-7) 2020 mandate are expected upon compliance with the ordinance. Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15) directed Department of Water Resources (DWR) to update the Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance on July 15, 2015 effective December 15, 2015. New development projects that include landscape areas of 500 sf or more are subject to the Ordinance. The update requires:

- More efficient irrigation systems;
- Incentives for graywater usage;
- Improvements in on-site stormwater capture;

- Limiting the portion of landscapes that can be planted with high water use plants; and
- Reporting requirements for local agencies.

ARB Refrigerant Management Program. ARB adopted a regulation in 2009 to reduce refrigerant GHG emissions from stationary sources through refrigerant leak detection and monitoring, leak repair, system retirement and retrofitting, reporting and recordkeeping, and proper refrigerant cylinder use, sale, and disposal. The regulation is set forth in sections 95380 to 95398 of Title 17, California Code of Regulations. The rules implementing the regulation establish a limit on statewide GHG emissions from stationary facilities with refrigeration systems with more than 50 pounds of a high GWP refrigerant. The refrigerant management program is designed to (1) reduce emissions of high-GWP GHG refrigerants from leaky stationary, non-residential refrigeration equipment; (2) reduce emissions from the installation and servicing of refrigeration and air-conditioning appliances using high-GWP refrigerants; and (3) verify GHG emission reductions.

Tractor-Trailer GHG Regulation. The tractors and trailers subject to this regulation must either use EPA SmartWay certified tractors and trailers or retrofit their existing fleet with SmartWay verified technologies. The regulation applies primarily to owners of 53-foot or longer box-type trailers, including both dry-van and refrigerated-van trailers, and owners of the heavy-duty tractors that pull them on California highways. These owners are responsible for replacing or retrofitting their affected vehicles with compliant aerodynamic technologies and low rolling resistance tires. Sleeper cab tractors model year 2011 and later must be SmartWay certified. All other tractors must use SmartWay verified low rolling resistance tires. There are also requirements for trailers to have low rolling resistance tires and aerodynamic devices.

Phase I and 2 Heavy-Duty Vehicle GHG Standards. ARB has adopted a new regulation for greenhouse gas (GHG) emissions from heavy-duty trucks and engines sold in California. It establishes GHG emission limits on truck and engine manufacturers and harmonizes with the U.S. EPA rule for new trucks and engines nationally. Existing heavy-duty vehicle regulations in California include engine criteria emission standards, tractor-trailer GHG requirements to implement SmartWay strategies (i.e., the Heavy-Duty Tractor-Trailer Greenhouse Gas Regulation), and in-use fleet retrofit requirements such as the Truck and Bus Regulation. In September 2011, the U.S. EPA adopted their new rule for heavy-duty trucks and engines. The U.S. EPA rule has compliance requirements for new compression and spark ignition engines, as well as trucks from Class 2b through Class 8. Compliance requirements begin with model year (MY) 2014 with stringency levels increasing through MY 2018. The rule organizes truck compliance into three groupings, which include a) heavy-duty pickups and vans; b) vocational vehicles; and c) combination tractors. The U.S. EPA rule does not regulate trailers.

ARB staff has worked jointly with the U.S. Environmental Protection Agency (U.S. EPA) and the National Highway Traffic Safety Administration (NHTSA) on the next phase of federal greenhouse gas (GHG) emission standards for medium- and heavy-duty vehicles, called federal Phase 2. The federal Phase 2 standards were built on the improvements in engine and vehicle efficiency required by the Phase 1 emission standards and represent a significant opportunity to achieve further GHG reductions for 2018 and later model year heavy-duty vehicles, including trailers. But as discussed above, the USEPA and NHTSA have proposed to roll back GHG and fuel economy standards for cars and light-duty trucks, which suggests a similar rollback of Phase 2 standards for medium and heavy-duty vehicles may be pursued.

SB 97 and the CEQA Guidelines Update. Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA.

On December 28, 2018, the Natural Resources Agency announced the Office of Administrative law approved the amendments to the CEQA guidelines for implementing the California Environmental Quality Act. The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

Section 1506.4 was amended to state that in determining the significance of a project's greenhouse gas emissions, the lead agency should focus its analysis on the reasonably foreseeable incremental contribution of the project's emissions to the effects of climate change. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions. The agency's analysis should consider a timeframe that is appropriate for the project. The agency's analysis also must reasonably reflect evolving scientific knowledge and state regulatory schemes. Additionally, a lead agency may use a model or methodology to estimate greenhouse gas emissions resulting from a project. The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change. The lead agency must support its selection of a model or methodology with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use (40).

REGIONAL

The project is within the Southern California Air Basin (SCAB), which is under the jurisdiction of the SCAQMD.

South Coast Air Quality Management District

SCAQMD is the agency responsible for air quality planning and regulation in the SCAB. The SCAQMD addresses the impacts to climate change of projects subject to SCAQMD permit as a lead agency if they are the only agency having discretionary approval for the project and acts as a responsible agency when a land use agency must also approve discretionary permits for the project. The SCAQMD acts as an expert commenting agency for impacts to air quality. This expertise carries over to GHG emissions, so the agency helps local land use agencies through the development of models and emission thresholds that can be used to address GHG emissions.

In 2008, SCAQMD formed a Working Group to identify GHG emissions thresholds for land use projects that could be used by local lead agencies in the SCAB. The Working Group developed several different options that are contained in the SCAQMD Draft Guidance Document – Interim CEQA GHG Significance Threshold, that could be applied by lead agencies. The working group has not provided additional guidance since release of the interim guidance in 2008. The SCAQMD Board has not approved the thresholds; however, the Guidance Document provides substantial evidence supporting the approaches to significance of GHG emissions that can be considered by the lead agency in adopting its own threshold. The current interim thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a GHG reduction plan. If a project is consistent with a qualifying local GHG reduction plan, it does not have significant GHG emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to the project's operational emissions. If a project's emissions are below one of the following screening thresholds, then the project is less than significant:
    - Residential and Commercial land use: 3,000 $MTCO_2e$ per year
    - Industrial land use: 10,000 $MTCO_2e$ per year
    - Based on land use type: residential: 3,500 $MTCO_2e$ per year; commercial: 1,400 $MTCO_2e$ per year; or mixed use: 3,000 $MTCO_2e$ per year
- Tier 4 has the following options:
    - Option 1: Reduce BAU emissions by a certain percentage; this percentage is currently undefined.
    - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
    - Option 3, 2020 target for service populations (SP), which includes residents and employees: 4.8 $MTCO_2e$/SP/year for projects and 6.6 $MTCO_2e$/SP/year for plans;
    - Option 3, 2035 target: 3.0 $MTCO_2e$/SP/year for projects and 4.1 $MTCO_2e$/SP/year for plans
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's interim thresholds used the Executive Order S-3-05-year 2050 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap carbon dioxide concentrations at 450 ppm, thus stabilizing global climate.

SCAQMD only has authority over GHG emissions from development projects that include air quality permits. At this time, it is unknown if the project would include stationary sources of emissions subject to SCAQMD permits. Notwithstanding, if the Project requires a stationary permit, it would be subject to the applicable SCAQMD regulations.

SCAQMD Regulation XXVII, adopted in 2009 includes the following rules:

- Rule 2700 defines terms and post global warming potentials.
- Rule 2701, SoCal Climate Solutions Exchange, establishes a voluntary program to encourage, quantify, and certify voluntary, high quality certified GHG emission reductions in the SCAQMD.
- Rule 2702, GHG Reduction Program created a program to produce GHG emission reductions within the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

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3 PROJECT GREENHOUSE GAS IMPACT

3.1 INTRODUCTION

The Project has been evaluated to determine if it will result in a significant greenhouse gas impact. The significance of these potential impacts is described in the following section.

3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related greenhouse gas impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to greenhouse gas if it would (1):

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

3.3 CALIFORNIA EMISSIONS ESTIMATOR MODEL™ EMPLOYED TO ANALYZE GHG EMISSIONS

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 California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$) and greenhouse gas emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (41). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine greenhouse gas emissions. Output from the model runs for construction activity are provided in Appendix 3.1.

3.4 CONSTRUCTION LIFE-CYCLE ANALYSIS NOT REQUIRED

A full life-cycle analysis (LCA) for construction activity is not included in this analysis due to the lack of consensus guidance on LCA methodology at this time (42). Life-cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the project development, and infrastructure) depends on emission factors or econometric factors that are not well established for all processes. At this time, an LCA would be extremely speculative and thus has not been prepared.

Additionally, the SCAQMD recommends analyzing direct and indirect project GHG emissions generated within California and not life-cycle emissions because the life-cycle effects from a project could occur outside of California, might not be very well understood or documented, and would be challenging to mitigate (43). Additionally, the science to calculate life cycle emissions is not yet established or well defined; therefore, SCAQMD has not recommended, and is not requiring, life-cycle emissions analysis.

3.5 CONSTRUCTION EMISSIONS

Construction activities associated with the Project would result in emissions of CO_2 and CH_4 from construction activities. The report *State Street Extension Air Quality Impact Analysis Report* (AQIA) (Urban Crossroads, Inc., 2019) contains detailed information regarding construction activity (44).

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. To amortize the emissions over the life of the Project, the SCAQMD recommends calculating the total greenhouse gas emissions for the construction activities, dividing it by a 30-year project life (45). As such, construction emissions were amortized over a 30-year period.

3.6 EMISSIONS SUMMARY

The Project will result in approximately 15.97 $MTCO_2e$ per year from construction activities. As such, the Project would not exceed the SCAQMD's numeric threshold of 3,000 $MTCO_2e$. Thus, project-related emissions would not have a significant direct or indirect impact on GHG and climate change.

TABLE 3-1: PROJECT GHG EMISSIONS

Emission Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total CO_2E
Annual construction-related emissions amortized over 30 years	15.88	0.00	0.00	15.97
Total CO_2E (All Sources)	**15.97**			
Screening Threshold (CO_2e)	**3,000**			
Threshold Exceeded?	**NO**			

Source: CalEEMod™ model output, See Appendix 3.1 for detailed model outputs.

3.7 GREENHOUSE GAS EMISSIONS FINDINGS AND RECOMMENDATIONS

GHG Impact #1: The Project would generate direct or indirect greenhouse gas emission that would result in a significant impact on the environment.

The City of San Bernardino has not adopted its own numeric threshold of significance for determining impacts with respect to GHG emissions. A screening threshold of 3,000 $MTCO_2e$ per year to determine if additional analysis is required is an acceptable approach for small projects. This approach is a widely accepted screening threshold used by numerous cities in the South Coast Air Basin and is based on the SCAQMD staff's proposed GHG screening threshold for stationary source emissions for non-industrial projects, as described in the SCAQMD's *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* ("SCAQMD Interim GHG Threshold"). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required (46).

The Project will result in approximately 15.97 $MTCO_2e$ per year from construction activities. As such, the Project would not exceed the SCAQMD's recommended numeric threshold of 3,000 $MTCO_2e$ if it were applied. Thus, project-related emissions would not have a significant direct or indirect impact on GHG and climate change and no mitigation or further analysis is required.

GHG Impact #2: The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

The Project's consistency with AB 32 and SB 32 are discussed below.

2008 Scoping Plan Consistency

ARB's *Scoping Plan* identifies strategies to reduce California's greenhouse gas emissions in support of AB32 which requires the State to reduce its GHG emissions to 1990 levels by 2020. Many of the strategies identified in the Scoping Plan are not applicable at the project level, such as long-term technological improvements to reduce emissions from vehicles. Some measures are applicable and supported by the project, such as energy efficiency. Finally, while some measures are not directly applicable, the project would not conflict with their implementation. Reduction measures are grouped into 18 action categories, as follows:

1. **California Cap-and-Trade Program Linked to Western Climate Initiative Partner Jurisdictions.** Implement a broad-based California cap-and-trade program to provide a firm limit on emissions. Link the California cap–and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California.[4] Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms.
2. **California Light-Duty Vehicle Greenhouse Gas Standards.** Implement adopted Pavley standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.
3. **Energy Efficiency.** Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities).
4. **Renewables Portfolio Standards.** Achieve 33 percent renewable energy mix statewide.
5. **Low Carbon Fuel Standard.** Develop and adopt the Low Carbon Fuel Standard.
6. **Regional Transportation-Related Greenhouse Gas Targets.** Develop regional greenhouse gas emissions reduction targets for passenger vehicles.
7. **Vehicle Efficiency Measures.** Implement light-duty vehicle efficiency measures.
8. **Goods Movement.** Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.
9. **Million Solar Roofs Program.** Install 3,000 megawatts of solar-electric capacity under California's existing solar programs.

[4] California Air Resources Board. California GHG Emissions – Forecast (2002-2020). October 2010

10. **Medium- and Heavy-Duty Vehicles.** Adopt medium- (MD) and heavy-duty (HD) vehicle efficiencies. Aerodynamic efficiency measures for HD trucks pulling trailers 53-feet or longer that include improvements in trailer aerodynamics and use of rolling resistance tires were adopted in 2008 and went into effect in 2010.[5] Future, yet to be determined improvements, includes hybridization of MD and HD trucks.
11. **Industrial Emissions.** Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.
12. **High Speed Rail.** Support implementation of a high speed rail system.
13. **Green Building Strategy.** Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.
14. **High Global Warming Potential Gases.** Adopt measures to reduce high warming global potential gases.
15. **Recycling and Waste.** Reduce methane emissions at landfills. Increase waste diversion, composting and other beneficial uses of organic materials, and mandate commercial recycling. Move toward zero-waste.
16. **Sustainable Forests.** Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation. The 2020 target for carbon sequestration is 5 million MTCO2E/YR.
17. **Water.** Continue efficiency programs and use cleaner energy sources to move and treat water.
18. **Agriculture.** In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.

Table 3-2 summarizes the project's consistency with the State Scoping Plan. As summarized, the project will not conflict with any of the provisions of the Scoping Plan and in fact supports seven of the action categories through energy efficiency, water conservation, recycling, and landscaping.

TABLE 3-2: 2008 SCOPING PLAN CONSISTENCY SUMMARY

Action	Supporting Measures[6]	Consistency
Cap-and-Trade Program	--	Not Applicable. These programs involve capping emissions from electricity generation, industrial facilities, and broad scoped fuels. Caps do not directly affect manufacturing projects.
Light-Duty Vehicle Standards	T-1	Not Applicable. This is a statewide measure establishing vehicle emissions standards.
Energy Efficiency	E-1 E-2 CR-1	Consistent. The project will include a variety of building, water, and solid waste efficiencies consistent with 2016 CALGREEN requirements.

[5] California Air Resources Board. Scoping Plan Measures Implementation Timeline. October 2010

[6] Supporting measures can be found at the following link: http://www.arb.ca.gov/cc/scopingplan/2013_update/appendix_b.pdf

Action	Supporting Measures[6]	Consistency
	CR-2	
Renewables Portfolio Standard	E-3	Not Applicable. Establishes the minimum statewide renewable energy mix.
Low Carbon Fuel Standard	T-2	Not Applicable. Establishes reduced carbon intensity of transportation fuels.
Regional Transportation-Related Greenhouse Gas Targets	T-3	Not Applicable. This is a statewide measure and is not within the purview of this Project.
Vehicle Efficiency Measures	T-4	Not Applicable. Identifies measures such as minimum tire-fuel efficiency, lower friction oil, and reduction in air conditioning use.
Goods Movement	T-5 T-6	Not applicable. Identifies measures to improve goods movement efficiencies such as advanced combustion strategies, friction reduction, waste heat recovery, and electrification of accessories. While these measures are yet to be implemented and will be voluntary, the proposed Project would not interfere with their implementation.
Million Solar Roofs (MSR) Program	E-4	Consistent. The MSR program sets a goal for use of solar systems throughout the state as a whole. While the project currently does not include solar energy generation, the building roof structure will be designed to support solar panels in the future.
Medium- & Heavy-Duty Vehicles	T-7 T-8	Not applicable. MD and HD trucks and trailers working from the industrial land uses are be subject to aerodynamic and hybridization requirements as established by ARB; no feature of the project would interfere with implementation of these requirements and programs.
Industrial Emissions	I-1 I-2 I-3 I-4 I-5	Not Applicable. These measures are applicable to large industrial facilities (> 500,000 $MTCO_2e$/yr) and other intensive uses such as refineries.
High Speed Rail	T-9	Not Applicable. Supports increased mobility choice.
Green Building Strategy	GB-1	Consistent. The project will include a variety of building, water, and solid waste efficiencies consistent with 2016 CALGREEN requirements.
High Global Warming Potential Gases	H-1 H-2 H-3 H-4	Not Applicable. The proposed Project is a not substantial sources of high GWP emissions and will comply with any future changes in air conditioning, fire protection suppressant, and other requirements.

Action	Supporting Measures[6]	Consistency
	H-5 H-6 H-7	
Recycling and Waste	RW-1 RW-2 RW-3	Consistent. The project will be required recycle a minimum of 50 percent from construction activities per State and City requirements.
Sustainable Forests	F-1	Consistent. The project will increase carbon sequestration by increasing on-site trees per the project landscaping plan.
Water	W-1 W-2 W-3 W-4 W-5 W-6	Consistent. The project will include use of low-flow fixtures and efficient landscaping per State requirements.
Agriculture	A-1	Not Applicable. The project is not an agricultural use.

SB 32/2017 Scoping Plan Consistency

The 2017 Scoping Plan Update reflects the 2030 target of a 40 percent reduction below 1990 levels, set by Executive Order B-30-15 and codified by SB 32. Table 3-3 summarizes the project's consistency with the 2017 Scoping Plan. As summarized, the project will not conflict with any of the provisions of the Scoping Plan and in fact supports seven of the action categories.

TABLE 3-3: 2017 SCOPING PLAN CONSISTENCY SUMMARY[7]

Action	Responsible Parties	Consistency
Implement SB 350 by 2030		
Increase the Renewables Portfolio Standard to 50 percent of retail sales by 2030 and ensure grid reliability.	CPUC CEC CARB	Consistent. This measure is not directly applicable to development projects, but the Proposed Project would use energy from Southern California Edison, which has committed to diversify its portfolio of energy sources by increasing energy from wind and solar sources.
Establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030.		Consistent. Although this measure is directed towards policymakers, the proposed Project would be designed and constructed to implement the energy efficiency measures for new commercial developments and would include several measures designed to reduce energy consumption.

[7] Measures can be found at the following link: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf

Action	Responsible Parties	Consistency
Reduce GHG emissions in the electricity sector through the implementation of the above measures and other actions as modeled in IRPs to meet GHG emissions reductions planning targets in the IRP process. Load-serving entities and publicly- owned utilities meet GHG emissions reductions planning targets through a combination of measures as described in IRPs.		Consistent. The proposed Project would be designed and constructed to implement the energy efficiency measures, where applicable by including several measures designed to reduce energy consumption. The proposed Project includes energy efficient field lighting and fixtures that meet the current Title 24 Standards throughout the Project Site and would be a modern development with energy efficient boilers, heaters, and air conditioning systems.
Implement Mobile Source Strategy (Cleaner Technology and Fuels)		
At least 1.5 million zero emission and plug-in hybrid light-duty electric vehicles by 2025.	CARB CalSTA SGC Caltrans CEC OPR Local Agencies	Consistent. These are CARB enforced standards; vehicles that access the project that are required to comply with the standards will comply with the strategy.
At least 4.2 million zero emission and plug-in hybrid light-duty electric vehicles by 2030.		Consistent. These are CARB enforced standards; vehicles that access the project that are required to comply with the standards will comply with the strategy.
Further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean cars regulations.		Not applicable. This measure is not within the purview of this Project.
Medium- and heavy-duty GHG Phase 2.		Not applicable. This measure is not within the purview of this Project.
Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20 percent of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. Also, new natural gas buses, starting in 2018, and diesel buses, starting in 2020, meet the optional heavy-duty low-NO_X standard.		Not applicable. This measure is not within the purview of this Project.

Action	Responsible Parties	Consistency
Last Mile Delivery: New regulation that would result in the use of low NO_X or cleaner engines and the deployment of increasing numbers of zero-emission trucks primarily for class 3-7 last mile delivery trucks in California. This measure assumes ZEVs comprise 2.5 percent of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10 percent in 2025 and remaining flat through 2030.		Not applicable. This measure is not within the purview of this Project.
Further reduce VMT through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming statewide implementation of SB 743; and potential additional VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."		Not applicable. This measure is not within the purview of this Project.
Increase stringency of SB 375 Sustainable Communities Strategy (2035 targets).	CARB	Not applicable. The Project is not within the purview of SB 375 and would therefore not conflict with this measure.
By 2019, adjust performance measures used to select and design transportation facilities		
Harmonize project performance with emissions reductions and increase competitiveness of transit and active transportation modes (e.g. via guideline documents, funding programs, project selection, etc.).	CalSTA SGC OPR CARB GoBiz IBank DOF CTC Caltrans	Not applicable. Although this is directed towards CARB and Caltrans, the Proposed Project would be designed to promote and support pedestrian activity on-site and in the Project Site area. The Project Site is within proximity to residential neighborhoods.
By 2019, develop pricing policies to support low-GHG transportation (e.g. low-emission vehicle zones for heavy duty, road user, parking pricing, transit discounts).	CalSTA Caltrans CTC OPR/SGC CARB	Not applicable. Although this measure is directed towards policymakers, the proposed Project would comply with AB 939, which sets a statewide policy that not less than 50 percent of solid waste generated be source reduced, recycled, or composted. Additionally, the proposed Project would be required to have a recycling program and recycling collection. During construction, the proposed Project shall recycle and reuse construction and demolition waste per County Solid Waste procedures.
Implement California Sustainable Freight Action Plan		

Action	Responsible Parties	Consistency
Improve freight system efficiency.	CalSTA CalEPA CNRA CARB Caltrans CEC GoBiz	When adopted, this measure would apply to all trucks accessing the Project site, this may include existing trucks or new trucks that are part of the statewide goods movement sector.
Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.		Not applicable. This measure is not within the purview of this Project.
Adopt a Low Carbon Fuel Standard with a CI reduction of 18 percent.	CARB	Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030). When adopted, this measure would apply to all fuel purchased and used by the Project in the state.
Implement the Short-Lived Climate Pollutant Strategy by 2030		
40 percent reduction in methane and hydrofluorocarbon emissions below 2013 levels.	CARB CalRecycle CDFA SWRCB Local Air Districts	When adopted, the Project would be required to comply with this measure and reduce SLPS accordingly.
50 percent reduction in black carbon emissions below 2013 levels.		Not applicable. This measure is not within the purview of this Project.
By 2019, develop regulations and programs to support organic waste landfill reduction goals in the SLCP and SB 1383.	CARB CalRecycle CDFA SWRCB Local Air Districts	Not applicable. This measure is not within the purview of this Project.
Implement the post-2020 Cap-and-Trade Program with declining annual caps.	CARB	When adopted, the Project would be required to comply with the Cap-and-Trade Program if it generates emissions from sectors covered by Cap-and-Trade.
By 2018, develop Integrated Natural and Working Lands Implementation Plan to secure California's land base as a net carbon sink		
Protect land from conversion through conservation easements and other incentives.	CNRA Departments Within CDFA	Not applicable. This measure is not within the purview of this Project.

Action	Responsible Parties	Consistency
Increase the long-term resilience of carbon storage in the land base and enhance sequestration capacity	CalEPA CARB	Not applicable. This measure is not within the purview of this Project.
Utilize wood and agricultural products to increase the amount of carbon stored in the natural and built environments		Not applicable. This measure is not within the purview of this Project.
Establish scenario projections to serve as the foundation for the Implementation Plan		Not applicable. This measure is not within the purview of this Project.
Establish a carbon accounting framework for natural and working lands as described in SB 859 by 2018	CARB	Not applicable. This measure is not within the purview of this Project.
Implement Forest Carbon Plan	CNRA CAL FIRE CalEPA and Departments Within	Not applicable. This measure is not within the purview of this Project.
Identify and expand funding and financing mechanisms to support GHG reductions across all sectors.	State Agencies & Local Agencies	Not applicable. This measure is not within the purview of this Project.

As shown above, the Project would not conflict with any of the 2017 Scoping Plan elements as any regulations adopted would apply directly or indirectly to the Project. Further, recent studies show that the State's existing and proposed regulatory framework will allow the State to reduce its GHG emissions level to 40 percent below 1990 levels by 2030 (34).

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5 CERTIFICATION

The contents of this greenhouse gas study report represent an accurate depiction of the greenhouse gas impacts associated with the proposed State Street Extension. The information contained in this greenhouse gas report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
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PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
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Air Dispersion Modeling – Lakes Environmental • June, 2006

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APPENDIX 3.1:

CALEEMOD ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

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Appendix G – Hydrology Study

TECHNICAL MEMORANDUM

FOR

STORM DRAIN FACILITIES
STATE STREET EXTENSION - PHASE 1

Prepared by:

ERSC
Engineering Resources of Southern California

July 2nd, 2019

Prepared for:

CITY OF SAN BERNARDINO, CALIFORNIA
FOUNDED IN 1810

REGISTERED PROFESSIONAL ENGINEER
STEVEN A. LATINO
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Table of Contents

Section 1: Purpose and Scope

This drainage feasibility study presents an analysis of the hydrologic and hydraulic effects of the proposed State Street Extension Project (project) located in the City of San Bernardino, California.

This study is to determine the incremental excess of runoff generated by the proposed condition of said project for a 10-, 25-, and 100-year storm event. Furthermore, the existing State Street storm drain system will be analyzed to determine the required capacity for conveyance of excess runoff generated by a 10-, 25-, and 100-year storm. The study will propose the required facilities needed to intercept and convey excess flows to Lytle Creek located west of State Street.

This study includes Rational Method calculations for the 10-, 25- and 100-year storm event based on the latest San Bernardino County Hydrology Manual (SBCHM) and 10-, 25-, and 100-year rainfall intensities from NOAA Atlas 14. The study also details the general project characteristics, the design analysis, criteria and methodology applied to the analysis of the project. An engineer's cost estimate for the proposed drainage facilities is included in Appendix A.

2.1 Project Description

The project entails the extension of State Street from Hanford Street to Baseline Road through an undeveloped lot located east of Lytle Creek and West of existing residential developments. The existing State Street storm drain runs parallel with the proposed street alignment and branches off to the west to discharge into Lytle Creek. The existing storm drain along the proposed street alignment is comprised mostly of 118” RCP. The downstream portion of the system transitions to a 13’ x 7’ open rectangular channel, a 13’ x 5.58’ RCB, and then a trapezoidal earthen channel before discharging to Lytle Creek.

A hydrologic analysis of the drainage area was conducted to determine the proposed hydrologic condition of the project site. The peak runoff discharge generated from the proposed condition is found to be approximately 14, 22, and 35 cfs for a 10-, 25-, and 100-year storm event, respectively. A hydraulic analysis was conducted to determine the capacity of the existing State Street storm drain. The existing storm drain system has sufficient capacity to safely convey the peak runoff to Lytle Creek. The 10-, 25-, and 100-year peak flows affiliated with the post-development condition will be intercepted by proposed catch basins along State Street and conveyed through the existing storm drain system.

2.1.1 Project Location

The drainage area for this project is located south of the 210 Freeway and west of the 215 Freeway in the City of San Bernardino, CA. The Vicinity Map shown below depicts the project area that is of interest for this hydrology study.

The total drainage area is approximately 25 acres. The area is bounded by the existing State Street alignment, spanning from 100 feet north of 16^{th} Street to Hanford Street, and the proposed State Street alignment, spanning from Hanford Street to Baseline Road. Approximately 18 acres of residential land use contributes runoff to the drainage area.

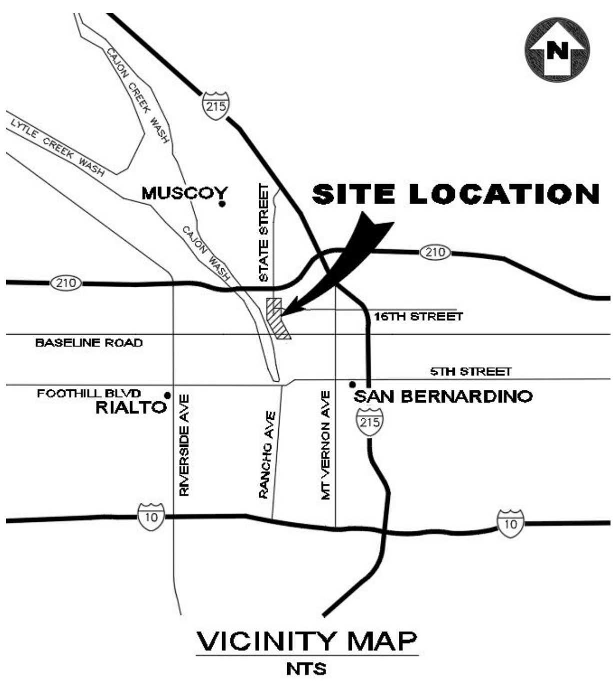


Figure 1 – Vicinity Map (Not to Scale)

2.2 Hydrologic Setting

This section summarizes the project size and location in the context of a larger watershed perspective, topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and other relevant hydrologic and environmental factors. Furthermore, this information will be used to determine the proposed storm drain facilities needed to adequately capture and convey the post-development runoff to Lytle Creek.

2.2.1 Watershed

The project site is located within the Santa Ana Watershed and is tributary to Lytle Creek, which is located west of State Street and north of Highway 66. The final discharge location is the Santa Ana Wash.

2.2.2 Existing Topography and Facilities

The drainage area slopes downward from north to south with a high elevation of approximately 1,225 feet at the most northwest portion of the drainage area, and a low elevation of 1,188 feet located approximately 120 feet northwest of the proposed Baseline Road intersection. This equates to an approximate slope of 0.6 percent from northwest to southeast. An existing parallel-pipe CMP culvert located at northeast corner of Baseline Road and University Parkway allows runoff to drain underneath Baseline and discharge southerly into the undeveloped lot adjacent to Arroyo Valley High School. An existing 118” RCP runs parallel with State Street with catch basins located at the intersection of Hanford Street. The storm drain branches off to from the proposed State Street alignment and discharges into Lytle Creek.

2.2.3 Adjacent Land Use

The land use established for the study area mostly contains mostly Single-Family Residential land with some Public/Quasi-Public land. Some of the residential land use appears to be undeveloped land. See Appendix B for the attached Land Use Map that was downloaded from the City of San Bernardino website.

2.2.4 Soil Conditions

In accordance with the Natural Resources Conservation Service Soil Survey, the hydrologic soil group for the study area is classified as soil groups A. The Natural Resources Conservation Service Soil Survey report is included in the Appendix C.

2.2.5 Downstream Conditions

The runoff generated by a 100-year storm event will be collected and conveyed by the existing 118” RCP, which transitions downstream into a rectangular channel and then an earthen trapezoidal channel. The final discharge point will be the Santa Ana River which will then ultimately discharge into the Pacific Ocean.

2.2.6 Existing Drainage Patterns

Runoff generated from the study area flows in a northwest to southeast direction. The drainage area has been broken down in to 3 subareas (A-1 through A-3), as shown in the Hydrology Map in Appendix E. Runoff flowing downstream along State Street is collected by catch basins located at the intersection of Hanford Street and conveyed through the existing 118” RCP. Runoff from the residential areas converges along Hanford Street and is directed to the unmaintained portion of State Street via gutter flow, where it continues downstream as sheet flow to an open lot located just north of Baseline Road and University Parkway. An existing parallel-pipe CMP culvert allows runoff to cross underneath Baseline and discharge southerly from the drainage boundary into an undeveloped lot adjacent to Arroyo Valley High School.

2.2.7 Proposed Drainage Patterns

The existing grade along the proposed State Street alignment is subject to change in order to provide sufficient cover for the existing storm drain system and a smooth transition at the intersection of Baseline Road. State Street will maintain existing grade north of Hanford Street. The proposed grade will remain constant from Hanford Street to 1,800 south of Hanford Street before entering a sag vertical curve to transition to Baseline Road intersection. The proposed onsite condition will experience approximately 35 cfs of runoff generated by a 100-year storm event. The proposed State Street extension will include 8” curb and gutter and four 7-foot wide catch basins. The low point of the proposed street is approximately located at Station 14+00 (State St. Stationing) at the sag vertical curve, in which two catch basins will be placed to intercept and convey runoff to the existing storm drain system. Two other catch basins will be placed at approximately Station 25+00 and Station 30+50 (State St. Stationing). With the proposed State Street drainage improvements, runoff generated from a 100-year storm event will be sufficiently intercepted and conveyed through the existing State Street storm drain storm drain to Lytle Creek. Offsite drainage area, which includes Subareas OA-1 and OA-2 per the State Street Hydrology Map in Appendix E, are not tributary to the storm drain facilities. In order to maintain the existing drainage course for these subareas, a proposed 18” CMP culvert will cross underneath the proposed State Street roadway to allow runoff to drain from OA-1 subarea to OA-2 subarea. From OA-2, runoff can resume its historic drainage path through the existing CMP Baseline culvert and discharging south of Baseline Road.

2.2.9 Impervious Cover

Approximately 3.5 acres of undeveloped land will be replaced with an impervious surface for the proposed extension of State Street. Of the total 25-acre drainage area, the estimated percent of impervious cover for the pre-development condition is 20%. The estimated percent of impervious cover for the post-development condition is approximately 39%. Therefore, the project increases the impervious cover of the drainage area by approximately 19%.

Section 3: Design Criteria and Methodology

3.1 Design Criteria

This section summarizes the design criteria and methodology applied during the drainage analysis of the drainage area. The design criteria and methodology follow the SBCHM. In 2010, the County of San Bernardino, issued an addendum to their hydrology manual that updated rainfall data from National Oceanic and Atmospheric Administration (NOAA) 1973 Atlas 2 to the NOAA Atlas 14, volume 6. The rainfall intensities obtained from NOAA Atlas 14 are located in Appendix D. Per the SBCHM, only the Rational Method is required for facility sizing when the watershed area is less than 640 acres. Because the largest subarea is approximately 23 acres, the Rational Method analysis will be performed to determine the runoff flowrate generated by 10-, 25-, and 100-year storm event.

3.2 Soil Type and Infiltration

The most significant factor affecting infiltration is the nature of the soil on the watershed. Per the SBCHM soils are classified as SCS Soil Type A, B, C, and D. Soils in Group A have high infiltration rates, while soils in Group D have very low infiltration rates. The drainage area is made up of Soil Group A which has a high infiltration rate. Other important factors in soil infiltration is the antecedent moisture condition (AMC). The AMC used for this analysis was AMC II. Refer to Appendix C for the soils report obtained from the Natural Resources Conservation Services Soil Survey.

3.3 Methodology

3.3.1 Runoff Calculation Method

Hydrology calculations were performed using the Rational Method outlined in the SBCHM and Civil CADD/ Civil Design Engineering Software, Version 7.1. Rainfall intensities were derived from NOAA Atlas 14, Volume 6, Version 2, for the 10, 25 and 100-year storm events (Appendix D). The hydrology calculations are included in Appendix F.

The rational method is based on the equation: ($Q = C \times I \times A$)

where:

Q = runoff (cfs)

C = runoff coefficient representing the ratio of runoff depth to rainfall depth

I = the time averaged rainfall intensity in inches per hour corresponding to the time of concentration

A = drainage area (acres)

3.3.2 Hydraulic Calculations

Hydraulic calculations for storm drain system analyses were performed using the Water Surface Pressure Gradient (WSPG) Software, Version 14.01. All hydraulic calculations are included in Appendix G.

Section 4: Hydrology and Hydraulic Analysis

This section summarizes the quantitative hydrologic analysis of the drainage area.

4.1 Summary of Hydrology Results

A hydrologic analysis was conducted to determine the post-development runoff generated by 10, 25 and 100-year storm events within the onsite and offsite drainage areas. Tables 1 and 2 summarize the onsite and offsite hydrology results, respectively.

Table 1: Proposed Onsite Peak Discharge Rate

PROPOSED ONSITE HYDROLOGIC CONDITION	
Storm Event	**Peak Discharge**
10-Year	14 cfs
25-Year	22 cfs
100-Year	35 cfs

Table 2: Proposed Offsite Peak Discharge Rate

PROPOSED OFFSITE HYDROLOGIC CONDITION	
Storm Event	**Peak Discharge**
10-Year	3 cfs
25-Year	4 cfs
100-Year	6 cfs

4.2 Summary of Hydraulic Results

Furthermore, the capacity of the existing State Street storm drain is investigated to determine the viability of sufficiently conveying the 100-year peak discharge to Lytle Creek.

4.2.1 Existing Hydraulic Conditions

Using the 100-year flowrate given by the Storm Drain Improvement Plans (Drawing No. 10842), the existing storm drain system along State Street was found to be operating at approximately 1,340 cfs for the 100-year storm event. The existing storm drain system operates under pressure from Station 35+95 to Station 49+40 (storm drain stationing). However, there is sufficient ground cover above the pipe that additional flow may be added to the storm drain system under the condition that the storm water surface elevation be a minimum of one foot below the existing ground surface. The flow lines of existing catch basins on Hanford Street at approximately Station 49+30 (storm drain stationing) are located approximately 4 feet above the hydraulic grade line during the 100-year storm event. Therefore, the existing storm drain system has the capacity to convey an additional 3 feet of hydraulic head, respectively. See Appendix I for storm drain record drawings and Appendix G for the WSPG calculations.

4.2.2 Proposed Hydraulic Conditions

To determine if the existing storm drain has adequate capacity to convey the post-development runoff, total 35 cfs was introduced to the existing storm drain WSPG model at the locations of four proposed 7-foot catch basins. Closely related to the existing condition, the proposed storm drain system is under pressure from Station 35+56 to Station 49+40 (storm drain stationing). At the crossing of Hanford Street, the depth from ground surface to the water surface elevation is approximately 3.5 feet, therefore, validating the storm drain system has sufficient capacity for post-development runoff. Refer to Appendix H for the hydraulic profile of the proposed storm drain system and Appendix G for the WSPG calculations.

4.2.2.1 Assumptions for 10- and 25- Year Hydraulic Evaluation

Due to lack of information on the 10- and 25-year flowrates for the existing storm drain system, the Q_{10} and Q_{25} at the storm drain system headworks are assumed to be proportional to the Q_{100}. Based on the hydrology study, approximately 40.7% of the 100-year peak flowrate is equal to the $Q_{10,}$ and 63.2% of the 100-year peak flowrate is equal to the Q_{25}. Applying these percentages to the Q_{100} for the storm drain system, the Q_{10} and Q_{25} are approximately 545.2 cfs and 846.6 cfs, respectively. The hydraulic profiles in Appendix H for the given storm events indicate the storm drain system is not under pressure for the post-development hydrologic conditions. The HGL is well within the confines of the system during the 10- and 25-year storm events.

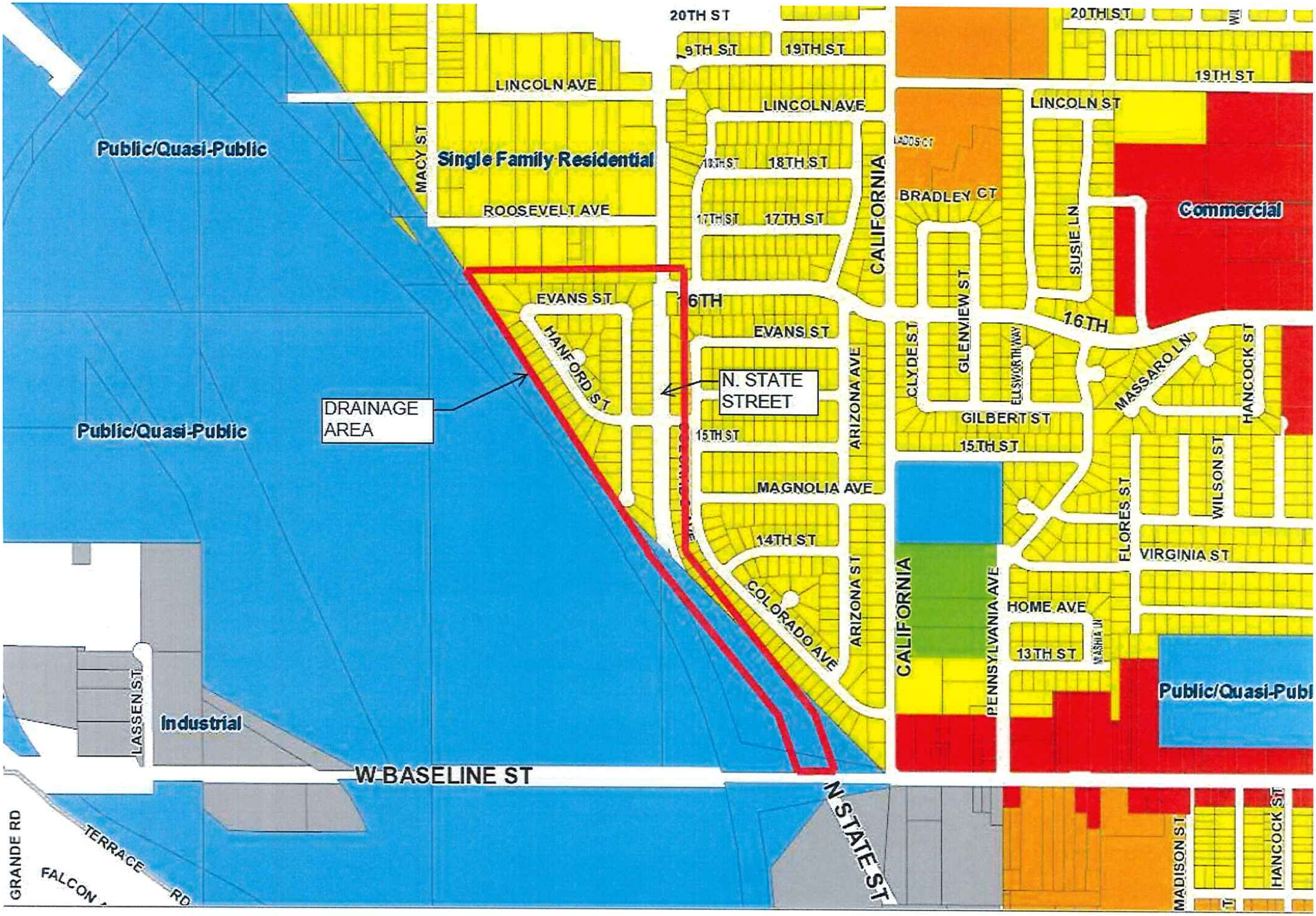
Section 5 Conclusion

The intent of this study was to assess the current drainage conditions and storm drain facilities for the project site, determine the peak flowrates for the 10-, 25- and 100-year storm events for the post-development hydrologic condition, and verify the existing storm drain facility along State Street has the hydraulic capacity to effectively convey the post-development runoff. As a result, the study verified the existing storm drain has sufficient capacity to safely convey the 100-year peak flowrate, even while under pressure. The study also verified the system is not under pressure during the 10- and 25-year storm events, assuming the upstream Q_{10} and Q_{25} flowrates are proportional to the Q_{100}. Four (4) 7-foot catch basins are proposed along the State Street alignment to intercept runoff and maintain an exceptional level of service. Two of the catch basins shall be placed at approximately Sta. 14+00 where a low point occurs in the alignment, and the lateral will extend 250± and intersect the storm drain system at the concrete rectangular channel wall. Two catch basins are located at approximately Sta. 25+00 and Sta. 30+50, respectively, and they tie in to the 118" RCP storm drain within State Street ROW. An Engineer's Estimate for the construction of the proposed catch basins is included in Appendix A.

Appendix A:
Engineer's Estimate

State Street Storm Drain Cost Estimate				
Facility Description	**Quanity**	**Unit**	**Unit Cost**	**Facility Cost**
State Street Storm Drain				
Catch Basins - w=7'	4	EA	$5,000	$20,000
18" RCP Catch Basin Laterals	340	LF	$130	$44,200
		SUBTOTAL:		$64,200
		15% CONTINGENCY:		$9,630
		TOTAL:		$73,830

Appendix B:
Land Use Map



Public/Quasi-Public
Single Family Residential
Commercial
Public/Quasi-Public
Industrial
Public/Quasi-Publ
DRAINAGE AREA
N. STATE STREET
20TH ST
19TH ST
LINCOLN AVE
LINCOLN ST
18TH ST
17TH ST
ROOSEVELT AVE
BRADLEY CT
MACY ST
CALIFORNIA
SUSIE LN
16TH
EVANS ST
HANFORD ST
ARIZONA AVE
CLYDE ST
GLENVIEW ST
MASSARO LN
HANCOCK ST
GILBERT ST
15TH ST
MAGNOLIA AVE
14TH ST
COLORADO AVE
FLORES ST
WILSON ST
VIRGINIA ST
PENNSYLVANIA AVE
HOME AVE
13TH ST
LASSEN ST
W BASELINE ST
N STATE ST
MADISON ST
GRANDE RD
TERRACE RD
FALCON

Appendix C:
Soils Group Map

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Bernardino County Southwestern Part, California

April 8, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

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
- 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 10, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 5, 2015—Jan 18, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	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
SpC	Soboba stony loamy sand, 2 to 9 percent slopes	12.1	78.1%
TvC	Tujunga gravelly loamy sand, 0 to 9 percent slopes	3.4	21.9%
Totals for Area of Interest		**15.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Bernardino County Southwestern Part, California

SpC—Soboba stony loamy sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hckv
Elevation: 960 to 3,690 feet
Mean annual precipitation: 12 to 39 inches
Mean annual air temperature: 60 to 65 degrees F
Frost-free period: 260 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Soboba and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Soboba

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

Ap - 0 to 10 inches: stony loamy sand
C1 - 10 to 24 inches: very stony loamy sand
C2 - 24 to 60 inches: very stony sand

Properties and qualities

Slope: 2 to 9 percent
Percent of area covered with surface fragments: 0.1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 19.99 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 5 percent

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tujunga, gravelly loamy sand
Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ramona
Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

TvC—Tujunga gravelly loamy sand, 0 to 9 percent slopes

Map Unit Setting
National map unit symbol: hcl2
Elevation: 10 to 1,500 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 250 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition
Tujunga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tujunga

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
H1 - 0 to 36 inches: gravelly loamy sand

H2 - 36 to 60 inches: gravelly sand

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Landform: Drainageways
Hydric soil rating: Yes

Soboba, gravelly loamy sand

Percent of map unit: 5 percent
Hydric soil rating: No

Delhi, fine sand

Percent of map unit: 5 percent
Hydric soil rating: No

Appendix D:

NOAA Atlas 14 Rainfall Intensities

NOAA Atlas 14, Volume 6, Version 2 LYTLE CREEK FOOTHILL B
Station ID: 04-5212
Location name: San Bernardino, California, USA*
Latitude: 34.095°, Longitude: -117.3347°
Elevation:
Elevation (station metadata): 1160 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.123 (0.102-0.149)	0.157 (0.131-0.191)	0.203 (0.169-0.248)	0.241 (0.198-0.296)	0.292 (0.232-0.372)	0.332 (0.258-0.431)	0.372 (0.282-0.496)	0.414 (0.305-0.568)	0.471 (0.332-0.673)	0.515 (0.351-0.763)
10-min	0.176 (0.146-0.213)	0.226 (0.188-0.274)	0.291 (0.242-0.355)	0.345 (0.284-0.424)	0.419 (0.333-0.533)	0.476 (0.370-0.618)	0.533 (0.404-0.711)	0.593 (0.437-0.814)	0.674 (0.476-0.965)	0.738 (0.502-1.09)
15-min	0.213 (0.177-0.258)	0.273 (0.227-0.332)	0.353 (0.292-0.429)	0.418 (0.343-0.513)	0.506 (0.402-0.644)	0.575 (0.447-0.747)	0.645 (0.489-0.859)	0.717 (0.528-0.984)	0.816 (0.576-1.17)	0.892 (0.608-1.32)
30-min	0.311 (0.259-0.377)	0.399 (0.332-0.485)	0.515 (0.427-0.628)	0.611 (0.502-0.750)	0.741 (0.588-0.942)	0.841 (0.654-1.09)	0.943 (0.715-1.26)	1.05 (0.773-1.44)	1.19 (0.842-1.71)	1.30 (0.888-1.93)
60-min	0.433 (0.361-0.526)	0.557 (0.463-0.676)	0.719 (0.596-0.875)	0.851 (0.700-1.05)	1.03 (0.820-1.31)	1.17 (0.911-1.52)	1.32 (0.997-1.75)	1.46 (1.08-2.01)	1.66 (1.17-2.38)	1.82 (1.24-2.70)
2-hr	0.620 (0.516-0.753)	0.796 (0.662-0.967)	1.03 (0.851-1.25)	1.21 (0.998-1.49)	1.47 (1.17-1.87)	1.67 (1.30-2.17)	1.87 (1.42-2.49)	2.08 (1.53-2.85)	2.36 (1.66-3.37)	2.57 (1.75-3.82)
3-hr	0.767 (0.639-0.931)	0.984 (0.818-1.20)	1.27 (1.05-1.54)	1.50 (1.23-1.84)	1.82 (1.44-2.31)	2.06 (1.60-2.67)	2.31 (1.75-3.07)	2.56 (1.89-3.51)	2.90 (2.05-4.16)	3.17 (2.16-4.70)
6-hr	1.07 (0.890-1.30)	1.37 (1.14-1.67)	1.77 (1.47-2.15)	2.09 (1.72-2.57)	2.52 (2.01-3.21)	2.86 (2.22-3.71)	3.20 (2.42-4.26)	3.55 (2.61-4.86)	4.01 (2.83-5.75)	4.38 (2.98-6.49)
12-hr	1.44 (1.20-1.74)	1.85 (1.54-2.25)	2.38 (1.98-2.90)	2.81 (2.31-3.46)	3.40 (2.70-4.32)	3.84 (2.99-4.99)	4.29 (3.25-5.71)	4.74 (3.50-6.51)	5.36 (3.78-7.67)	5.83 (3.97-8.65)
24-hr	1.91 (1.70-2.21)	2.47 (2.19-2.86)	3.20 (2.82-3.70)	3.78 (3.31-4.41)	4.56 (3.86-5.49)	5.15 (4.27-6.33)	5.74 (4.65-7.23)	6.35 (5.00-8.22)	7.15 (5.41-9.65)	7.77 (5.68-10.8)
2-day	2.32 (2.05-2.67)	3.05 (2.69-3.51)	3.99 (3.52-4.62)	4.76 (4.17-5.56)	5.81 (4.92-6.99)	6.60 (5.48-8.12)	7.41 (6.00-9.33)	8.24 (6.49-10.7)	9.35 (7.08-12.6)	10.2 (7.47-14.2)
3-day	2.44 (2.16-2.81)	3.26 (2.89-3.77)	4.37 (3.85-5.05)	5.28 (4.62-6.16)	6.53 (5.53-7.87)	7.51 (6.23-9.24)	8.52 (6.90-10.7)	9.56 (7.54-12.4)	11.0 (8.33-14.8)	12.1 (8.88-16.9)
4-day	2.59 (2.29-2.98)	3.51 (3.10-4.05)	4.75 (4.19-5.49)	5.78 (5.05-6.74)	7.21 (6.11-8.69)	8.34 (6.92-10.3)	9.51 (7.71-12.0)	10.7 (8.47-13.9)	12.5 (9.43-16.8)	13.8 (10.1-19.3)
7-day	2.93 (2.60-3.38)	3.99 (3.53-4.61)	5.42 (4.78-6.27)	6.62 (5.79-7.71)	8.28 (7.01-9.97)	9.59 (7.96-11.8)	11.0 (8.87-13.8)	12.4 (9.77-16.0)	14.4 (10.9-19.4)	16.0 (11.7-22.3)
10-day	3.18 (2.82-3.67)	4.35 (3.85-5.02)	5.93 (5.23-6.86)	7.25 (6.34-8.45)	9.09 (7.70-10.9)	10.5 (8.75-13.0)	12.1 (9.77-15.2)	13.7 (10.8-17.7)	15.9 (12.0-21.4)	17.7 (12.9-24.6)
20-day	3.87 (3.43-4.46)	5.34 (4.72-6.16)	7.32 (6.46-8.47)	8.99 (7.87-10.5)	11.3 (9.60-13.7)	13.2 (11.0-16.2)	15.2 (12.3-19.1)	17.2 (13.6-22.3)	20.1 (15.2-27.1)	22.4 (16.4-31.2)
30-day	4.58 (4.06-5.28)	6.35 (5.62-7.33)	8.75 (7.72-10.1)	10.8 (9.43-12.6)	13.6 (11.5-16.4)	15.9 (13.2-19.6)	18.3 (14.8-23.0)	20.8 (16.4-26.9)	24.3 (18.4-32.8)	27.2 (19.9-37.9)
45-day	5.40 (4.78-6.22)	7.50 (6.63-8.65)	10.4 (9.15-12.0)	12.8 (11.2-14.9)	16.2 (13.7-19.5)	18.9 (15.7-23.3)	21.8 (17.7-27.5)	24.8 (19.6-32.2)	29.1 (22.0-39.3)	32.5 (23.8-45.4)
60-day	6.26 (5.54-7.21)	8.70 (7.69-10.0)	12.0 (10.6-13.9)	14.8 (13.0-17.3)	18.8 (15.9-22.6)	22.0 (18.2-27.0)	25.3 (20.5-31.9)	28.8 (22.7-37.3)	33.8 (25.6-45.6)	37.8 (27.6-52.7)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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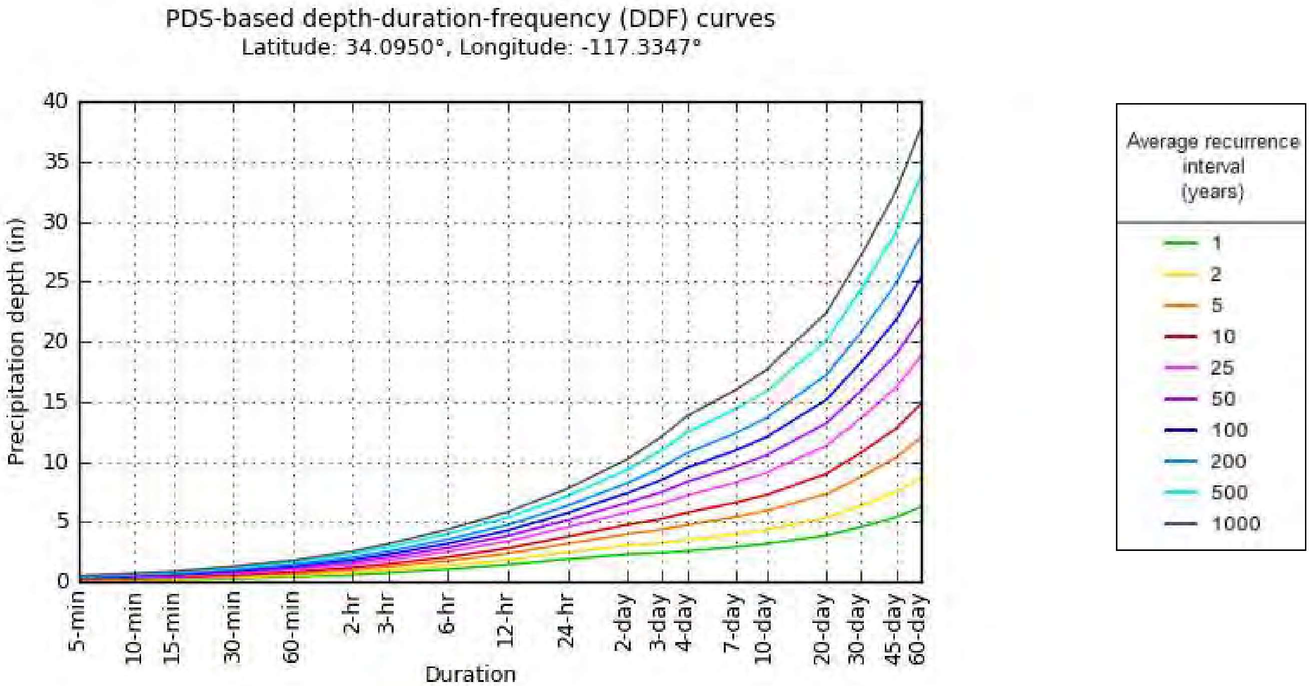
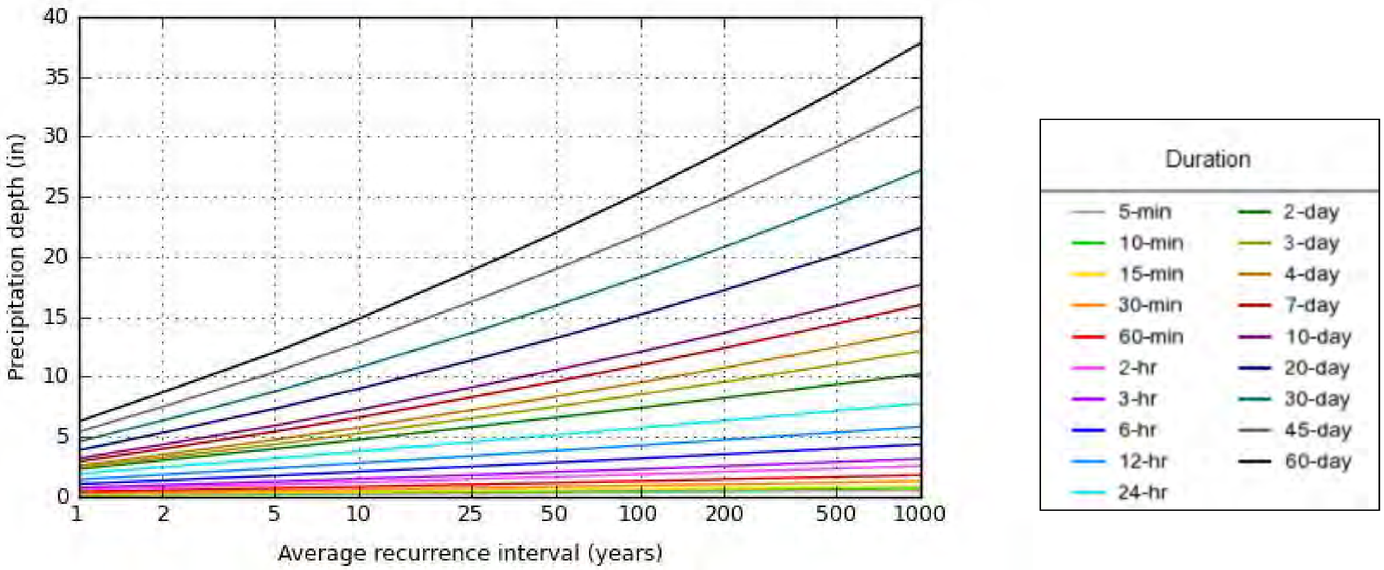
PF graphical





NOAA Atlas 14, Volume 6, Version 2 Created (GMT): Thu Mar 14 18:45:10 2019

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Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial

[Back to Top](#)

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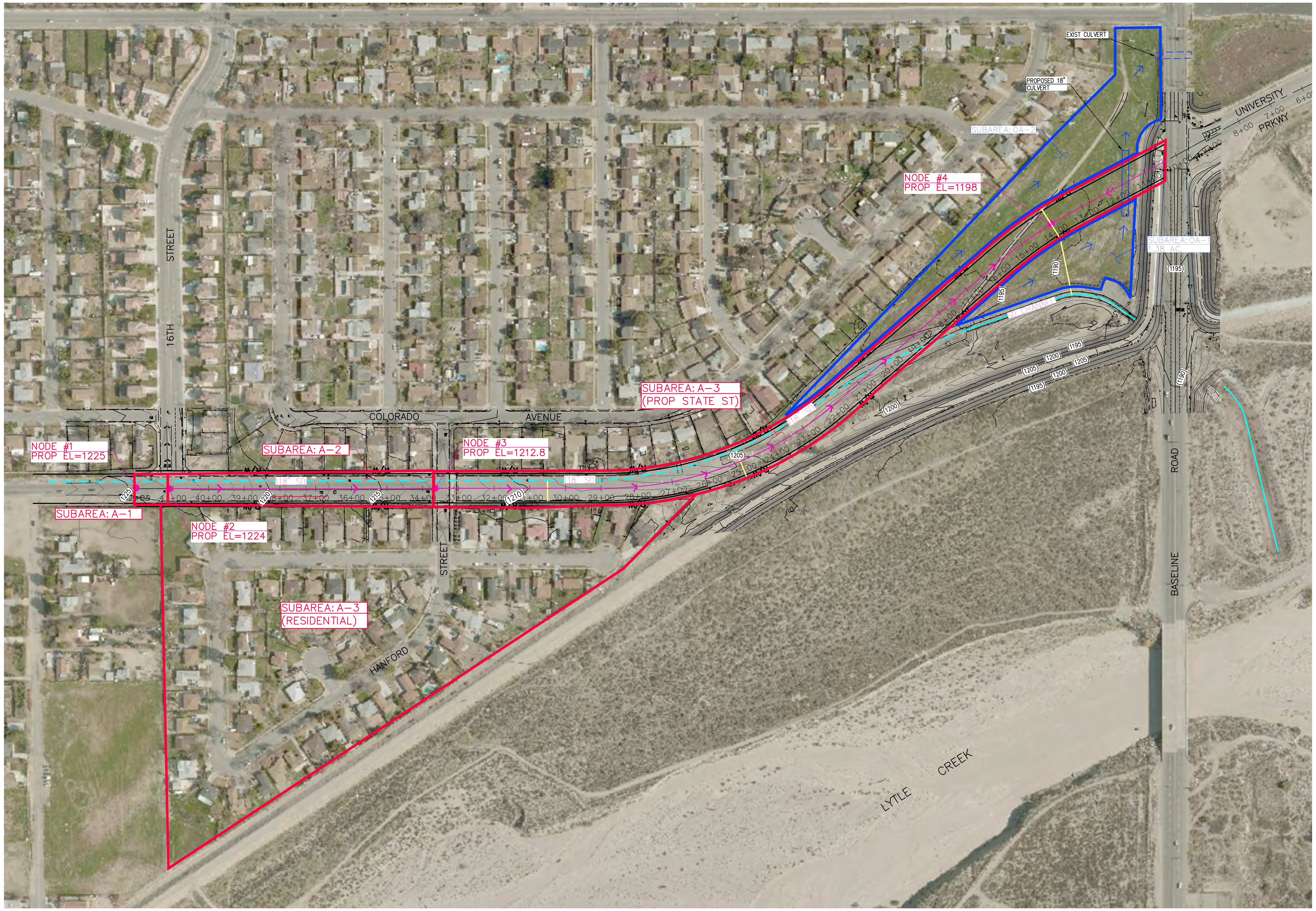
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Appendix E:
Hydrology Map



ONSITE SUBAREA RUNOFF

SUBAREA	AREA (AC)	Q_{10} (CFS)	Q_{25} (CFS)	Q_{100} (CFS)
A–1	0.22	0.49	0.62	0.83
A–2	1.60	2.65	3.32	4.41
A–3 (RESIDENTIAL) (STATE ST.)	17.7 5.37	11.13	18.19	29.77
TOTAL:	24.89	14.27	22.13	35.01

OFFSITE SUBAREA RUNOFF

SUBAREA	AREA (AC)	Q_{10} (CFS)	Q_{25} (CFS)	Q_{100} (CFS)
OA–1	1.38	0.97	1.39	2.06
OA–2	3.18	2.05	2.99	4.50
TOTAL:	4.56	3.02	4.38	6.56

LEGEND

SUBAREA: X–X	AREA DESIGNATION
	FLOW PATH
	FLOW PATH FOR OFFSITE DRAINAGE AREAS
	EXISTING 118" STORM DRAIN
	EXISTING STORM DRAIN CHANNEL
	PROPOSED 18" SD LATERAL
	ONSITE DRAINAGE BOUNDARY
	OFFSITE DRAINAGE BOUNDARY
	NODE
NODE #X PROP EL=XXXX	NODE DESIGNATION & PROPOSED ELEVATION

SCALE: 1" = 150'

FEET

150 0 150 300

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CHECKED BY:

RECOMMENDED BY:

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES–PUBLIC WORKS/ENGINEERING

STATE STREET EXTENSION - PHASE 1
HYDROLOGY MAP

DRAWING NO.

SHEET 1 OF 1 SHEETS

FOR CITY USE ONLY: FILE NO. W.O. NO.

Appendix F:
Hydrology Calculations

- Onsite Hydrology Calculations
  - 10-Year
  - 25-Year
  - 100-Year
- Offsite Hydrology Calculations
  - 10-Year
  - 25-Year
  - 100-Year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study   Date: 06/20/19

CITY OF SAN BERNARDINO,CA
STATE STREET DRAINAGE IMPROVEMENTS
10 YEAR STORM EVENT
JOB No.00015014

Program License Serial Number 6158

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.851 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

____

RESIDENTIAL(2 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.7000 Max loss rate(Fm)= 0.684(In/Hr)
Initial subarea data:
Initial area flow distance = 97.000(Ft.)
Top (of initial area) elevation = 1225.000(Ft.)
Bottom (of initial area) elevation = 1224.000(Ft.)
Difference in elevation = 1.000(Ft.)
Slope = 0.01031 s(%)= 1.03
TC = k(0.438)*[(length^3)/(elevation change)]^0.2

```
      Initial area time of concentration =    6.816 min.
      Rainfall intensity =      3.138(In/Hr) for a    10.0 year storm
      Effective runoff coefficient used for area (Q=KCIA) is C = 0.704
      Subarea runoff =      0.486(CFS)
      Total initial stream area =        0.220(Ac.)
      Pervious area fraction = 0.700
      Initial area Fm value =    0.684(In/Hr)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Process from Point/Station        2.000 to Point/Station
3.000
      **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
      __________________________________________________________________
___
      Top of street segment elevation =  1224.000(Ft.)
      End of street segment elevation =  1212.800(Ft.)
      Length of street segment  =   750.000(Ft.)
      Height of curb above gutter flowline  =    8.0(In.)
      Width of half street (curb to crown)  =  35.500(Ft.)
      Distance from crown to crossfall grade break  =   0.500(Ft.)
      Slope from gutter to grade break (v/hz) =   0.020
      Slope from grade break to crown (v/hz)  =   0.020
      Street flow is on [2] side(s) of the street
      Distance from curb to property line  =  14.000(Ft.)
      Slope from curb to property line (v/hz) =   0.025
      Gutter width =   2.000(Ft.)
      Gutter hike from flowline =  2.000(In.)
       Manning's N in gutter =  0.0150
       Manning's N from gutter to grade break =  0.0150
       Manning's N from grade break to crown =  0.0150
      Estimated mean flow rate at midpoint of street =      1.871(CFS)
      Depth of flow =   0.238(Ft.), Average velocity =   2.153(Ft/s)
      Streetflow hydraulics at midpoint of street travel:
      Halfstreet flow width =   5.548(Ft.)
      Flow velocity =   2.15(Ft/s)
      Travel time =    5.81 min.     TC =   12.62  min.
       Adding area flow to street
      RESIDENTIAL(11+ dwl/acre)
      Decimal fraction soil group A = 1.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 32.00
      Pervious ratio(Ap) = 0.2000     Max loss rate(Fm)=     0.196(In/Hr)
      Rainfall intensity =      2.168(In/Hr) for a    10.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.794
      Subarea runoff =      2.649(CFS) for    1.600(Ac.)
      Total runoff =      3.135(CFS)
      Effective area this stream =        1.82(Ac.)
      Total Study Area (Main Stream No. 1) =       1.82(Ac.)
```

```
Area averaged Fm value =    0.255(In/Hr)
Street flow at end of street =      3.135(CFS)
Half street flow at end of street =      1.567(CFS)
Depth of flow =   0.273(Ft.), Average velocity =   2.377(Ft/s)
Flow width (from curb towards crown)=   7.299(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
Process from Point/Station        3.000 to Point/Station
4.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
__________________________________________________________________
___
Top of street segment elevation =  1212.800(Ft.)
End of street segment elevation =  1198.000(Ft.)
Length of street segment  =  1960.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  35.500(Ft.)
Distance from crown to crossfall grade break  =   0.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      8.764(CFS)
Depth of flow =   0.393(Ft.), Average velocity =   2.305(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.321(Ft.)
Flow velocity =   2.30(Ft/s)
Travel time =   14.17 min.     TC =   26.80  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.380(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with
modified
rational method)(Q=KCIA) is C = 0.415
Subarea runoff =     11.127(CFS) for   23.070(Ac.)
Total runoff =     14.262(CFS)
Effective area this stream =       24.89(Ac.)
Total Study Area (Main Stream No. 1) =       24.89(Ac.)
Area averaged Fm value =    0.744(In/Hr)
Street flow at end of street =     14.262(CFS)
```

```
Half street flow at end of street =      7.131(CFS)
Depth of flow =   0.451(Ft.), Average velocity =   2.591(Ft/s)
Flow width (from curb towards crown)=  16.203(Ft.)
End of computations, Total Study Area =          24.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.761
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 06/20/19

CITY OF SAN BERNARDINO,CA
STATE STREET DRAINAGE IMPROVEMENTS
25 YEAR STORM EVENT
JOB No.00015014

Program License Serial Number 6158

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.030 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++

Process from Point/Station 1.000 to Point/Station 2.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(2 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.7000 Max loss rate(Fm)= 0.684(In/Hr)
Initial subarea data:
Initial area flow distance = 97.000(Ft.)
Top (of initial area) elevation = 1225.000(Ft.)
Bottom (of initial area) elevation = 1224.000(Ft.)
Difference in elevation = 1.000(Ft.)
Slope = 0.01031 s(%)= 1.03
TC = k(0.438)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =    6.816 min.
Rainfall intensity =      3.798(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.738
Subarea runoff =      0.617(CFS)
Total initial stream area =        0.220(Ac.)
Pervious area fraction = 0.700
Initial area Fm value =    0.684(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
Process from Point/Station        2.000 to Point/Station
3.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________
___
Top of street segment elevation =  1224.000(Ft.)
End of street segment elevation =  1212.800(Ft.)
Length of street segment  =   750.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  35.500(Ft.)
Distance from crown to crossfall grade break  =   0.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.354(CFS)
Depth of flow =   0.253(Ft.), Average velocity =   2.245(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   6.306(Ft.)
Flow velocity =   2.24(Ft/s)
Travel time =    5.57 min.     TC =   12.38  min.
 Adding area flow to street
RESIDENTIAL(11+ dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.2000     Max loss rate(Fm)=     0.196(In/Hr)
Rainfall intensity =      2.655(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with
modified
rational method)(Q=KCIA) is C = 0.814
Subarea runoff =      3.315(CFS) for    1.600(Ac.)
Total runoff =      3.931(CFS)
Effective area this stream =        1.82(Ac.)
Total Study Area (Main Stream No. 1) =       1.82(Ac.)
```

```
      Area averaged Fm value =    0.255(In/Hr)
      Street flow at end of street =      3.931(CFS)
      Half street flow at end of street =      1.966(CFS)
      Depth of flow =   0.289(Ft.), Average velocity =   2.494(Ft/s)
      Flow width (from curb towards crown)=   8.134(Ft.)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Process from Point/Station        3.000 to Point/Station
4.000
      **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
      ____________________________________________________________________
___
      Top of street segment elevation =  1212.800(Ft.)
      End of street segment elevation =  1198.000(Ft.)
      Length of street segment  =  1960.000(Ft.)
      Height of curb above gutter flowline  =    8.0(In.)
      Width of half street (curb to crown)  =  35.500(Ft.)
      Distance from crown to crossfall grade break  =   0.500(Ft.)
      Slope from gutter to grade break (v/hz) =   0.020
      Slope from grade break to crown (v/hz)  =   0.020
      Street flow is on [2] side(s) of the street
      Distance from curb to property line  =  14.000(Ft.)
      Slope from curb to property line (v/hz) =   0.025
      Gutter width =   2.000(Ft.)
      Gutter hike from flowline =  2.000(In.)
       Manning's N in gutter =  0.0150
       Manning's N from gutter to grade break =  0.0150
       Manning's N from grade break to crown =  0.0150
      Estimated mean flow rate at midpoint of street =     13.089(CFS)
      Depth of flow =   0.440(Ft.), Average velocity =   2.538(Ft/s)
      Streetflow hydraulics at midpoint of street travel:
      Halfstreet flow width =  15.659(Ft.)
      Flow velocity =   2.54(Ft/s)
      Travel time =   12.87 min.     TC =   25.26  min.
       Adding area flow to street
      RESIDENTIAL(1 acre lot)
      Decimal fraction soil group A = 1.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 32.00
      Pervious ratio(Ap) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
      Rainfall intensity =      1.731(In/Hr) for a    25.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.513
      Subarea runoff =     18.188(CFS) for   23.070(Ac.)
      Total runoff =     22.119(CFS)
      Effective area this stream =       24.89(Ac.)
      Total Study Area (Main Stream No. 1) =       24.89(Ac.)
      Area averaged Fm value =    0.744(In/Hr)
      Street flow at end of street =     22.119(CFS)
```

```
Half street flow at end of street =     11.059(CFS)
Depth of flow =   0.512(Ft.), Average velocity =   2.884(Ft/s)
Flow width (from curb towards crown)=  19.257(Ft.)
End of computations, Total Study Area =           24.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.761
Area averaged SCS curve number =  32.0
```

```
              San Bernardino County Rational Hydrology Program

                  (Hydrology Manual Date - August 1986)

     CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version
7.1
          Rational Hydrology Study        Date: 06/20/19
     -------------------------------------------------------------------
-----
     CITY OF SAN BERNARDINO,CA
     STATE STREET DRAINAGE IMPROVEMENTS
     100 YEAR STORM EVENT
     JOB No.00015014
     -------------------------------------------------------------------
-----


     Program License Serial Number 6158

     -------------------------------------------------------------------
-----
      *********   Hydrology Study Control Information **********

     -------------------------------------------------------------------
-----
     Rational hydrology study storm event year is   100.0
     Computed rainfall intensity:
     Storm year =   100.00   1 hour rainfall =     1.320 (In.)
     Slope used for rainfall intensity curve b =  0.6000
     Soil antecedent moisture condition (AMC) = 2


     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
     Process from Point/Station        1.000 to Point/Station
2.000
     **** INITIAL AREA EVALUATION ****
     ___________________________________________________________________

___
     RESIDENTIAL(2 dwl/acre)
     Decimal fraction soil group A = 1.000
     Decimal fraction soil group B = 0.000
     Decimal fraction soil group C = 0.000
     Decimal fraction soil group D = 0.000
     SCS curve number for soil(AMC 2)  = 32.00
     Pervious ratio(Ap) = 0.7000     Max loss rate(Fm)=     0.684(In/Hr)
     Initial subarea data:
     Initial area flow distance =    97.000(Ft.)
     Top (of initial area) elevation =  1225.000(Ft.)
     Bottom (of initial area) elevation =  1224.000(Ft.)
     Difference in elevation =     1.000(Ft.)
     Slope =    0.01031  s(%)=       1.03
     TC = k(0.438)*[(length^3)/(elevation change)]^0.2
```

Initial area time of concentration =   6.816 min.
Rainfall intensity =   4.868(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.773
Subarea runoff =   0.828(CFS)
Total initial stream area =   0.220(Ac.)
Pervious area fraction = 0.700
Initial area Fm value =   0.684(In/Hr)

++
Process from Point/Station   2.000 to Point/Station
3.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1224.000(Ft.)
End of street segment elevation = 1212.800(Ft.)
Length of street segment =   750.000(Ft.)
Height of curb above gutter flowline =   8.0(In.)
Width of half street (curb to crown) = 35.500(Ft.)
Distance from crown to crossfall grade break =   0.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz) =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line = 14.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline = 2.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street =   3.090(CFS)
Depth of flow =   0.272(Ft.), Average velocity =   2.370(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.248(Ft.)
Flow velocity =   2.37(Ft/s)
Travel time =   5.27 min.   TC =   12.09 min.
Adding area flow to street
RESIDENTIAL(11+ dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.2000   Max loss rate(Fm)=   0.196(In/Hr)
Rainfall intensity =   3.451(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with
modified
rational method)(Q=KCIA) is C = 0.834
Subarea runoff =   4.408(CFS) for   1.600(Ac.)
Total runoff =   5.236(CFS)
Effective area this stream =   1.82(Ac.)
Total Study Area (Main Stream No. 1) =   1.82(Ac.)

```
Area averaged Fm value =    0.255(In/Hr)
Street flow at end of street =      5.236(CFS)
Half street flow at end of street =      2.618(CFS)
Depth of flow =   0.312(Ft.), Average velocity =   2.656(Ft/s)
Flow width (from curb towards crown)=   9.268(Ft.)


+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
Process from Point/Station        3.000 to Point/Station
4.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
___________________________________________________________________
___
Top of street segment elevation =  1212.800(Ft.)
End of street segment elevation =  1198.000(Ft.)
Length of street segment  =  1960.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  35.500(Ft.)
Distance from crown to crossfall grade break  =   0.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     20.187(CFS)
Depth of flow =   0.498(Ft.), Average velocity =   2.820(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  18.581(Ft.)
Flow velocity =   2.82(Ft/s)
Travel time =   11.58 min.     TC =   23.67  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.306(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with
modified
rational method)(Q=KCIA) is C = 0.610
Subarea runoff =     29.766(CFS) for   23.070(Ac.)
Total runoff =     35.002(CFS)
Effective area this stream =       24.89(Ac.)
Total Study Area (Main Stream No. 1) =       24.89(Ac.)
Area averaged Fm value =    0.744(In/Hr)
Street flow at end of street =     35.002(CFS)
```

```
Half street flow at end of street =     17.501(CFS)
Depth of flow =   0.587(Ft.), Average velocity =   3.228(Ft/s)
Flow width (from curb towards crown)=  23.010(Ft.)
End of computations, Total Study Area =           24.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.761
Area averaged SCS curve number =  32.0
```

```
                    San Bernardino County Rational Hydrology Program

                         (Hydrology Manual Date - August 1986)

      CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version
7.1
           Rational Hydrology Study        Date: 06/20/19
     -------------------------------------------------------------------
-----
     CITY OF SAN BERNARDINO, CA
     STATE STREET DRAINAGE IMPROVEMENTS
     OFFSITE, 10-YEAR STORM EVENT
     JOB NO. 00015014
     -------------------------------------------------------------------
-----


     Program License Serial Number 6158

     -------------------------------------------------------------------
-----
      *********   Hydrology Study Control Information **********

     -------------------------------------------------------------------
-----
     Rational hydrology study storm event year is    10.0
     Computed rainfall intensity:
     Storm year =    10.00   1 hour rainfall =     0.851 (In.)
     Slope used for rainfall intensity curve b =  0.6000
     Soil antecedent moisture condition (AMC) = 2


     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
     Process from Point/Station        1.000 to Point/Station
2.000
     **** INITIAL AREA EVALUATION ****
     ___________________________________________________________________
___
     UNDEVELOPED (average cover) subarea
     Decimal fraction soil group A = 1.000
     Decimal fraction soil group B = 0.000
     Decimal fraction soil group C = 0.000
     Decimal fraction soil group D = 0.000
     SCS curve number for soil(AMC 2)  = 50.00
     Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.810(In/Hr)
     Initial subarea data:
     Initial area flow distance =   620.000(Ft.)
     Top (of initial area) elevation =  1198.000(Ft.)
     Bottom (of initial area) elevation =  1188.000(Ft.)
     Difference in elevation =    10.000(Ft.)
     Slope =    0.01613  s(%)=       1.61
     TC = k(0.706)*[(length^3)/(elevation change)]^0.2
```

```
     Initial area time of concentration =   21.098 min.
     Rainfall intensity =      1.593(In/Hr) for a    10.0 year storm
     Effective runoff coefficient used for area (Q=KCIA) is C = 0.443
     Subarea runoff =      0.973(CFS)
     Total initial stream area =        1.380(Ac.)
     Pervious area fraction = 1.000
     Initial area Fm value =    0.810(In/Hr)


     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
     Process from Point/Station        2.000 to Point/Station
3.000
     **** PIPEFLOW TRAVEL TIME (Program estimated size) ****
     ____________________________________________________________________
___
     Upstream point/station elevation =  1188.000(Ft.)
     Downstream point/station elevation =  1187.000(Ft.)
     Pipe length  =   200.00(Ft.)   Manning's N = 0.013
     No. of pipes = 1  Required pipe flow  =     0.973(CFS)
     Nearest computed pipe diameter  =      9.00(In.)
     Calculated individual pipe flow  =     0.973(CFS)
     Normal flow depth in pipe =    6.27(In.)
     Flow top width inside pipe =    8.27(In.)
     Critical Depth =    5.43(In.)
     Pipe flow velocity =      2.96(Ft/s)
     Travel time through pipe =    1.13 min.
     Time of concentration (TC) =    22.22 min.


     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
     Process from Point/Station        4.000 to Point/Station
3.000
     **** SUBAREA FLOW ADDITION ****
     ____________________________________________________________________
___
     UNDEVELOPED (average cover) subarea
     Decimal fraction soil group A = 1.000
     Decimal fraction soil group B = 0.000
     Decimal fraction soil group C = 0.000
     Decimal fraction soil group D = 0.000
     SCS curve number for soil(AMC 2)  = 50.00
     Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.810(In/Hr)
     Time of concentration =    22.22 min.
     Rainfall intensity =      1.544(In/Hr) for a    10.0 year storm
     Effective runoff coefficient used for area,(total area with
modified
     rational method)(Q=KCIA) is C = 0.428
     Subarea runoff =      1.335(CFS) for    2.110(Ac.)
     Total runoff =      2.308(CFS)
     Effective area this stream =        3.49(Ac.)
     Total Study Area (Main Stream No. 1) =        3.49(Ac.)
     Area averaged Fm value =    0.810(In/Hr)
```

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+++
Process from Point/Station 4.000 to Point/Station
3.000
**** CONFLUENCE OF MINOR STREAMS ****
____
____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 3.490(Ac.)
Runoff from this stream = 2.308(CFS)
Time of concentration = 22.22 min.
Rainfall intensity = 1.544(In/Hr)
Area averaged loss rate (Fm) = 0.8095(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	2.31	3.490	22.22	0.810	1.544

Qmax(1) =
1.000 * 1.000 * 2.308) + = 2.308

Total of 1 streams to confluence:
Flow rates before confluence point:
2.308
Maximum flow rates at confluence using above data:
2.308
Area of streams before confluence:
3.490
Effective area values after confluence:
3.490
Results of confluence:
Total flow rate = 2.308(CFS)
Time of concentration = 22.223 min.
Effective stream area after confluence = 3.490(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) = 0.810(In/Hr)
Study area total (this main stream) = 3.49(Ac.)

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+++
Process from Point/Station 3.000 to Point/Station
5.000
**** SUBAREA FLOW ADDITION ****
____
____
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000

```
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 50.00
      Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.810(In/Hr)
      Time of concentration =    22.22 min.
      Rainfall intensity =      1.544(In/Hr) for a    10.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.428
      Subarea runoff =      0.708(CFS) for    1.070(Ac.)
      Total runoff =      3.016(CFS)
      Effective area this stream =        4.56(Ac.)
      Total Study Area (Main Stream No. 1) =        4.56(Ac.)
      Area averaged Fm value =    0.810(In/Hr)


      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Process from Point/Station        5.000 to Point/Station
6.000
      **** PIPEFLOW TRAVEL TIME (Program estimated size) ****
      ___________________________________________________________________
___
      Upstream point/station elevation =  1186.000(Ft.)
      Downstream point/station elevation =  1185.000(Ft.)
      Pipe length  =   115.00(Ft.)   Manning's N = 0.013
      No. of pipes = 1  Required pipe flow  =     3.016(CFS)
      Nearest computed pipe diameter  =     12.00(In.)
      Calculated individual pipe flow  =     3.016(CFS)
      Normal flow depth in pipe =    8.96(In.)
      Flow top width inside pipe =   10.43(In.)
      Critical Depth =    8.93(In.)
      Pipe flow velocity =      4.79(Ft/s)
      Travel time through pipe =    0.40 min.
      Time of concentration (TC) =    22.62 min.
      End of computations, Total Study Area =            4.56 (Ac.)
      The following figures may
      be used for a unit hydrograph study of the same area.
      Note: These figures do not consider reduced effective area
      effects caused by confluences in the rational equation.

      Area averaged pervious area fraction(Ap) = 1.000
      Area averaged SCS curve number =  50.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study   Date: 06/20/19

CITY OF SAN BERNARDINO, CA
STATE STREET DRAINAGE IMPROVEMENTS
OFFSITE, 25-YEAR STORM EVENT
JOB NO. 00015014

Program License Serial Number 6158

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is   25.0
Computed rainfall intensity:
Storm year =   25.00   1 hour rainfall =   1.030 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++

Process from Point/Station   1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

____

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Pervious ratio(Ap) = 1.0000   Max loss rate(Fm)=   0.810(In/Hr)
Initial subarea data:
Initial area flow distance =   620.000(Ft.)
Top (of initial area) elevation = 1198.000(Ft.)
Bottom (of initial area) elevation = 1188.000(Ft.)
Difference in elevation =   10.000(Ft.)
Slope =   0.01613 s(%)=   1.61
TC = k(0.706)*[(length^3)/(elevation change)]^0.2

Initial area time of concentration = 21.098 min.
Rainfall intensity = 1.928(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.522
Subarea runoff = 1.390(CFS)
Total initial stream area = 1.380(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.810(In/Hr)

+++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1188.000(Ft.)
Downstream point/station elevation = 1187.000(Ft.)
Pipe length = 200.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.390(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.390(CFS)
Normal flow depth in pipe = 6.36(In.)
Flow top width inside pipe = 11.98(In.)
Critical Depth = 5.99(In.)
Pipe flow velocity = 3.29(Ft/s)
Travel time through pipe = 1.01 min.
Time of concentration (TC) = 22.11 min.

+++
Process from Point/Station 4.000 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.810(In/Hr)
Time of concentration = 22.11 min.
Rainfall intensity = 1.875(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.511
Subarea runoff = 1.956(CFS) for 2.110(Ac.)
Total runoff = 3.346(CFS)
Effective area this stream = 3.49(Ac.)
Total Study Area (Main Stream No. 1) = 3.49(Ac.)
Area averaged Fm value = 0.810(In/Hr)

```
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
     Process from Point/Station        4.000 to Point/Station
3.000
     **** CONFLUENCE OF MINOR STREAMS ****
     ___________________________________________________________________
___
     Along Main Stream number: 1 in normal stream number 1
     Stream flow area =      3.490(Ac.)
     Runoff from this stream =      3.346(CFS)
     Time of concentration =   22.11 min.
     Rainfall intensity =     1.875(In/Hr)
     Area averaged loss rate (Fm) =    0.8095(In/Hr)
     Area averaged Pervious ratio (Ap) = 1.0000
     Summary of stream data:

     Stream Flow rate    Area    TC     Fm       Rainfall Intensity
      No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


     1      3.35     3.490     22.11    0.810      1.875
     Qmax(1) =
              1.000 *    1.000 *     3.346) + =       3.346

     Total of 1 streams to confluence:
     Flow rates before confluence point:
            3.346
     Maximum flow rates at confluence using above data:
             3.346
     Area of streams before confluence:
             3.490
     Effective area values after confluence:
             3.490
     Results of confluence:
     Total flow rate =      3.346(CFS)
     Time of concentration =    22.112 min.
     Effective stream area after confluence =      3.490(Ac.)
     Study area average Pervious fraction(Ap) =  1.000
     Study area average soil loss rate(Fm) =    0.810(In/Hr)
     Study area total (this main stream) =       3.49(Ac.)


     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
     Process from Point/Station        3.000 to Point/Station
5.000
     **** SUBAREA FLOW ADDITION ****
     ___________________________________________________________________
___
     UNDEVELOPED (average cover) subarea
     Decimal fraction soil group A = 1.000
     Decimal fraction soil group B = 0.000
```

```
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 50.00
      Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.810(In/Hr)
      Time of concentration =    22.11 min.
      Rainfall intensity =      1.875(In/Hr) for a    25.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.511
      Subarea runoff =      1.026(CFS) for    1.070(Ac.)
      Total runoff =      4.372(CFS)
      Effective area this stream =        4.56(Ac.)
      Total Study Area (Main Stream No. 1) =        4.56(Ac.)
      Area averaged Fm value =    0.810(In/Hr)


      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Process from Point/Station        5.000 to Point/Station
6.000
      **** PIPEFLOW TRAVEL TIME (Program estimated size) ****
      ____________________________________________________________________
___
      Upstream point/station elevation =  1186.000(Ft.)
      Downstream point/station elevation =  1185.000(Ft.)
      Pipe length  =   115.00(Ft.)   Manning's N = 0.013
      No. of pipes = 1  Required pipe flow  =     4.372(CFS)
      Nearest computed pipe diameter  =     15.00(In.)
      Calculated individual pipe flow  =     4.372(CFS)
      Normal flow depth in pipe =    9.48(In.)
      Flow top width inside pipe =   14.47(In.)
      Critical Depth =   10.16(In.)
      Pipe flow velocity =      5.35(Ft/s)
      Travel time through pipe =    0.36 min.
      Time of concentration (TC) =    22.47 min.
      End of computations, Total Study Area =            4.56 (Ac.)
      The following figures may
      be used for a unit hydrograph study of the same area.
      Note: These figures do not consider reduced effective area
      effects caused by confluences in the rational equation.

      Area averaged pervious area fraction(Ap) = 1.000
      Area averaged SCS curve number =  50.0
```

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                San Bernardino County Rational Hydrology Program

                    (Hydrology Manual Date - August 1986)

       CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version
7.1
            Rational Hydrology Study        Date: 06/20/19
      ------------------------------------------------------------------
-----
      CITY OF SAN BERNARDINO, CA
      STATE STREET DRAINAGE IMPROVEMENTS
      OFFSITE, 100-YEAR STOMR EVENT
      JOB NO. 00015014
      ------------------------------------------------------------------
-----


      Program License Serial Number 6158

      ------------------------------------------------------------------
-----
       *********   Hydrology Study Control Information **********

      ------------------------------------------------------------------
-----
      Rational hydrology study storm event year is   100.0
      Computed rainfall intensity:
      Storm year =   100.00   1 hour rainfall =     1.320 (In.)
      Slope used for rainfall intensity curve b =  0.6000
      Soil antecedent moisture condition (AMC) = 2


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Process from Point/Station        1.000 to Point/Station
2.000
      **** INITIAL AREA EVALUATION ****
      __________________________________________________________________

___
      UNDEVELOPED (average cover) subarea
      Decimal fraction soil group A = 1.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 50.00
      Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.810(In/Hr)
      Initial subarea data:
      Initial area flow distance =   620.000(Ft.)
      Top (of initial area) elevation =  1198.000(Ft.)
      Bottom (of initial area) elevation =  1188.000(Ft.)
      Difference in elevation =    10.000(Ft.)
      Slope =    0.01613  s(%)=       1.61
      TC = k(0.706)*[(length^3)/(elevation change)]^0.2
```

Initial area time of concentration = 21.098 min.
Rainfall intensity = 2.471(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.605
Subarea runoff = 2.064(CFS)
Total initial stream area = 1.380(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.810(In/Hr)

+++
+++
Process from Point/Station 2.000 to Point/Station
3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____
___
Upstream point/station elevation = 1188.000(Ft.)
Downstream point/station elevation = 1187.000(Ft.)
Pipe length = 200.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.064(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.064(CFS)
Normal flow depth in pipe = 8.26(In.)
Flow top width inside pipe = 11.11(In.)
Critical Depth = 7.36(In.)
Pipe flow velocity = 3.58(Ft/s)
Travel time through pipe = 0.93 min.
Time of concentration (TC) = 22.03 min.

+++
+++
Process from Point/Station 4.000 to Point/Station
3.000
**** SUBAREA FLOW ADDITION ****
____
___
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.810(In/Hr)
Time of concentration = 22.03 min.
Rainfall intensity = 2.408(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with
modified
rational method)(Q=KCIA) is C = 0.597
Subarea runoff = 2.957(CFS) for 2.110(Ac.)
Total runoff = 5.021(CFS)
Effective area this stream = 3.49(Ac.)
Total Study Area (Main Stream No. 1) = 3.49(Ac.)
Area averaged Fm value = 0.810(In/Hr)

++
+++
Process from Point/Station 4.000 to Point/Station
3.000
**** CONFLUENCE OF MINOR STREAMS ****
____
____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 3.490(Ac.)
Runoff from this stream = 5.021(CFS)
Time of concentration = 22.03 min.
Rainfall intensity = 2.408(In/Hr)
Area averaged loss rate (Fm) = 0.8095(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	5.02	3.490	22.03	0.810	2.408

Qmax(1) =
1.000 * 1.000 * 5.021) + = 5.021

Total of 1 streams to confluence:
Flow rates before confluence point:
5.021
Maximum flow rates at confluence using above data:
5.021
Area of streams before confluence:
3.490
Effective area values after confluence:
3.490
Results of confluence:
Total flow rate = 5.021(CFS)
Time of concentration = 22.029 min.
Effective stream area after confluence = 3.490(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) = 0.810(In/Hr)
Study area total (this main stream) = 3.49(Ac.)

++
+++
Process from Point/Station 3.000 to Point/Station
5.000
**** SUBAREA FLOW ADDITION ****
____
____
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000

```
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 50.00
      Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.810(In/Hr)
      Time of concentration =    22.03 min.
      Rainfall intensity =      2.408(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.597
      Subarea runoff =      1.539(CFS) for    1.070(Ac.)
      Total runoff =      6.560(CFS)
      Effective area this stream =        4.56(Ac.)
      Total Study Area (Main Stream No. 1) =        4.56(Ac.)
      Area averaged Fm value =    0.810(In/Hr)


      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Process from Point/Station        5.000 to Point/Station
6.000
      **** PIPEFLOW TRAVEL TIME (Program estimated size) ****
      ___________________________________________________________________
___
      Upstream point/station elevation =  1186.000(Ft.)
      Downstream point/station elevation =  1185.000(Ft.)
      Pipe length  =   115.00(Ft.)   Manning's N = 0.013
      No. of pipes = 1  Required pipe flow  =     6.560(CFS)
      Nearest computed pipe diameter  =     18.00(In.)
      Calculated individual pipe flow  =     6.560(CFS)
      Normal flow depth in pipe =   10.78(In.)
      Flow top width inside pipe =   17.64(In.)
      Critical Depth =   11.88(In.)
      Pipe flow velocity =      5.94(Ft/s)
      Travel time through pipe =    0.32 min.
      Time of concentration (TC) =    22.35 min.
      End of computations, Total Study Area =           4.56 (Ac.)
      The following figures may
      be used for a unit hydrograph study of the same area.
      Note: These figures do not consider reduced effective area
      effects caused by confluences in the rational equation.

      Area averaged pervious area fraction(Ap) = 1.000
      Area averaged SCS curve number =  50.0
```

Appendix G:
Hydraulic Calculations

- WSPG Calculation for Existing State Street Storm Drain Capacity – 100 - Year
- WSPG Calculation for Proposed State Street Storm Drain Capacity
  - 10-Year
  - 25-Year
  - 100-Year
- Inlet Capacity Calculation

00015014.OUT

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Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1929.000	1169.280	4.930	1174.210	1339.63	2.36	.09	1174.30	.07	2.71	213.60	8.000	16.400	****	0 .0
40.559	.0030					.0001	.01	5.00	.26	2.60	.014	.00	****	TRAP
1969.559	1169.402	4.805	1174.207	1339.63	2.48	.10	1174.30	.08	2.71	208.60	8.000	16.400	****	0 .0
39.494	.0030					.0002	.01	4.88	.27	2.60	.014	.00	****	TRAP
2009.053	1169.521	4.683	1174.204	1339.63	2.60	.10	1174.31	.09	2.71	203.72	8.000	16.400	****	0 .0
38.444	.0030					.0002	.01	4.77	.29	2.60	.014	.00	****	TRAP
2047.496	1169.637	4.564	1174.201	1339.63	2.73	.12	1174.32	.09	2.71	198.95	8.000	16.400	****	0 .0
37.408	.0030					.0002	.01	4.66	.31	2.60	.014	.00	****	TRAP
2084.904	1169.750	4.447	1174.197	1339.63	2.86	.13	1174.32	.10	2.71	194.30	8.000	16.400	****	0 .0
36.384	.0030					.0002	.01	4.55	.32	2.60	.014	.00	****	TRAP
2121.288	1169.859	4.334	1174.193	1339.63	3.00	.14	1174.33	.11	2.71	189.76	8.000	16.400	****	0 .0
35.370	.0030					.0003	.01	4.44	.34	2.60	.014	.00	****	TRAP
2156.657	1169.966	4.223	1174.189	1339.63	3.15	.15	1174.34	.11	2.71	185.32	8.000	16.400	****	0 .0
34.364	.0030					.0003	.01	4.34	.37	2.60	.014	.00	****	TRAP
2191.021	1170.069	4.115	1174.184	1339.63	3.30	.17	1174.35	.12	2.71	180.99	8.000	16.400	****	0 .0
33.364	.0030					.0004	.01	4.24	.39	2.60	.014	.00	****	TRAP

```
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2224.386  1170.170    4.009  1174.179   1339.63     3.46     .19  1174.36     .13    2.71   176.77    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
   32.367    .0030                                             .0004      .01    4.14     .41    2.60    .014       .00  ****  TRAP
```

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************************************************************************************************************************** ********
         | Invert   | Depth   | Water    |    Q     |  Vel      Vel   |  Energy  | Super  |Critical|Flow Top|Height/|Base Wt|       |No Wth
 Station |  Elev    |  (FT)   |  Elev    |  (CFS)   | (FPS)     Head  | Grd.El.| Elev   | Depth  | Width  |Dia.-FT|or I.D.|  ZL   |Prs/Pip
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      -|
 L/Elem  |Ch Slope  |         |          |          |          SF Ave|    HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR   |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2256.753  1170.267    3.906  1174.173   1339.63     3.63     .20  1174.38     .14    2.71   172.64    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
   31.369    .0030                                             .0005      .01    4.05     .44    2.60    .014       .00  ****  TRAP
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2288.122  1170.362    3.805  1174.167   1339.63     3.81     .22  1174.39     .15    2.71   168.61    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
   30.366    .0030                                             .0005      .02    3.96     .46    2.60    .014       .00  ****  TRAP
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2318.488  1170.453    3.707  1174.160   1339.63     3.99     .25  1174.41     .16    2.71   164.68    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
   29.352    .0030                                             .0006      .02    3.87     .49    2.60    .014       .00  ****  TRAP
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2347.840  1170.542    3.611  1174.153   1339.63     4.19     .27  1174.42     .18    2.71   160.84    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
   28.320    .0030                                             .0007      .02    3.79     .52    2.60    .014       .00  ****  TRAP
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2376.160  1170.627    3.517  1174.144   1339.63     4.39     .30  1174.44     .19    2.71   157.10    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
    1.040    .0030                                             .0007      .00    3.71     .56    2.60    .014       .00  ****  TRAP
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2377.200  1170.630    3.514  1174.144   1339.63     4.40     .30  1174.44     .00    2.71   156.97    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
   13.105    .0035                                             .0085      .11    3.51     .56    4.28    .050       .00  ****  TRAP
         |          |         |          |          |         |          |         |         |         |         |         |       |
 2390.305  1170.675    3.608  1174.283   1339.63     4.19     .27  1174.56     .00    2.71   160.71    8.000   16.400  ****   0   .0
        -|-        -|-       -|-        -|-        -|-       -|-      -|-        -|-       -|-       -|-       -|-       -|-     -|-      |-
   17.588    .0035                                             .0075      .13    3.61     .52    4.28    .050       .00  ****  TRAP
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          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2407.894  1170.736    3.704  1174.440   1339.63    4.00     .25  1174.69     .00    2.71  164.55    8.000  16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   24.067    .0035                                          .0066      .16    3.70     .49    4.28    .050      .00  ****  TRAP
          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2431.961  1170.819    3.802  1174.621   1339.63    3.81     .23  1174.85     .00    2.71  168.47    8.000  16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   34.026    .0035                                          .0058      .20    3.80     .47    4.28    .050      .00  ****  TRAP
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          | Invert  |  Depth | Water   |    Q    |  Vel    Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|       |No Wth
 Station  |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)   Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL   |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     -|
 L/Elem   |Ch Slope |        |         |         |        SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR   |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2465.986  1170.937    3.902  1174.839   1339.63    3.63     .21  1175.04     .00    2.71  172.50    8.000  16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   47.134    .0035                                          .0051      .24    3.90     .44    4.28    .050      .00  ****  TRAP
          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2513.120  1171.100    3.999  1175.099   1339.63    3.48     .19  1175.29     .00    2.71  176.38    8.000  16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
TRANS STR   .0041                                                          4.00     .41            .050      .00  ****  TRAP
          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2552.490  1171.260    3.256  1174.516   1339.63   31.65   15.56  1190.07     .00    5.58   13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   51.114    .0426                                          .0261     1.34    3.26    3.09    2.79    .013      .00   .00  BOX
          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2603.604  1173.437    3.359  1176.796   1339.63   30.68   14.61  1191.41     .00    5.58   13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   60.541    .0426                                          .0234     1.41    3.36    2.95    2.79    .013      .00   .00  BOX
          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2664.145  1176.015    3.523  1179.538   1339.63   29.25   13.28  1192.82     .00    5.58   13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   46.622    .0426                                          .0204      .95    3.52    2.75    2.79    .013      .00   .00  BOX
          |         |        |         |         |       |       |         |       |        |        |       |       |        |
 2710.767  1178.001    3.695  1181.696   1339.63   27.89   12.08  1193.77     .00    5.58   13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   36.993    .0426                                          .0178      .66    3.70    2.56    2.79    .013      .00   .00  BOX
```

2747.759	1179.576	3.875	1183.452	1339.63	26.59	10.98	1194.43	.00	5.58	13.00	5.583	13.000	.00	0	.0
29.903	.0426					.0155	.46	3.88	2.38	2.79	.013	.00	.00	BOX	
2777.663	1180.850	4.065	1184.915	1339.63	25.35	9.98	1194.90	.00	5.58	13.00	5.583	13.000	.00	0	.0
24.442	.0426					.0136	.33	4.06	2.22	2.79	.013	.00	.00	BOX	
2802.104	1181.891	4.263	1186.154	1339.63	24.17	9.07	1195.23	.00	5.58	13.00	5.583	13.000	.00	0	.0
20.087	.0426					.0119	.24	4.26	2.06	2.79	.013	.00	.00	BOX	

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Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth / Type Ch	Prs/Pip
2822.192	1182.746	4.471	1187.218	1339.63	23.05	8.25	1195.47	.00	5.58	13.00	5.583	13.000	.00	0	.0
16.518	.0426					.0104	.17	4.47	1.92	2.79	.013	.00	.00	BOX	
2838.710	1183.450	4.689	1188.139	1339.63	21.98	7.50	1195.64	.00	5.58	13.00	5.583	13.000	.00	0	.0
TRANS STR	.0099					.0113	.10	4.69	1.79		.014	.00	.00	BOX	
2847.770	1183.540	4.681	1188.221	1339.63	22.02	7.53	1195.75	3.43	6.91	13.00	7.000	13.000	.00	0	.0
53.580	.0080					.0099	.53	8.11	1.79	5.03	.013	.00	.00	RECTANG	
2901.350	1183.970	4.636	1188.606	1339.63	22.23	7.67	1196.28	.14	6.91	13.00	7.000	13.000	.00	0	.0
169.490	.0082					.0105	1.79	4.77	1.82	4.99	.013	.00	.00	RECTANG	
3070.840	1185.360	4.476	1189.836	1339.63	23.02	8.23	1198.07	.00	6.91	13.00	7.000	13.000	.00	0	.0
107.787	.0082					.0115	1.24	4.48	1.92	4.99	.013	.00	.00	RECTANG	

```
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 3178.627  1186.242    4.350  1190.592   1339.63   23.69    8.72  1199.31     .00    6.91    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
  143.883    .0082                                             .0128     1.85    4.35    2.00     4.99    .013      .00   .00  RECTANG
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 3322.510  1187.420    4.147  1191.567   1339.63   24.85    9.59  1201.15     .00    6.91    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
TRANS STR   .0083                                             .0117      .28    4.15    2.15              .014      .00   .00  RECTANG
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 3346.460  1187.620    8.660  1196.280   1339.63   18.92    5.56  1201.84     .03    8.66     6.37    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
   75.397    .0047                                             .0063      .48    8.69    1.00     9.83    .013      .00   .00  PIPE
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 3421.857  1187.976    9.287  1197.264   1339.63   18.04    5.05  1202.32     .02    8.66     4.49    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
  157.313    .0047                                             .0065     1.02    9.31     .78     9.83    .013      .00   .00  PIPE
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                                                WATER SURFACE PROFILE LISTING                     Date: 5-17-2019  Time: 3:37:16
                         STATE STREET STORM DRAIN
                          00015014

******************************************************************************************************************** ********
         | Invert  |  Depth | Water   |    Q    |  Vel    Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|     |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)   Head |  Grd.El.|  Elev |  Depth | Width  |Dia.-FT|or I.D.|  ZL |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   -|
 L/Elem  |Ch Slope |        |         |         |        SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 3579.170  1188.720    9.772  1198.492   1339.63   17.67    4.85  1203.34     .02    8.66     1.50    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
   23.382    .0047                                             .0069      .16    9.79     .44     9.83    .013      .00   .00  PIPE
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 3602.552  1188.830    9.830  1198.660   1339.63   17.65    4.84  1203.50    9.83    8.66      .00    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
  201.028    .0047                                             .0071     1.43    9.83     .00     9.83    .013      .00   .00  PIPE
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 3803.580  1189.780   10.911  1200.691   1339.63   17.65    4.84  1205.53     .00    8.66      .00    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
  392.910    .0047                                             .0072     2.83   10.91     .00     9.83    .013      .00   .00  PIPE
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
 4196.490  1191.640   11.877  1203.517   1339.63   17.65    4.84  1208.35     .00    8.66      .00    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   |-
  727.210    .0071                                             .0072     5.23   11.88     .00     8.14    .013      .00   .00  PIPE
```

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         |         |        |         |         |              |         |       |        |        |       |       |      |
 4923.700  1196.780   11.966  1208.746   1339.63   17.65    4.84  1213.58     .00    8.66      .00    9.830     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   20.280    .0071                                           .0075     5.47    11.97     .00    8.14    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |        |       |       |      |
 4943.980  1200.980   11.966  1212.946   1339.63   17.65    4.84  1217.78     .00    8.66      .00    9.830     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
```

Program Package Serial Number: 1416

WATER SURFACE PROFILE LISTING Date: 6-27-2019 Time:10: 4:27

STATE STREET STORM DRAIN

00015014

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1929.000	1169.280	4.930	1174.210	559.47	.99	.02	1174.23	.01	1.81	213.60	8.000	16.400	****	0 .0
41.339	.0030					.0000	.00	4.94	.11	1.78	.014	.00	****	TRAP
1970.339	1169.405	4.805	1174.209	559.47	1.03	.02	1174.23	.01	1.81	208.60	8.000	16.400	****	0 .0
40.343	.0030					.0000	.00	4.82	.11	1.78	.014	.00	****	TRAP
2010.681	1169.526	4.683	1174.209	559.47	1.09	.02	1174.23	.01	1.81	203.72	8.000	16.400	****	0 .0
39.369	.0030					.0000	.00	4.70	.12	1.78	.014	.00	****	TRAP
2050.050	1169.645	4.564	1174.208	559.47	1.14	.02	1174.23	.02	1.81	198.95	8.000	16.400	****	0 .0
38.417	.0030					.0000	.00	4.58	.13	1.78	.014	.00	****	TRAP
2088.467	1169.760	4.447	1174.208	559.47	1.19	.02	1174.23	.02	1.81	194.30	8.000	16.400	****	0 .0
37.485	.0030					.0000	.00	4.46	.14	1.78	.014	.00	****	TRAP
2125.951	1169.873	4.334	1174.207	559.47	1.25	.02	1174.23	.02	1.81	189.76	8.000	16.400	****	0 .0
36.573	.0030					.0000	.00	4.35	.14	1.78	.014	.00	****	TRAP
2162.525	1169.983	4.223	1174.206	559.47	1.31	.03	1174.23	.02	1.81	185.32	8.000	16.400	****	0 .0
35.682	.0030					.0001	.00	4.24	.15	1.78	.014	.00	****	TRAP
2198.207	1170.091	4.115	1174.206	559.47	1.38	.03	1174.23	.02	1.81	180.99	8.000	16.400	****	0 .0
34.809	.0030					.0001	.00	4.14	.16	1.78	.014	.00	****	TRAP

2233.016	1170.196	4.009	1174.205	559.47	1.44	.03	1174.24	.02	1.81	176.77	8.000	16.400	****	0 .0
33.955	.0030					.0001	.00	4.03	.17	1.78	.014	.00	****	TRAP

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Program Package Serial Number: 1416

WATER SURFACE PROFILE LISTING Date: 6-27-2019 Time:10: 4:27

STATE STREET STORM DRAIN

00015014

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2266.971	1170.298	3.906	1174.204	559.47	1.52	.04	1174.24	.02	1.81	172.64	8.000	16.400	****	0 .0
33.118	.0030					.0001	.00	3.93	.18	1.78	.014	.00	****	TRAP
2300.089	1170.398	3.805	1174.203	559.47	1.59	.04	1174.24	.03	1.81	168.61	8.000	16.400	****	0 .0
32.299	.0030					.0001	.00	3.83	.19	1.78	.014	.00	****	TRAP
2332.388	1170.495	3.707	1174.202	559.47	1.67	.04	1174.25	.03	1.81	164.68	8.000	16.400	****	0 .0
31.497	.0030					.0001	.00	3.74	.21	1.78	.014	.00	****	TRAP
2363.885	1170.590	3.611	1174.201	559.47	1.75	.05	1174.25	.03	1.81	160.84	8.000	16.400	****	0 .0
13.315	.0030					.0001	.00	3.64	.22	1.78	.014	.00	****	TRAP
2377.200	1170.630	3.571	1174.201	559.47	1.78	.05	1174.25	.00	1.81	159.22	8.000	16.400	****	0 .0
46.304	.0035					.0016	.07	3.57	.22	2.99	.050	.00	****	TRAP
2423.504	1170.790	3.478	1174.268	559.47	1.87	.05	1174.32	.00	1.81	155.51	8.000	16.400	****	0 .0
50.540	.0035					.0018	.09	3.48	.24	2.99	.050	.00	****	TRAP
2474.044	1170.965	3.387	1174.352	559.47	1.96	.06	1174.41	.00	1.81	151.89	8.000	16.400	****	0 .0
39.076	.0035					.0020	.08	3.39	.25	2.99	.050	.00	****	TRAP

2513.120	1171.100	3.326	1174.426	559.47	2.03	.06	1174.49	.00	1.81	149.42	8.000	16.400	****	0 .0
TRANS STR	.0041							3.33	.26		.050	.00	****	TRAP
2552.490	1171.260	1.670	1172.931	559.47	25.76	10.31	1183.24	.00	3.86	13.00	5.583	13.000	.00	0 .0
79.550	.0426					.0326	2.59	1.67	3.51	1.56	.013	.00	.00	BOX

Program Package Serial Number: 1416

WATER SURFACE PROFILE LISTING Date: 6-27-2019 Time:10: 4:27

STATE STREET STORM DRAIN

00015014

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2632.040	1174.648	1.746	1176.394	559.47	24.65	9.43	1185.83	.00	3.86	13.00	5.583	13.000	.00	0 .0
54.117	.0426					.0283	1.53	1.75	3.29	1.56	.013	.00	.00	BOX
2686.157	1176.953	1.831	1178.784	559.47	23.50	8.58	1187.36	.00	3.86	13.00	5.583	13.000	.00	0 .0
38.152	.0426					.0245	.93	1.83	3.06	1.56	.013	.00	.00	BOX
2724.309	1178.578	1.921	1180.498	559.47	22.41	7.80	1188.29	.00	3.86	13.00	5.583	13.000	.00	0 .0
28.758	.0426					.0212	.61	1.92	2.85	1.56	.013	.00	.00	BOX
2753.067	1179.802	2.014	1181.817	559.47	21.36	7.09	1188.90	.00	3.86	13.00	5.583	13.000	.00	0 .0
22.537	.0426					.0184	.41	2.01	2.65	1.56	.013	.00	.00	BOX
2775.605	1180.762	2.113	1182.875	559.47	20.37	6.44	1189.32	.00	3.86	13.00	5.583	13.000	.00	0 .0
18.091	.0426					.0159	.29	2.11	2.47	1.56	.013	.00	.00	BOX
2793.696	1181.533	2.216	1183.749	559.47	19.42	5.86	1189.61	.00	3.86	13.00	5.583	13.000	.00	0 .0
14.737	.0426					.0138	.20	2.22	2.30	1.56	.013	.00	.00	BOX

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           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2808.433  1182.161    2.324  1184.484    559.47   18.52     5.32  1189.81     .00    3.86    13.00    5.583  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    12.104    .0426                                           .0120      .14    2.32    2.14    1.56    .013        .00   .00  BOX
           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2820.537  1182.676    2.437  1185.113    559.47   17.66     4.84  1189.95     .00    3.86    13.00    5.583  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
     9.972    .0426                                           .0104      .10    2.44    1.99    1.56    .013        .00   .00  BOX
           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2830.509  1183.101    2.556  1185.657    559.47   16.83     4.40  1190.06     .00    3.86    13.00    5.583  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
     8.201    .0426                                           .0090      .07    2.56    1.86    1.56    .013        .00   .00  BOX
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                               Program Package Serial Number: 1416
                                           WATER SURFACE PROFILE LISTING                    Date: 6-27-2019  Time:10: 4:27
                           STATE STREET STORM DRAIN
                             00015014

 ****************************************************************************************************************************** ********
          | Invert   |  Depth  |  Water   |    Q     |  Vel      Vel   |  Energy  |  Super  |Critical|Flow Top|Height/|Base Wt|      |No Wth
  Station |  Elev    |  (FT)   |  Elev    |  (CFS)   | (FPS)     Head  |  Grd.El.|  Elev   | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     -|
  L/Elem  |Ch Slope |         |          |          |           SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
 *********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2838.710  1183.450    2.681  1186.131    559.47   16.05     4.00  1190.13     .00    3.86    13.00    5.583  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
 TRANS STR   .0099                                            .0097      .09    2.68    1.73            .014        .00   .00  BOX
           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2847.770  1183.540    2.681  1186.221    559.47   16.05     4.00  1190.22    1.82    3.86    13.00    7.000  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    53.580    .0080                                           .0084      .45    4.51    1.73    2.72    .013        .00   .00  RECTANG
           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2901.350  1183.970    2.670  1186.640    559.47   16.12     4.03  1190.67     .00    3.86    13.00    7.000  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    31.810    .0097                                           .0084      .27    2.67    1.74    2.55    .013        .00   .00  RECTANG
           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2933.160  1184.280    2.692  1186.972    559.47   15.99     3.97  1190.94     .00    3.86    13.00    7.000  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
 JUNCT STR   .0100                                            .0086      .09    2.79    1.72            .013        .00   .00  RECTANG
           |          |         |          |          |         |         |         |        |         |         |        |        |        |
  2943.160  1184.380    2.600  1186.980    552.34   16.34     4.15  1191.13     .10    3.83    13.00    7.000  13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   127.680    .0077                                           .0095     1.21    2.70    1.79    2.74    .013        .00   .00  RECTANG
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          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3070.840  1185.360    2.503  1187.863    552.34   16.97    4.47  1192.34     .00    3.83    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   63.519    .0082                                          .0103      .66    2.50    1.89    2.68    .013       .00   .00  RECTANG
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3134.359  1185.880    2.452  1188.332    552.34   17.33    4.66  1192.99     .00    3.83    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  107.660    .0082                                          .0115     1.23    2.45    1.95    2.68    .013       .00   .00  RECTANG
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3242.019  1186.761    2.338  1189.099    552.34   18.17    5.13  1194.23     .00    3.83    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   80.491    .0082                                          .0132     1.06    2.34    2.09    2.68    .013       .00   .00  RECTANG
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3322.510  1187.420    2.229  1189.650    552.34   19.06    5.64  1195.29     .00    3.83    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
TRANS STR   .0083                                           .0110      .26    2.23    2.25            .014       .00   .00  RECTANG
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                      Program Package Serial Number: 1416
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                   STATE STREET STORM DRAIN
                    00015014

 *********************************************************************************************************************** ********
          | Invert  |  Depth | Water   |    Q    |  Vel    Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|     |No Wth
 Station  |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)   Head | Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-   -|
 L/Elem   |Ch Slope |        |         |         |        SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR |Type Ch
 *********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3346.460  1187.620    4.956  1192.577    552.34   14.40    3.22  1195.80     .06    5.65     9.83    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  232.710    .0047                                          .0048     1.11    5.02    1.28    4.96    .013       .00   .00  PIPE
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3579.170  1188.720    4.935  1193.655    552.34   14.48    3.26  1196.91     .18    5.65     9.83    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  224.410    .0047                                          .0049     1.11    5.12    1.30    4.97    .013       .00   .00  PIPE
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3803.580  1189.780    4.869  1194.649    552.34   14.73    3.37  1198.02     .00    5.65     9.83    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  133.577    .0044                                          .0053      .71    4.87    1.33    5.05    .013       .00   .00  PIPE
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3937.157  1190.374    4.737  1195.111    552.34   15.26    3.61  1198.73     .00    5.65     9.82    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  129.353    .0044                                          .0059      .77    4.74    1.40    5.05    .013       .00   .00  PIPE
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          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4066.510  1190.950    4.566  1195.516    552.34   16.00    3.98  1199.49    .00    5.65    9.81   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
JUNCT STR   .0048                                          .0065      .07   4.57   1.50            .013     .00   .00  PIPE
          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4076.830  1191.000    4.476  1195.476    548.77   16.32    4.13  1199.61    .00    5.63    9.79   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
    7.993    .0067                                          .0067      .05    4.48   1.55    4.48   .013     .00   .00  PIPE
          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4084.823  1191.053    4.476  1195.529    548.77   16.32    4.13  1199.66    .00    5.63    9.79   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
  521.117    .0067                                          .0063     3.30    4.48   1.55    4.48   .013     .00   .00  PIPE
          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4605.940  1194.530    4.617  1199.147    548.77   15.67    3.81  1202.96    .00    5.63    9.81   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
JUNCT STR   .0080                                          .0061      .06   4.62   1.46            .013     .00   .00  PIPE
          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4615.940  1194.610    4.549  1199.159    545.20   15.87    3.91  1203.07    .00    5.61    9.80   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
  103.518    .0071                                          .0060      .62    4.55   1.49    4.39   .013     .00   .00  PIPE
 FILE: 00015014-10YR.WSW                    W S P G W - CIVILDESIGN Version 14.03                                   PAGE
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                         Program Package Serial Number: 1416
                                        WATER SURFACE PROFILE LISTING                    Date: 6-27-2019  Time:10: 4:27
                   STATE STREET STORM DRAIN
                     00015014

************************************************************************************************************************ ********
          | Invert   |  Depth  |  Water   |     Q    |  Vel    Vel   |  Energy  |  Super  |Critical|Flow Top|Height/|Base Wt|       |No Wth
 Station  |  Elev    |  (FT)   |  Elev    |   (CFS)  | (FPS)   Head  | Grd.El.|  Elev   | Depth  | Width  |Dia.-FT|or I.D.|  ZL   |Prs/Pip
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     -|
 L/Elem   |Ch Slope  |         |          |          |         SF Ave|    HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR   |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4719.458  1195.340    4.643  1199.983    545.20   15.45    3.71  1203.69    .00    5.61    9.81   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
  100.054    .0071                                          .0054      .54    4.64   1.44    4.39   .013     .00   .00  PIPE
          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4819.512  1196.045    4.819  1200.865    545.20   14.73    3.37  1204.24    .00    5.61    9.83   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
   54.585    .0071                                          .0048      .26    4.82   1.34    4.39   .013     .00   .00  PIPE
          |          |         |          |          |        |        |          |         |        |         |         |        |        |
 4874.097  1196.430    5.002  1201.432    545.20   14.05    3.06  1204.50    .00    5.61    9.83   9.830    .000   .00   1   .0
         -|-        -|-      -|-        -|-        -|-     -|-      -|-        -|-      -|-     -|-      -|-     -|-      -|-     |-
   30.220    .0071                                          .0042      .13    5.00   1.25    4.39   .013     .00   .00  PIPE
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         |          |        |          |          |               |          |       |        |        |       |       |      |
 4904.317  1196.643    5.195  1201.839    545.20   13.39    2.79  1204.62     .00    5.61     9.81    9.830     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   15.086    .0071                                           .0037      .06     5.20    1.16    4.39    .013       .00   .00  PIPE
         |          |        |          |          |               |          |       |        |        |       |       |      |
 4919.403  1196.750    5.398  1202.148    545.20   12.77    2.53  1204.68     .00    5.61     9.78    9.830     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    4.297    .0071                                           .0033      .01     5.40    1.08    4.39    .013       .00   .00  PIPE
         |          |        |          |          |               |          |       |        |        |       |       |      |
 4923.700  1196.780    5.613  1202.393    545.20   12.17    2.30  1204.69     .00    5.61     9.73    9.830     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
         |          |        |          |          |               |          |       |        |        |       |       |      |
 4943.980  1200.980    5.613  1206.593    545.20   12.17    2.30  1208.89     .00    5.61     9.73    9.830     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
```

Program Package Serial Number: 1416

WATER SURFACE PROFILE LISTING Date: 6-27-2019 Time:10:16: 2

STATE STREET STORM DRAIN

00015014

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1929.000	1169.280	4.930	1174.210	868.84	1.53	.04	1174.25	.03	2.22	213.60	8.000	16.400	****	0 .0
41.113	.0030					.0001	.00	4.96	.17	2.16	.014	.00	****	TRAP
1970.113	1169.404	4.805	1174.209	868.84	1.61	.04	1174.25	.03	2.22	208.60	8.000	16.400	****	0 .0
40.098	.0030					.0001	.00	4.84	.18	2.16	.014	.00	****	TRAP
2010.210	1169.525	4.683	1174.208	868.84	1.69	.04	1174.25	.04	2.22	203.72	8.000	16.400	****	0 .0
39.103	.0030					.0001	.00	4.72	.19	2.16	.014	.00	****	TRAP
2049.313	1169.642	4.564	1174.206	868.84	1.77	.05	1174.25	.04	2.22	198.95	8.000	16.400	****	0 .0
38.128	.0030					.0001	.00	4.60	.20	2.16	.014	.00	****	TRAP
2087.442	1169.757	4.447	1174.205	868.84	1.85	.05	1174.26	.04	2.22	194.30	8.000	16.400	****	0 .0
37.172	.0030					.0001	.00	4.49	.21	2.16	.014	.00	****	TRAP
2124.614	1169.869	4.334	1174.203	868.84	1.94	.06	1174.26	.04	2.22	189.76	8.000	16.400	****	0 .0
36.234	.0030					.0001	.00	4.38	.22	2.16	.014	.00	****	TRAP
2160.848	1169.978	4.223	1174.201	868.84	2.04	.06	1174.27	.05	2.22	185.32	8.000	16.400	****	0 .0
35.313	.0030					.0001	.00	4.27	.24	2.16	.014	.00	****	TRAP
2196.161	1170.085	4.115	1174.199	868.84	2.14	.07	1174.27	.05	2.22	180.99	8.000	16.400	****	0 .0
34.409	.0030					.0001	.01	4.17	.25	2.16	.014	.00	****	TRAP

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           |          |         |          |          |               |          |        |         |         |        |        |        |
  2230.570  1170.188    4.009  1174.197    868.84     2.24      .08  1174.28     .06     2.22   176.77    8.000   16.400  ****   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
    33.520    .0030                                            .0002      .01    4.06      .27    2.16    .014       .00  ****  TRAP
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                               Program Package Serial Number: 1416
                                           WATER SURFACE PROFILE LISTING                      Date: 6-27-2019  Time:10:16: 2
                           STATE STREET STORM DRAIN
                             00015014

 ************************************************************************************************************************ ********
           | Invert   | Depth  | Water    |    Q     |  Vel     Vel  |  Energy  | Super  |Critical|Flow Top|Height/|Base Wt|      |No Wth
  Station  |  Elev    |  (FT)  |  Elev    |  (CFS)   | (FPS)    Head |  Grd.El.|  Elev  | Depth  |  Width |Dia.-FT|or I.D.|  ZL  |Prs/Pip
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     -|
  L/Elem   |Ch Slope  |        |          |          |         SF Ave|   HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
 *********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
           |          |         |          |          |               |          |        |         |         |        |        |        |
  2264.090  1170.289    3.906  1174.195    868.84     2.35      .09  1174.28     .06     2.22   172.64    8.000   16.400  ****   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
    32.645    .0030                                            .0002      .01    3.97      .28    2.16    .014       .00  ****  TRAP
           |          |         |          |          |               |          |        |         |         |        |        |        |
  2296.735  1170.387    3.805  1174.193    868.84     2.47      .09  1174.29     .06     2.22   168.61    8.000   16.400  ****   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
    31.784    .0030                                            .0002      .01    3.87      .30    2.16    .014       .00  ****  TRAP
           |          |         |          |          |               |          |        |         |         |        |        |        |
  2328.519  1170.483    3.707  1174.190    868.84     2.59      .10  1174.29     .07     2.22   164.68    8.000   16.400  ****   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
    30.935    .0030                                            .0002      .01    3.78      .32    2.16    .014       .00  ****  TRAP
           |          |         |          |          |               |          |        |         |         |        |        |        |
  2359.455  1170.576    3.611  1174.187    868.84     2.71      .11  1174.30     .07     2.22   160.84    8.000   16.400  ****   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
    17.746    .0030                                            .0003      .00    3.68      .34    2.16    .014       .00  ****  TRAP
           |          |         |          |          |               |          |        |         |         |        |        |        |
  2377.200  1170.630    3.556  1174.186    868.84     2.79      .12  1174.31     .00     2.22   158.64    8.000   16.400  ****   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
   135.920    .0035                                            .0036      .48    3.56      .35    3.59    .050       .00  ****  TRAP
           |          |         |          |          |               |          |        |         |         |        |        |        |
  2513.120  1171.100    3.572  1174.672    868.84     2.77      .12  1174.79     .00     2.22   159.27    8.000   16.400  ****   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
 TRANS STR   .0041                                                           3.57      .35             .050       .00  ****  TRAP
           |          |         |          |          |               |          |        |         |         |        |        |        |
  2552.490  1171.260    2.332  1173.592    868.84    28.66    12.76  1186.35     .00     5.18    13.00    5.583   13.000   .00   0   .0
          -|-        -|-      -|-       -|-        -|-      -|-      -|-       -|-      -|-      -|-      -|-     -|-      -|-     |-
    11.119    .0426                                            .0303      .34    2.33     3.31    2.09    .013       .00   .00  BOX
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           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2563.609  1171.734    2.345  1174.079    868.84   28.50   12.61  1186.69    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    71.200    .0426                                               .0281     2.00    2.35    3.28     2.09     .013      .00    .00  BOX
           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2634.810  1174.766    2.460  1177.225    868.84   27.17   11.46  1188.69    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    50.671    .0426                                               .0244     1.24    2.46    3.05     2.09     .013      .00    .00  BOX
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                         STATE STREET STORM DRAIN
                           00015014

 ********************************************************************************************************************** ********
           | Invert   |  Depth  |  Water   |     Q    |   Vel     Vel   |  Energy  | Super  |Critical|Flow Top|Height/|Base Wt|       |No Wth
  Station  |  Elev    |  (FT)   |  Elev    |  (CFS)   |  (FPS)    Head  |  Grd.El.|  Elev  | Depth  | Width  |Dia.-FT|or I.D.|  ZL   |Prs/Pip
         -|-        -|-       -|-        -|-        -|-       -|-     -|-        -|-      -|-      -|-      -|-     -|-     -|-    -|
  L/Elem   |Ch Slope |         |          |          |          SF Ave|    HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR   |Type Ch
 *********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2685.481  1176.924    2.580  1179.504    868.84   25.91   10.42  1189.93    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    38.386    .0426                                               .0212      .81    2.58    2.84     2.09     .013      .00    .00  BOX
           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2723.867  1178.559    2.706  1181.264    868.84   24.70    9.47  1190.74    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    30.168    .0426                                               .0184      .56    2.71    2.65     2.09     .013      .00    .00  BOX
           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2754.035  1179.844    2.838  1182.681    868.84   23.55    8.61  1191.29    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    24.256    .0426                                               .0160      .39    2.84    2.46     2.09     .013      .00    .00  BOX
           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2778.290  1180.877    2.976  1183.853    868.84   22.46    7.83  1191.68    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    19.776    .0426                                               .0139      .28    2.98    2.29     2.09     .013      .00    .00  BOX
           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2798.067  1181.719    3.121  1184.840    868.84   21.41    7.12  1191.96    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    16.249    .0426                                               .0121      .20    3.12    2.14     2.09     .013      .00    .00  BOX
           |          |         |          |          |         |        |          |        |        |         |         |        |         |
  2814.316  1182.411    3.274  1185.685    868.84   20.41    6.47  1192.16    .00    5.18    13.00    5.583  13.000    .00   0   .0
         -|-        -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    13.387    .0426                                               .0106      .14    3.27    1.99     2.09     .013      .00    .00  BOX
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          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2827.703  1182.981    3.434  1186.415    868.84   19.46    5.88  1192.30     .00    5.18    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   11.007    .0426                                            .0092      .10    3.43    1.85     2.09    .013       .00   .00  BOX
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2838.710  1183.450    3.601  1187.051    868.84   18.56    5.35  1192.40     .00    5.18    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
 TRANS STR   .0099                                            .0100      .09    3.60    1.72              .014       .00   .00  BOX
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2847.770  1183.540    3.601  1187.141    868.84   18.56    5.35  1192.49    2.44    5.18    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   53.580    .0080                                            .0087      .46    6.04    1.72     3.69    .013       .00   .00  RECTANG
↑ FILE: 00015014-25YR.WSW                       W S P G W - CIVILDESIGN Version 14.03                                 PAGE
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                               Program Package Serial Number: 1416
                                                 WATER SURFACE PROFILE LISTING                   Date: 6-27-2019  Time:10:16: 2
                           STATE STREET STORM DRAIN
                             00015014

 **************************************************************************************************************************** ********
          | Invert  |  Depth | Water   |    Q    |  Vel    Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
  Station |  Elev   |  (FT)  | Elev    |  (CFS)  | (FPS)   Head |  Grd.El.| Elev  | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
  L/Elem  |Ch Slope |        |         |         |       SF Ave|   HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
 *********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2901.350  1183.970    3.584  1187.554    868.84   18.65    5.40  1192.95     .00    5.18    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   31.810    .0097                                            .0087      .28    3.58    1.74     3.45    .013       .00   .00  RECTANG
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2933.160  1184.280    3.601  1187.881    868.84   18.56    5.35  1193.23     .00    5.18    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
 JUNCT STR   .0100                                            .0089      .09    3.73    1.72              .013       .00   .00  RECTANG
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2943.160  1184.380    3.476  1187.856    857.72   18.98    5.59  1193.45     .13    5.13    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  127.680    .0077                                            .0097     1.24    3.61    1.79     3.71    .013       .00   .00  RECTANG
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3070.840  1185.360    3.367  1188.727    857.72   19.60    5.96  1194.69     .00    5.13    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  126.234    .0082                                            .0107     1.35    3.37    1.88     3.63    .013       .00   .00  RECTANG
          |         |        |         |         |       |       |         |       |        |        |       |       |       |
 3197.074  1186.393    3.250  1189.643    857.72   20.30    6.40  1196.04     .00    5.13    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  125.436    .0082                                            .0121     1.52    3.25    1.98     3.63    .013       .00   .00  RECTANG
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          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 3322.510  1187.420    3.099  1190.519    857.72   21.29    7.04  1197.56    .00    5.13    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
TRANS STR   .0083                                          .0102      .25    3.10    2.13             .014      .00   .00  RECTANG
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 3346.460  1187.620    6.579  1194.199    857.72   15.89    3.92  1198.12    .07    7.09     9.25    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  232.710    .0047                                         .0048     1.11    6.65    1.16     6.59    .013      .00   .00  PIPE
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 3579.170  1188.720    6.543  1195.263    857.72   15.99    3.97  1199.23    .21    7.09     9.28    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  224.410    .0047                                         .0049     1.11    6.75    1.17     6.59    .013      .00   .00  PIPE
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 3803.580  1189.780    6.425  1196.205    857.72   16.32    4.14  1200.34    .00    7.09     9.35    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  126.817    .0044                                         .0053      .67    6.43    1.21     6.74    .013      .00   .00  PIPE
↑ FILE: 00015014-25YR.WSW                  W S P G W - CIVILDESIGN Version 14.03                                      PAGE
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                              Program Package Serial Number: 1416
                                                    WATER SURFACE PROFILE LISTING                 Date: 6-27-2019  Time:10:16: 2
                        STATE STREET STORM DRAIN
                          00015014

 ******************************************************************************************************************  ********
          | Invert  |  Depth | Water   |    Q    |  Vel    Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|       |No Wth
 Station  |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)   Head |  Grd.El.|  Elev |  Depth | Width  |Dia.-FT|or I.D.|  ZL   |Prs/Pip
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 L/Elem   |Ch Slope |        |         |         |        SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR   |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 3930.397  1190.344    6.232  1196.576    857.72   16.90    4.44  1201.01    .00    7.09     9.47    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  136.113    .0044                                         .0059      .80    6.23    1.29     6.74    .013      .00   .00  PIPE
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 4066.510  1190.950    5.985  1196.935    857.72   17.73    4.88  1201.82    .00    7.09     9.59    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
JUNCT STR   .0048                                          .0064      .07    5.98    1.39             .013      .00   .00  PIPE
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 4076.830  1191.000    5.843  1196.843    852.16   18.12    5.10  1201.94    .00    7.07     9.65    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  529.110    .0067                                         .0064     3.36    5.84    1.45     5.83    .013      .00   .00  PIPE
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
 4605.940  1194.530    6.013  1200.543    852.16   17.52    4.76  1205.31    .00    7.07     9.58    9.830    .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
JUNCT STR   .0080                                          .0062      .06    6.01    1.37             .013      .00   .00  PIPE
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           |          |         |          |          |        |        |          |        |         |         |        |        |      |
  4615.939  1194.610    5.900  1200.510    846.60   17.80    4.92  1205.43     .00    7.04     9.63   9.830     .000   .00   1   .0
          -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-    |-
   120.682    .0071                                                .0062      .75     5.90    1.41     5.71    .013       .00   .00  PIPE
           |          |         |          |          |        |        |          |        |         |         |        |        |      |
  4736.621  1195.461    6.014  1201.475    846.60   17.40    4.70  1206.17     .00    7.04     9.58   9.830     .000   .00   1   .0
          -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-    |-
   126.874    .0071                                                .0057      .72     6.01    1.36     5.71    .013       .00   .00  PIPE
           |          |         |          |          |        |        |          |        |         |         |        |        |      |
  4863.495  1196.355    6.264  1202.620    846.60   16.59    4.27  1206.89     .00    7.04     9.45   9.830     .000   .00   1   .0
          -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-    |-
    60.206    .0071                                                .0050      .30     6.26    1.26     5.71    .013       .00   .00  PIPE
           |          |         |          |          |        |        |          |        |         |         |        |        |      |
  4923.700  1196.780    6.530  1203.310    846.60   15.82    3.88  1207.19     .00    7.04     9.28   9.830     .000   .00   1   .0
          -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-    |-
           |          |         |          |          |        |        |          |        |         |         |        |        |      |
  4943.980  1200.980    6.530  1207.510    846.60   15.82    3.88  1211.39     .00    7.04     9.28   9.830     .000   .00   1   .0
          -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-    |-
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WATER SURFACE PROFILE LISTING Date: 5-17-2019 Time: 3:40:15

STATE STREET STORM DRAIN

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Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1929.000	1169.280	4.930	1174.210	1372.63	2.42	.09	1174.30	.08	2.74	213.60	8.000	16.400	****	0 .0
40.510	.0030					.0002	.01	5.01	.26	2.62	.014	.00	****	TRAP
1969.510	1169.402	4.805	1174.207	1372.63	2.54	.10	1174.31	.08	2.74	208.60	8.000	16.400	****	0 .0
39.440	.0030					.0002	.01	4.89	.28	2.62	.014	.00	****	TRAP
2008.950	1169.521	4.683	1174.204	1372.63	2.66	.11	1174.31	.09	2.74	203.72	8.000	16.400	****	0 .0
38.385	.0030					.0002	.01	4.77	.30	2.62	.014	.00	****	TRAP
2047.334	1169.636	4.564	1174.200	1372.63	2.79	.12	1174.32	.10	2.74	198.95	8.000	16.400	****	0 .0
37.343	.0030					.0002	.01	4.66	.31	2.62	.014	.00	****	TRAP
2084.677	1169.749	4.447	1174.196	1372.63	2.93	.13	1174.33	.10	2.74	194.30	8.000	16.400	****	0 .0
36.312	.0030					.0003	.01	4.55	.33	2.62	.014	.00	****	TRAP
2120.989	1169.858	4.334	1174.192	1372.63	3.07	.15	1174.34	.11	2.74	189.76	8.000	16.400	****	0 .0
35.291	.0030					.0003	.01	4.45	.35	2.62	.014	.00	****	TRAP
2156.280	1169.965	4.223	1174.188	1372.63	3.22	.16	1174.35	.12	2.74	185.32	8.000	16.400	****	0 .0
34.276	.0030					.0003	.01	4.34	.37	2.62	.014	.00	****	TRAP
2190.556	1170.068	4.115	1174.183	1372.63	3.38	.18	1174.36	.13	2.74	180.99	8.000	16.400	****	0 .0
33.267	.0030					.0004	.01	4.24	.40	2.62	.014	.00	****	TRAP

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          |          |         |          |          |                |          |        |         |         |        |        |
 2223.823  1170.168    4.009  1174.177   1372.63    3.54     .20  1174.37     .14    2.74   176.77    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
   32.258    .0030                                             .0004      .01    4.15     .42    2.62    .014      .00  ****  TRAP
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                               Program Package Serial Number: 1416
                                            WATER SURFACE PROFILE LISTING                     Date: 5-17-2019  Time: 3:40:15
                          STATE STREET STORM DRAIN
                            00015014

************************************************************************************************************************ ********
          | Invert   | Depth  | Water    |    Q     |  Vel    Vel   |  Energy  | Super  |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station  | Elev     | (FT)   | Elev     |  (CFS)   | (FPS)   Head  | Grd.El.| Elev   | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     -|
 L/Elem   |Ch Slope |        |          |          |        SF Ave|    HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
          |          |         |          |          |                |          |        |         |         |        |        |
 2256.081  1170.265    3.906  1174.171   1372.63    3.72     .21  1174.39     .15    2.74   172.64    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
   31.247    .0030                                             .0005      .01    4.05     .45    2.62    .014      .00  ****  TRAP
          |          |         |          |          |                |          |        |         |         |        |        |
 2287.328  1170.359    3.805  1174.165   1372.63    3.90     .24  1174.40     .16    2.74   168.61    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
   30.228    .0030                                             .0005      .02    3.96     .48    2.62    .014      .00  ****  TRAP
          |          |         |          |          |                |          |        |         |         |        |        |
 2317.556  1170.450    3.707  1174.157   1372.63    4.09     .26  1174.42     .17    2.74   164.68    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
   29.195    .0030                                             .0006      .02    3.88     .50    2.62    .014      .00  ****  TRAP
          |          |         |          |          |                |          |        |         |         |        |        |
 2346.751  1170.538    3.611  1174.149   1372.63    4.29     .29  1174.44     .18    2.74   160.84    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
   28.139    .0030                                             .0007      .02    3.79     .54    2.62    .014      .00  ****  TRAP
          |          |         |          |          |                |          |        |         |         |        |        |
 2374.890  1170.623    3.517  1174.141   1372.63    4.50     .31  1174.45     .20    2.74   157.10    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
    2.310    .0030                                             .0007      .00    3.71     .57    2.62    .014      .00  ****  TRAP
          |          |         |          |          |                |          |        |         |         |        |        |
 2377.200  1170.630    3.510  1174.140   1372.63    4.51     .32  1174.46     .00    2.74   156.81    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
   11.705    .0035                                             .0090      .11    3.51     .57    4.32    .050      .00  ****  TRAP
          |          |         |          |          |                |          |        |         |         |        |        |
 2388.905  1170.671    3.604  1174.274   1372.63    4.30     .29  1174.56     .00    2.74   160.56    8.000   16.400  ****   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-      |-
   15.628    .0035                                             .0079      .12    3.60     .54    4.32    .050      .00  ****  TRAP
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          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2404.532  1170.725    3.700  1174.424   1372.63    4.10     .26  1174.69     .00    2.74   164.39    8.000   16.400  ****   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    21.186    .0035                                          .0070      .15    3.70     .51    4.32    .050      .00  ****  TRAP
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2425.718  1170.798    3.798  1174.596   1372.63    3.91     .24  1174.83     .00    2.74   168.31    8.000   16.400  ****   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    29.483    .0035                                          .0061      .18    3.80     .48    4.32    .050      .00  ****  TRAP
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                                         WATER SURFACE PROFILE LISTING                  Date: 5-17-2019  Time: 3:40:15
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                       00015014

 ************************************************************************************************************************* ********
          | Invert  | Depth  | Water   |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
  Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)   Head  | Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
  L/Elem  |Ch Slope |        |         |         |          SF Ave|   HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
 *********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2455.201  1170.900    3.898  1174.798   1372.63    3.73     .22  1175.01     .00    2.74   172.33    8.000   16.400  ****   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    42.888    .0035                                          .0054      .23    3.90     .45    4.32    .050      .00  ****  TRAP
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2498.088  1171.048    4.001  1175.049   1372.63    3.56     .20  1175.25     .00    2.74   176.45    8.000   16.400  ****   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    15.031    .0035                                          .0050      .07    4.00     .42    4.32    .050      .00  ****  TRAP
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2513.120  1171.100    4.029  1175.129   1372.63    3.51     .19  1175.32     .00    2.74   177.56    8.000   16.400  ****   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
 TRANS STR   .0041                                                         4.03     .42             .050      .00  ****  TRAP
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2552.490  1171.260    3.329  1174.589   1372.63   31.72   15.62  1190.21     .00    5.58    13.00    5.583   13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    66.741    .0426                                          .0253     1.69    3.33    3.06    2.84    .013      .00   .00  BOX
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2619.231  1174.102    3.476  1177.579   1372.63   30.37   14.32  1191.90     .00    5.58    13.00    5.583   13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    55.605    .0426                                          .0222     1.24    3.48    2.87    2.84    .013      .00   .00  BOX
          |         |        |         |         |        |       |         |       |        |        |       |       |       |
  2674.836  1176.471    3.646  1180.117   1372.63   28.96   13.02  1193.14     .00    5.58    13.00    5.583   13.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-      -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    43.368    .0426                                          .0194      .84    3.65    2.67    2.84    .013      .00   .00  BOX
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            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2718.204  1178.318    3.824  1182.142   1372.63   27.61   11.84  1193.98     .00    5.58    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
   34.682    .0426                                           .0169      .59    3.82    2.49    2.84    .013       .00   .00  BOX
            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2752.886  1179.795    4.011  1183.805   1372.63   26.33   10.76  1194.57     .00    5.58    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
   28.169    .0426                                           .0148      .42    4.01    2.32    2.84    .013       .00   .00  BOX
            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2781.055  1180.994    4.206  1185.201   1372.63   25.10    9.78  1194.98     .00    5.58    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
   23.082    .0426                                           .0130      .30    4.21    2.16    2.84    .013       .00   .00  BOX
↑ FILE: 00015014.WSW                      W S P G W - CIVILDESIGN Version 14.03                                       PAGE
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                                         WATER SURFACE PROFILE LISTING                    Date: 5-17-2019  Time: 3:40:15
                          STATE STREET STORM DRAIN
                            00015014

 ************************************************************************************************************************ ********
          | Invert  | Depth | Water   |    Q    | Vel    Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|       |No Wth
 Station  |  Elev   | (FT)  |  Elev   |  (CFS)  | (FPS)  Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL   |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 L/Elem   |Ch Slope |       |         |         |       SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR   |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2804.137  1181.977    4.412  1186.389   1372.63   23.93    8.89  1195.28     .00    5.58    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
   18.981    .0426                                           .0113      .22    4.41    2.01    2.84    .013       .00   .00  BOX
            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2823.118  1182.786    4.627  1187.413   1372.63   22.82    8.09  1195.50     .00    5.58    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
   15.592    .0426                                           .0099      .15    4.63    1.87    2.84    .013       .00   .00  BOX
            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2838.710  1183.450    4.853  1188.303   1372.63   21.76    7.35  1195.65     .00    5.58    13.00    5.583  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
TRANS STR   .0099                                            .0108      .10    4.85    1.74             .014       .00   .00  BOX
            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2847.770  1183.540    4.847  1188.387   1372.63   21.78    7.37  1195.76    3.36    7.02    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
   53.580    .0080                                           .0094      .50    8.21    1.74    5.11    .013       .00   .00  RECTANG
            |         |        |         |         |       |       |         |       |        |        |       |       |       |
 2901.350  1183.970    4.811  1188.781   1372.63   21.95    7.48  1196.26     .00    7.02    13.00    7.000  13.000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    |-
   31.810    .0097                                           .0095      .30    4.81    1.76    4.77    .013       .00   .00  RECTANG
```

```
          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 2933.160  1184.280    4.815  1189.095    1372.63    21.93     7.47  1196.56     .00     7.02    13.00    7.000   13.000    .00   0   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
JUNCT STR   .0100                                              .0098      .10    4.99     1.76              .013      .00    .00  RECTANG
          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 2943.160  1184.380    4.658  1189.038    1356.13    22.40     7.79  1196.83     .18     6.97    13.00    7.000   13.000    .00   0   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
  127.680    .0077                                             .0106     1.36    4.84     1.83     5.15    .013      .00    .00  RECTANG
          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 3070.840  1185.360    4.507  1189.867    1356.13    23.14     8.32  1198.18     .00     6.97    13.00    7.000   13.000    .00   0   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
  108.334    .0082                                             .0116     1.25    4.51     1.92     5.03    .013      .00    .00  RECTANG
          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 3179.175  1186.247    4.378  1190.625    1356.13    23.83     8.81  1199.44     .00     6.97    13.00    7.000   13.000    .00   0   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
  143.335    .0082                                             .0129     1.85    4.38     2.01     5.03    .013      .00    .00  RECTANG
↑ FILE: 00015014.WSW                          W S P G W - CIVILDESIGN Version 14.03                                     PAGE
5
                                   Program Package Serial Number: 1416
                                                WATER SURFACE PROFILE LISTING                     Date: 5-17-2019  Time: 3:40:15
                             STATE STREET STORM DRAIN
                               00015014

 ************************************************************************************************************************ ********
          | Invert   | Depth | Water    |    Q     | Vel     Vel   |  Energy  | Super  |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station  |  Elev    | (FT)  |  Elev    |  (CFS)   | (FPS)   Head  | Grd.El.| Elev   | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-        -|-      -|-        -|-        -|-      -|-    -|-      -|-      -|-      -|-      -|-      -|-     -|-    -|
 L/Elem   |Ch Slope |       |          |          |          SF Ave|    HF    |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******

          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 3322.510  1187.420    4.175  1191.595    1356.13    24.99     9.70  1201.29     .00     6.97    13.00    7.000   13.000    .00   0   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
TRANS STR   .0083                                              .0118      .28    4.17     2.16              .014      .00    .00  RECTANG
          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 3346.460  1187.620    8.699  1196.319    1356.13    19.09     5.66  1201.98     .03     8.70     6.27    9.830     .000    .00   1   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
   75.568    .0047                                             .0065      .49    8.73     1.00     9.83    .013      .00    .00  PIPE
          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 3422.028  1187.977    9.346  1197.323    1356.13    18.20     5.14  1202.47     .02     8.70     4.25    9.830     .000    .00   1   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
  145.209    .0047                                             .0068      .98    9.37      .77     9.83    .013      .00    .00  PIPE
          |          |         |          |          |         |         |          |        |         |         |         |         |      |
 3567.237  1188.664    9.830  1198.494    1356.13    17.87     4.96  1203.45    9.83     8.70      .00    9.830     .000    .00   1   .0
        -|-        -|-       -|-        -|-        -|-      -|-      -|-        -|-      -|-       -|-       -|-      -|-      -|-      |-
   11.933    .0047                                             .0073      .09    9.83      .00     9.83    .013      .00    .00  PIPE
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         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 3579.170  1188.720    9.945  1198.665   1356.13   17.87    4.96  1203.62     .00    8.70      .00   9.830     .000   .00   1   .0
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  224.410    .0047                                           .0074     1.65      .00     .00    9.83    .013      .00   .00  PIPE
         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 3803.580  1189.780   11.172  1200.952   1356.13   17.87    4.96  1205.91     .00    8.70      .00   9.830     .000   .00   1   .0
        -|-         -|-        -|-         -|-         -|-       -|-       -|-         -|-       -|-        -|-        -|-       -|-      -|-      |-
  262.930    .0044                                           .0074     1.94    11.17     .00    9.83    .013      .00   .00  PIPE
         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 4066.510  1190.950   11.940  1202.890   1356.13   17.87    4.96  1207.85     .00    8.70      .00   9.830     .000   .00   1   .0
        -|-         -|-        -|-         -|-         -|-       -|-       -|-         -|-       -|-        -|-        -|-       -|-      -|-      |-
JUNCT STR   .0048                                            .0073      .08   11.94     .00              .013      .00   .00  PIPE
         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 4076.830  1191.000   12.082  1203.082   1347.88   17.76    4.90  1207.98     .00    8.68      .00   9.830     .000   .00   1   .0
        -|-         -|-        -|-         -|-         -|-       -|-       -|-         -|-       -|-        -|-        -|-       -|-      -|-      |-
  529.110    .0067                                           .0073     3.85    12.08     .00    8.52    .013      .00   .00  PIPE
         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 4605.940  1194.530   12.404  1206.934   1347.88   17.76    4.90  1211.83     .00    8.68      .00   9.830     .000   .00   1   .0
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JUNCT STR   .0080                                            .0072      .07   12.40     .00              .013      .00   .00  PIPE
↑ FILE: 00015014.WSW                     W S P G W - CIVILDESIGN Version 14.03                                   PAGE
6
                           Program Package Serial Number: 1416
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                      STATE STREET STORM DRAIN
                        00015014

 ******************************************************************************************************************** ********
         | Invert  | Depth | Water   |    Q    | Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   | (FT)  | Elev    |  (CFS)  | (FPS)   Head |  Grd.El.|  Elev |  Depth |  Width |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-     -|-       -|-       -|-     -|-    -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 L/Elem  |Ch Slope |       |         |         |        SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 4615.940  1194.610   12.512  1207.122   1339.63   17.65    4.84  1211.96     .00    8.66      .00   9.830     .000   .00   1   .0
        -|-         -|-        -|-         -|-         -|-       -|-       -|-         -|-       -|-        -|-        -|-       -|-      -|-      |-
  307.760    .0071                                           .0072     2.21    12.51     .00    8.15    .013      .00   .00  PIPE
         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 4923.700  1196.780   12.555  1209.335   1339.63   17.65    4.84  1214.17     .00    8.66      .00   9.830     .000   .00   1   .0
        -|-         -|-        -|-         -|-         -|-       -|-       -|-         -|-       -|-        -|-        -|-       -|-      -|-      |-
   20.280    .0071                                           .0083     2.56    12.56     .00    8.15    .013      .00   .00  PIPE
         |           |          |           |           |         |         |           |         |         |          |          |         |        |
 4943.980  1200.980   12.555  1213.535   1339.63   17.65    4.84  1218.37     .00    8.66      .00   9.830     .000   .00   1   .0
        -|-         -|-        -|-         -|-         -|-       -|-       -|-         -|-       -|-        -|-        -|-       -|-      -|-      |-
↑
```

Q inlet Calculation Based on Longitudinal Street Slope
Based on Bureau of Engineering City of Los Angeles
Design Chart LL-8

$$Q = CW^{0.83}D^2$$

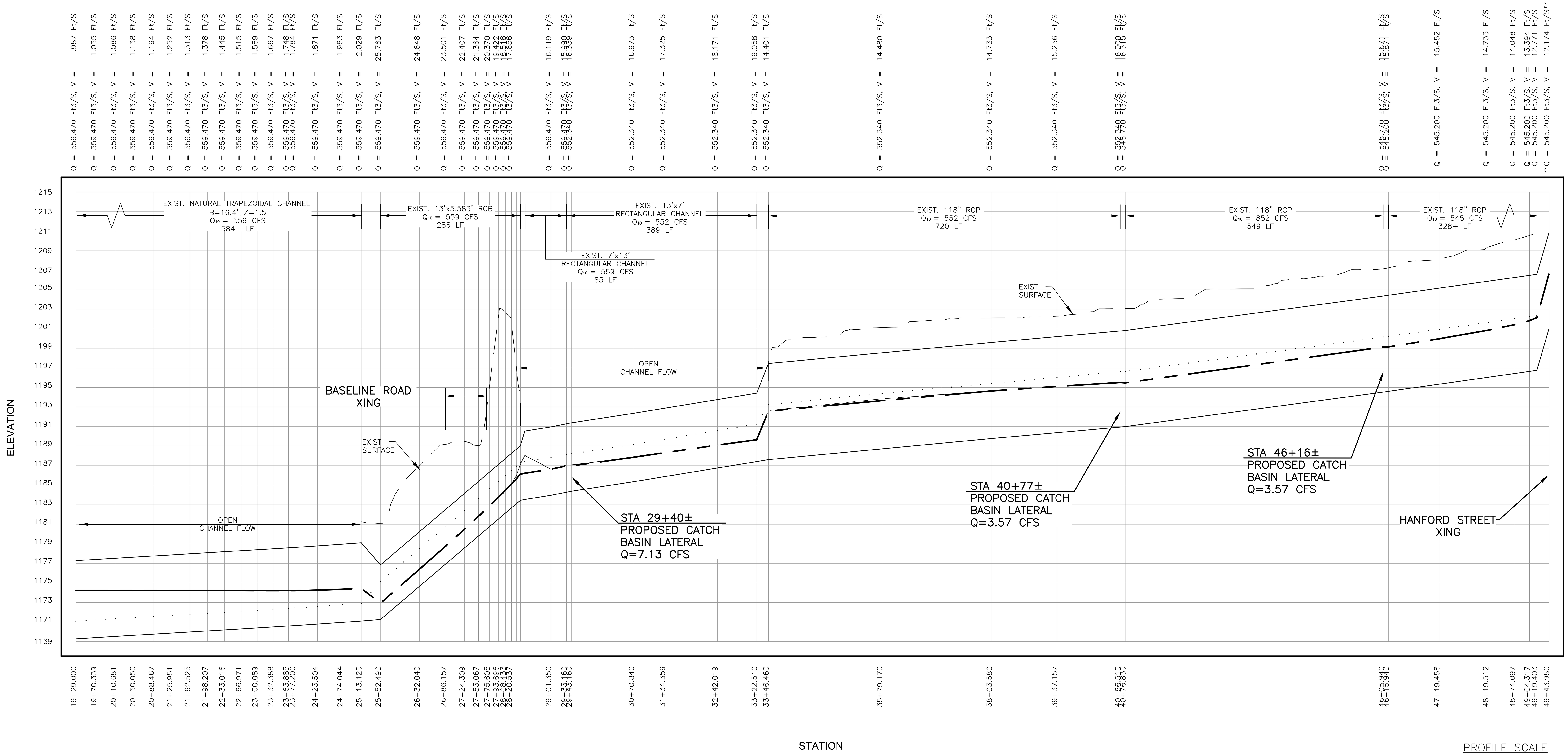
C= 2.71
D= 1 feet

Catch Basin Width	Q inlet (cfs)
W=7'	13.63
W=14'	24.22
W=21'	33.92
W=28'	43.06
	18.32

Appendix H:

Hydraulic Profile

- WSPG Hydraulic Profile for Storm Drain – Proposed Condition
  - 10-Year
  - 25-Year
  - 100-Year



PROFILE SCALE
HORIZ: 1" = 100'
VERT: 1" = 5'

LEGEND

- CHANNEL BANK
- SUPER ELEVATION
- CRITICAL
- HYDRAULIC GRADE LINE
- INVERT
- EXISTING SURFACE

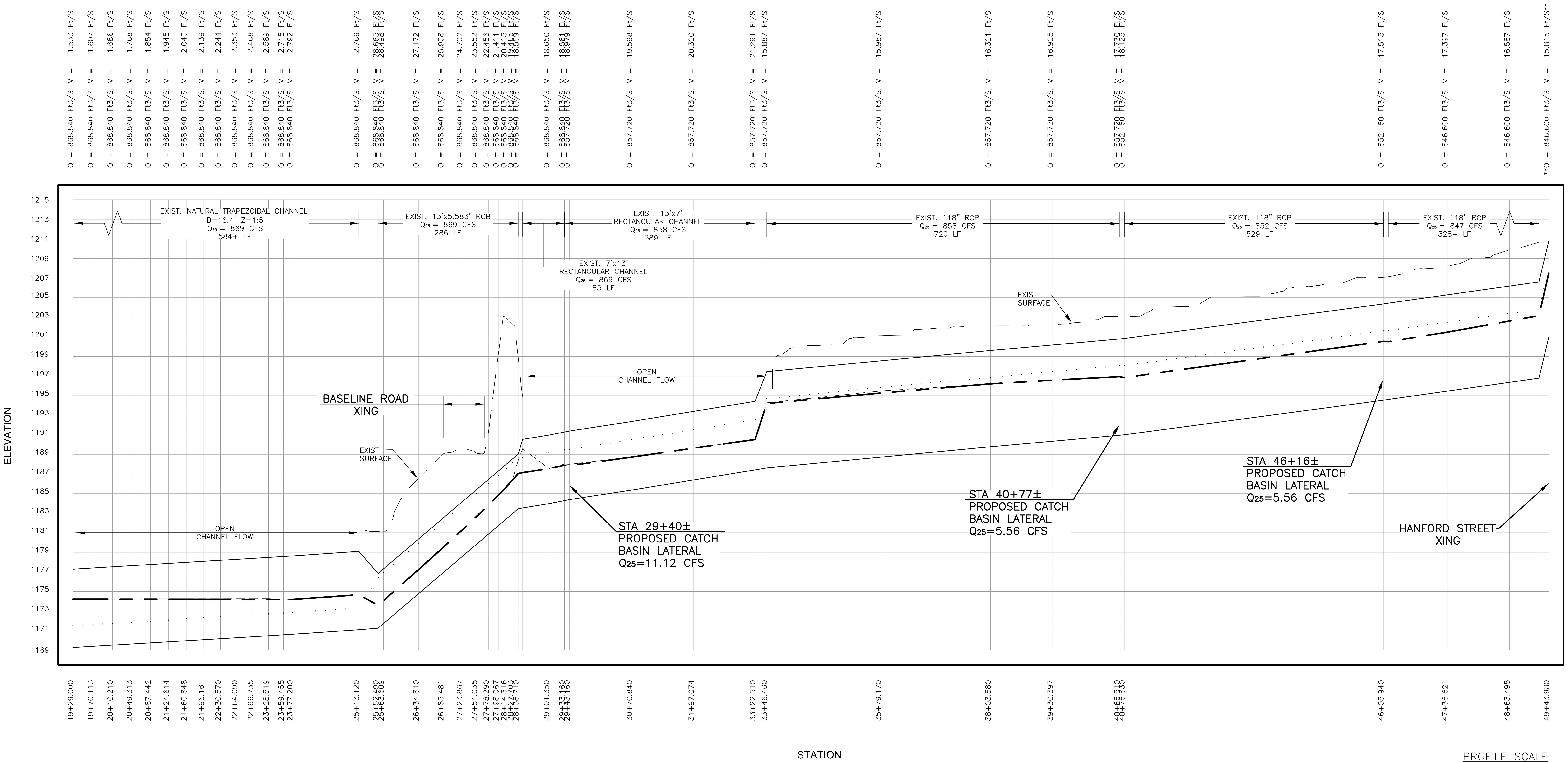
ASSUMPTIONS:

Q_{10} AT THE SYSTEM HEADWORKS IS ESTIMATED DUE TO LACK OF INFORMATION. Q_{10} IS ASSUMED TO BE APPROXIMATELY 41% PERCENT OF THE Q_{100} (Q_{100}=1339.6 CFS PER STATE STREET STORM DRAIN IMP. PLANS DRAWING NO. 10842).
THEREFORE, Q_{10}=545.2 CFS AT SYSTEM HEADWORKS.

ERSC INC.COM
Engineering Resources of Southern California
1861 W. Redlands Blvd, Bldg 7B
Redlands, Ca. 92373
P: (909) 890-1255
F: (909) 890-0995

CITY OF SAN BERNARDINO
STATE STREET STORM DRAIN
10-YR STORM - HGL PROFILE

±700' S/O BASELINE ROAD – HANFORD STREET
STA. 19+29.00 TO STA 49+43.98



PROFILE SCALE
HORIZ: 1" = 100'
VERT: 1" = 5'

LEGEND

CHANNEL BANK
SUPER ELEVATION
CRITICAL
HYDRAULIC GRADE LINE
INVERT
EXISTING SURFACE

ASSUMPTIONS:

Q_{25} AT THE SYSTEM HEADWORKS IS ESTIMATED DUE TO LACK OF INFORMATION. Q_{25} IS ASSUMED TO BE APPROXIMATELY 63% PERCENT OF THE Q_{100} (Q_{100}=1339.6 CFS PER STATE STREET STORM DRAIN IMP. PLANS DRAWING NO. 10842).
THEREFORE, Q_{25}=846.6 CFS AT SYSTEM HEADWORKS.

ERSC INC.COM
Engineering Resources of Southern California
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Redlands, Ca. 92373
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CITY OF SAN BERNARDINO
STATE STREET STORM DRAIN
25-YR STORM - HGL PROFILE

±700' S/O BASELINE ROAD – HANFORD STREET
STA. 19+29.00 TO STA 49+43.98

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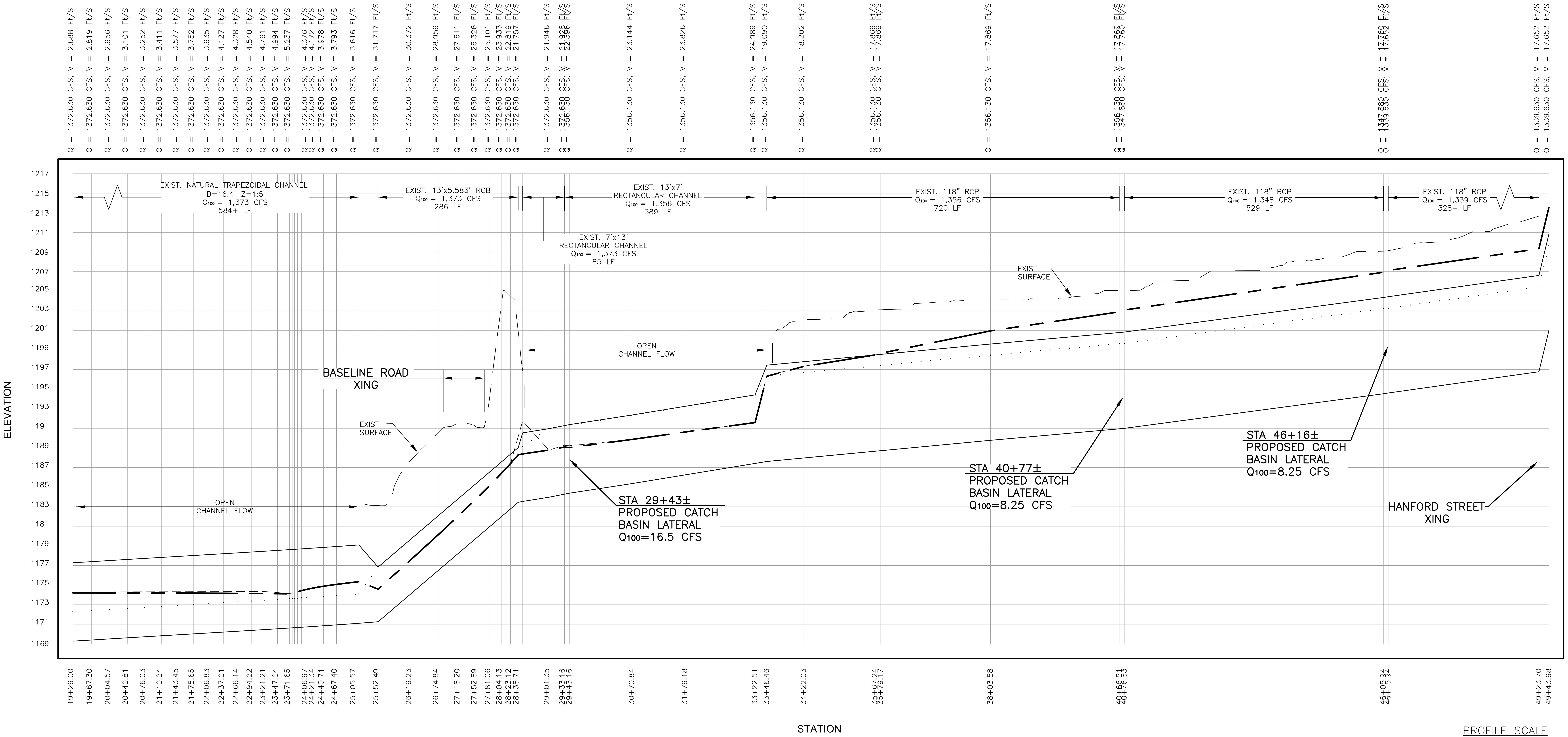


PROFILE SCALE
HORIZ: 1" = 100'
VERT: 1" = 5'

LEGEND

- CHANNEL BANK
- SUPER ELEVATION
- CRITICAL
- HYDRAULIC GRADE LINE
- INVERT
- EXISTING SURFACE

ERSC INC.COM
Engineering Resources of Southern California
1861 W. Redlands Blvd, Bldg 7B
Redlands, Ca. 92373
P: (909) 890-1255
F: (909) 890-0995

CITY OF SAN BERNARDINO
STATE STREET STORM DRAIN
100-YR - HGL PROFILE

±700' S/O BASELINE ROAD – HANFORD STREET
STA. 19+29.00 TO STA 49+43.98

Drawing name: T:\Projects\00015014 – San Bernardino, City of – State Street Phase 1\DESIGN\CAD\00015014-100YR SD HGL.dwg Jun 27, 2019 – 3:39pm

Appendix I:
Record Drawings

City of San Bernardino, California
Development Services~Public Works/Engineering

STORM DRAIN IMPROVEMENTS
STATE STREET - LYTLE CREEK TO ADAMS STREET
HIGHLAND AVENUE - STATE STREET TO CALIFORNIA STREET
HIGHLAND AVENUE - STATE STREET TO MACY STREET

SHEET 1 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

GENERAL NOTES

1. ALL WORK EMBODIED ON THESE PLANS SHALL BE DONE IN CONFORMITY WITH APPLICABLE PROVISIONS OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 2000 EDITION, THE STANDARD DRAWINGS ON FILE IN THE OFFICE OF THE DIRECTOR OF PUBLIC WORKS ENGINEERING, AND THE SPECIAL PROVISIONS
2. THE EXISTENCE AND LOCATIONS OF ANY UNDERGROUND UTILITIES, PIPES OR SUBSTRUCTURES SHOWN ON THESE PLANS HAVE BEEN OBTAINED BY A SEARCH OF AVAILABLE RECORDS.
   THE APPROVAL OF THESE PLANS BY THE CITY OF SAN BERNARDINO DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATIONS OR THE EXISTENCE OR NONEXISTENCE OF ANY UTILITIES.
3. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO PROTECT NOT ONLY UTILITIES AND SUBSTRUCTURES SHOWN BUT OTHER UTILITIES AND SUBSTRUCTURES THAT ARE NOT SHOWN ON THESE PLANS.
4. THE CONTRACTOR SHALL NOTIFY ALL UTILITIES AT LEAST 48 HOURS IN ADVANCE OF ANY EXCAVATION. FOR ASSISTANCE CALL UNDERGROUND SERVICE ALERT, USA 1-800-422-4133.
5. DURING THE PERIOD OF CONSTRUCTION, THE CONTRACTOR SHALL FURNISH, ERECT AND MAINTAIN SUCH WARNINGS, SIGNS, BARRICADES, AND OTHER SAFETY MEASURES AS TO MAINTAIN SAFE PASSAGE FOR PEDESTRIANS AND VEHICLES AT ALL TIMES AS DIRECTED BY THE CITY OF SAN BERNARDINO FIELD ENGINEER WITH REFERENCE TO THE W.A.T.C.H. MANUAL.
6. THE CONTRACTOR SHALL REINSTALL PAVEMENT MARKINGS AND STRIPING THAT HAVE BEEN DISTURBED BY HIS OPERATIONS.
7. THE CONTRACTOR SHALL POSSESS A CLASS "A" OR APPROPRIATE CLASS LICENSE AT THE TIME THE CONTRACT IS AWARDED.
8. THE CONTRACTOR SHALL NOT OPEN MORE TRENCH THAN CAN BE PROPERLY CONSTRUCTED AND FILLED IN A DAY'S OPERATION. ANY TRENCH UNAVOIDABLY LEFT OPEN DURING THE HOURS OF DARKNESS OR OVER A WEEKEND SHALL BE FENCED WITH A 6-FOOT CHAIN LINK FENCING AND BE PROPERLY LIGHTED.
9. SHOULD ANY OF THE EXISTING UTILITIES OR ANY OTHER FACILITIES CONFLICT WITH THE PROPOSED STORM DRAIN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND AWAIT THE RELOCATION AND/OR ALTERNATIVE DESIGN.
10. ALL REMOVALS IN PAVED AREAS SHALL BE SAW CUT ON A NEAT, STRAIGHT LINE PARALLEL TO THE PIPE LINE. THE CUT EDGE SHALL BE PROTECTED FROM CRUSHING AND ALL BROKEN EDGES SHALL BE RECUT PRIOR TO PAVING OPERATIONS.
11. OSHA PERMIT REQUIRED FOR TRENCHES OVER 5' IN DEPTH.
12. ALL TRENCH BACK FILLS SHALL BE TESTED AND CERTIFIED BY A SOILS ENGINEER PRIOR TO ACCEPTANCE.
13. CONTRACTOR IS HEREBY NOTIFIED THAT BASELINE STREET HAS A SUB-SURFACE REINFORCED CONCRETE ROADWAY. SIZE, LOCATION, DEPTH AND THICKNESS IS UNKNOWN
14. CONTRACTOR SHALL REPLACE EXISTING A.C. PAVEMENT PER CITY OF SAN BERNARDINO STD. NO. 310

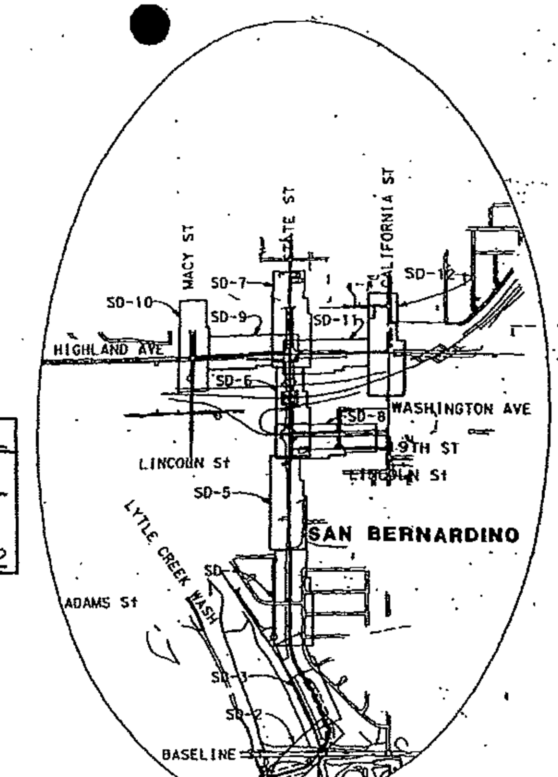
DEPARTMENT OF WATER RESOURCES SPECIAL NOTES

1. A SEVEN (7) DAY ADVANCE NOTIFICATION IS REQUIRED PRIOR TO STARTING WORK WITHIN STATE WATER PROJECT (SWP) RIGHT OF WAY. CONTACT THE DEPARTMENT OF WATER RESOURCES' DIVISION OF LAND AND RIGHT OF WAY, ENCROACHMENT PERMIT SECTION, SACRAMENTO, CALIFORNIA AT (800) 600-4397. THE APPROPRIATE DEPARTMENT WATER RESOURCES (DWR) FIELD DIVISION SHALL BE SIMULTANEOUSLY NOTIFIED AT (661) 702-8000.

   EXCEPT AS OTHERWISE PROVIDED HEREIN, MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO PROTECT IN PLACE ANY AND ALL SWP FACILITIES AND APPURTANANCES, INCLUDING, BUT NOT LIMITED TO, COMMUNICATION CONTROL CABLES AND CORROSION PROTECTION TEST STATIONS. THE PERMITTEE AND CONTRACTOR WILL BE LIABLE FOR ANY DAMAGE TO SWP FACILITIES AND APPURTANANCES AS A RESULT OF THE CONSTRUCTION, AND FOR ANY OTHER DAMAGES OR LOSSES SUFFERED BY DWR OR ITS WATER CONTRACTORS, INCLUDING POWER, IRRIGATION, MUNICIPAL AND INDUSTRIAL WATER SUPPLY, AND COMMUNICATION LOSSES.
2. ALL TRENCH EXCAVATION SHALL COMPLY WITH THE MOST CURRENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS. TRENCH BACKFILL SHALL BE PLACED IN NO GREATER 100 mm (4-INCH) LIFTS IF HAND COMPACTED, OR NOT GREATER THAN 200 mm (8-INCH) LIFTS IF POWER COMPACTED. TRENCH BACKFILL COMPACTION WITHIN SWP RIGHT OF WAY SHALL BE COMPACTED TO 88 PERCENT RELATIVE COMPACTION (ASTM D1567), EXCEPT ACROSS SWP PIPELINES, ROADWAYS, EMBANKMENTS, AND THROUGH PROTECTIVE DIKES WHERE BACKFILL COMPACTION SHALL MEET 95 PERCENT (ASTM D1557). (THIS NOTE ONLY PERTAINS TO DEPARTMENT OF WATER RESOURCES' FACILITIES.)
3. A SEVEN (7) DAY ADVANCE NOTIFICATION TO DWR IS REQUIRED PRIOR TO ANY GRADING, EARTH MOVEMENT OR CONSTRUCTION AROUND SWP CATHODIC PROTECTION TEST STATIONS. CONTACT THE DWR SOUTHERN FIELD DIVIDSION'S ENGINEERING SECTION AT (661) 702-8000.
4. THE CONTRACTOR SHALL OBTAIN A JACKING PERMIT FROM THE STATE DEPARTMENT OF WATER RESOURCES (DWR) FOR THE INSTALLATION OF THE 48 INCH DIAMETER PIPE UNDER THE SANTA ANA PIPE LINE (SAPL) AT HIGHLAND AVENUE. A PERMIT WILL NOT BE ISSUED UNTIL THE CONTRACTOR HAS SUBMITTED AND OBTAINED DWR APPROVAL OF THE PROCEDURES, PIT EXCAVATION PLANS, SCHEDULES, AND EQUIPMENT TO BE USED FOR THE JACKING OF 4-FOOT INSIDE DIAMETER REINFORCED CONCRETE PIPE UNDERNEATH THE SAPL AT THE INTERSECTION OF STATE STREET AND HIGHLAND AVENUE, A SHIELD SHALL BE USED IN THE CUTTING HEAD. FULL PENETRATION WELDING IS REQUIRED. A STEEL CASING IS REQUIRED FOR THE CROSSING. THE CASING MUST EXTEND A MINIMUM OF 10 FEET PERPENDICULAR BEYOND EACH SIDE OF THE SAPL. THE INSIDE DIAMETER OF THE STEEL CASING SHALL BE A MINIMUM OF 4 INCHES LARGER THAN THE OUTSIDE DIAMETER OF THE CONCRETE PIPE. THE GAP BETWEEN THE BOREHOLE AND THE REQUIRED STEEL CASING SHALL BE FILLED WITH CEMENT GROUT. THE ANNULAR SPACE BETWEEN THE STEEL CASING AND THE REINFORCED CONCRETE PIPE SHALL BE FILLED WITH CEMENT SLURRY.

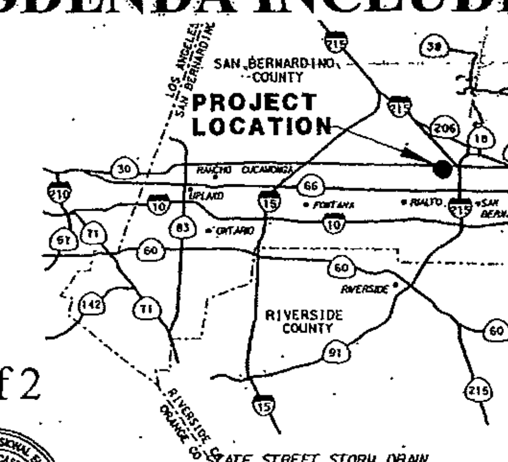
SPECIAL GENERAL NOTES

1. CONTRACTOR IS HEREBY NOTIFIED THAT BASELINE STREET HAS A SUB-SURFACE REINFORCED CONCRETE ROADWAY. SIZE, LOCATION, DEPTH AND THICKNESS IS UNKNOWN.
2. FOR BENCHMARK & BASIS OF BEARINGS, SEE SD-01A



LOCATION MAP
NO SCALE

ADDENDA INCLUDED



VICINITY MAP
NO SCALE

Volume 2 of 2

LIST OF DRAWINGS

DRAWING NO.	DESCRIPTION
SD-01	TITLE SHEET
SD-01A	CONSTRUCTION NOTES
SD-02 TO SD-07	PLAN AND PROFILE DRAWING & ENVIRONMENTAL CONSTRAINTS PLAN - STATE STREET
SD-08	PLAN AND PROFILE DRAWING - "CL" LINE
SD-09 TO SD-10	PLAN AND PROFILE DRAWING - HIGHLAND AVENUE WEST
SD-11 TO SD-12	PLAN AND PROFILE DRAWING - HIGHLAND AVENUE EAST
SD-13	PROFILES - LATERAL NO.'S 1 THRU 10
SD-14	PROFILES - LATERAL NO.'S 11 THRU 20
SD-15	PROFILES - LATERAL NO.'S 21 THRU 31
SD-16	PROFILES - LATERAL NO.'S 32 THRU 40
SD-17	PROFILES - LATERAL NO.'S 40 THRU 44
SD-18	NATURAL TRAP CHANNEL DETAILS
SD-19	CONCRETE RECTANGULAR CHANNEL TYPE II DETAILS
SD-20	MANHOLE NO.4 DETAILS
SD-21	TRANSITION STRUCTURE (RCP TO RCP) DETAILS
SD-22	CATCH BASIN DETAILS
SD-23	MANHOLE DETAILS
SD-24	DETAILS & CROSS SECTIONS
SD-25	PRECAST REINFORCED CONCRETE BOX
SD-26	REINFORCED CONCRETE BOX DETAILS
SD-27	CONCRETE RECTANGULAR CHANNEL TYPE I DETAILS
SD-28	OUTLET/IMPACT STRUCTURE
SD-29	WROUGHT IRON FENCING DETAILS

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 100
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
MADLEN BENJAMIN
No. C044640
Exp. 3/31/06
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
MARK LANCASTER
No. C 40048
Exp. 12-31-05
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 40048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MC

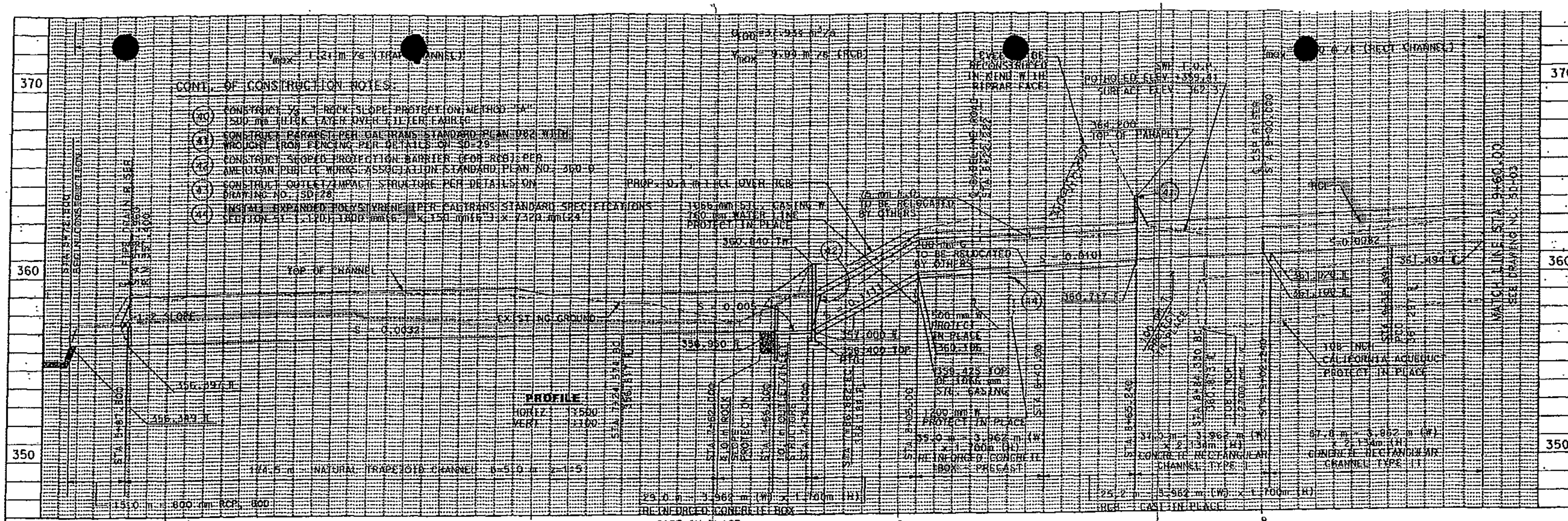
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
TITLE SHEET

DRAWING NO. SD-01
SHEET 1 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842

MAY 17 2005



CONT. OF CONSTRUCTION NOTES:

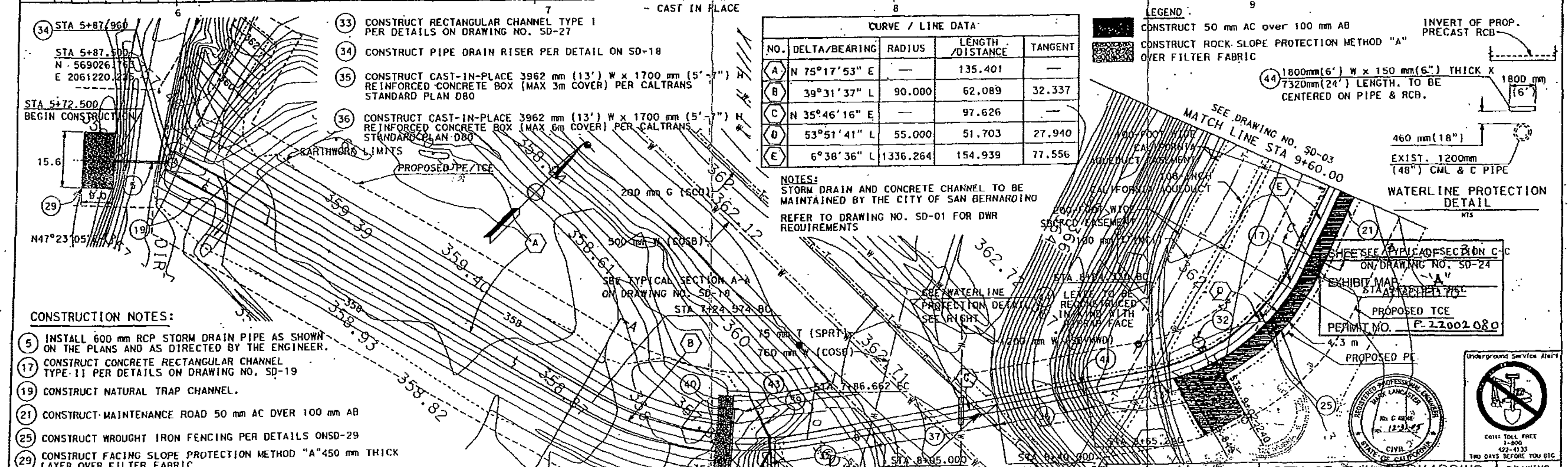
(40) CONSTRUCT 1/4 T ROCK SLOPE PROTECTION METHOD "A" 1500 mm THICK LAYER OVER FILTER FABRIC

(41) CONSTRUCT PARAPET PER CALTRANS STANDARD PLAN B82 WITH WROUGHT IRON FENCING PER DETAILS ON SD-29

(42) CONSTRUCT SCOPED PROTECTION BARRIER (FOR RCB) PER AMERICAN PUBLIC WORKS ASSOCIATION STANDARD PLAN NO. 360-0

(43) CONSTRUCT OUTLET/IMPACT STRUCTURE PER DETAILS ON DRAWING NO. SD-28

(44) INSTALL EXPANDED POLYSTYRENE (PER CALTRANS STANDARD SPECIFICATIONS SECTION 51-1.12D) 1800 mm(6') x 150 mm(6") x 7320 mm(24')



(33) CONSTRUCT RECTANGULAR CHANNEL TYPE I PER DETAILS ON DRAWING NO. SD-27

(34) CONSTRUCT PIPE DRAIN RISER PER DETAIL ON SD-18

(35) CONSTRUCT CAST-IN-PLACE 3962 mm (13') W x 1700 mm (5'-7") H REINFORCED CONCRETE BOX (MAX 3m COVER) PER CALTRANS STANDARD PLAN D80

(36) CONSTRUCT CAST-IN-PLACE 3962 mm (13') W x 1700 mm (5'-7") H REINFORCED CONCRETE BOX (MAX 6m COVER) PER CALTRANS STANDARD PLAN D80

CURVE / LINE DATA				
NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
A	N 75°17'53" E	—	135.401	—
B	39°31'37" L	90.000	62.089	32.337
C	N 35°46'16" E	—	97.626	—
D	53°51'41" L	55.000	51.703	27.940
E	6°38'36" L	1336.264	154.939	77.556

NOTES:
STORM DRAIN AND CONCRETE CHANNEL TO BE MAINTAINED BY THE CITY OF SAN BERNARDINO

REFER TO DRAWING NO. SD-01 FOR DWR REQUIREMENTS

LEGEND
CONSTRUCT 50 mm AC over 100 mm AB
CONSTRUCT ROCK SLOPE PROTECTION METHOD "A" OVER FILTER FABRIC

(44) 1800mm(6') W x 150 mm(6") THICK X 7320mm(24') LENGTH. TO BE CENTERED ON PIPE & RCB.

CONSTRUCTION NOTES:

(5) INSTALL 600 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.

(17) CONSTRUCT CONCRETE RECTANGULAR CHANNEL TYPE II PER DETAILS ON DRAWING NO. SD-19

(19) CONSTRUCT NATURAL TRAP CHANNEL.

(21) CONSTRUCT MAINTENANCE ROAD 50 mm AC OVER 100 mm AB

(25) CONSTRUCT WROUGHT IRON FENCING PER DETAILS ONSD-29

(29) CONSTRUCT FACING SLOPE PROTECTION METHOD "A"450 mm THICK LAYER OVER FILTER FABRIC

(32) CONSTRUCT 900 mm CSP PERFORATED RISER WITH 600 mm PIPE DRAIN PIPE

(37) CONSTRUCT PRECAST 3962 mm (13') W x 1700 mm (5'-7") H REINFORCED CONCRETE BOX (MAX 3m COVER) PER CALTRANS STANDARD PLAN D80 AND DETAILS ON DRAWING NO. SD-02B

(39) CONSTRUCT TYPE "A" BOX CULVERT WINGWALL PER CALTRANS STANDARD PLAN D84 WITH WROUGHT IRON FENCING PER DETAILS ON SD-29

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

Underground Service Alert
Call: TOLL FREE 1-800 422-4133
TWO DAYS BEFORE YOU DIG

APPROVED July 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: RQ

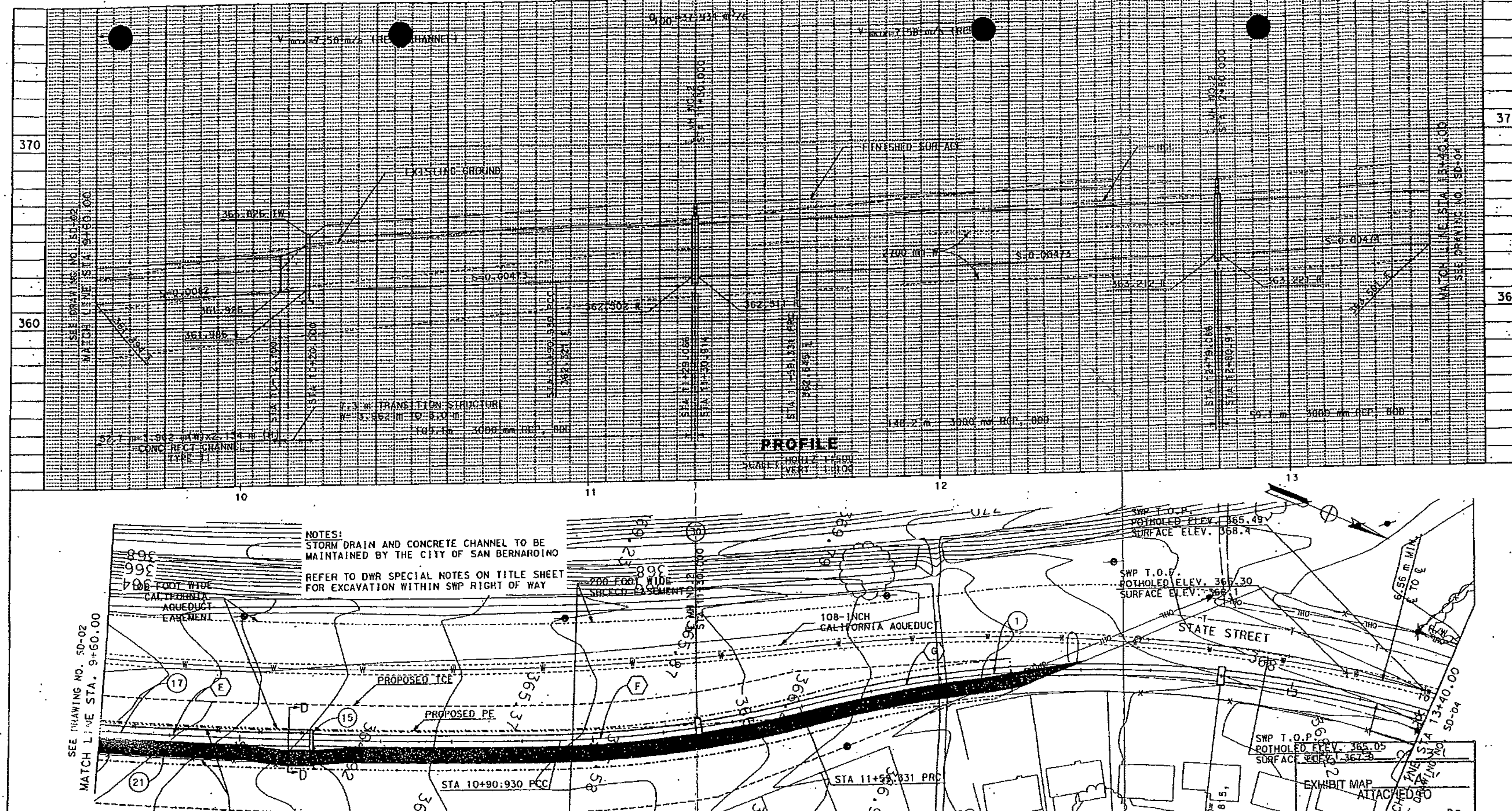
MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 5+72.50 TO STA 9+60.00

DRAWING NO. SD-02
SHEET 3 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842



NOTES:
STORM DRAIN AND CONCRETE CHANNEL TO BE MAINTAINED BY THE CITY OF SAN BERNARDINO

REFER TO DWR SPECIAL NOTES ON TITLE SHEET FOR EXCAVATION WITHIN SWP RIGHT OF WAY

CONSTRUCTION NOTES:

1. INSTALL 3000 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
15. CONSTRUCT HEADWALL PER CALTRANS STD PLAN D86B WITH WROUGHT IRON FENCING PER DETAILS ON SD-29
17. CONSTRUCT CONCRETE RECTANGULAR CHANNEL TYPE II PER DETAILS ON DRAWING NO. SD-19
21. CONSTRUCT MAINTENANCE ROAD 50 mm AC OVER 100 mm AB
25. CONSTRUCT WROUGHT IRON FENCING PER DETAILS ON SD-29
26. INSTALL 12' WIDE WROUGHT IRON GATE TO THE SATISFACTION OF THE CITY ENGINEER
30. CONSTRUCT MANHOLE NO.2 PER DETAIL ON SD-23

CURVE / LINE DATA				
NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
E	N 6°38'36" L	1336.264	154.939	77.556
F	12°26'00" L	315.000	68.355	34.31
G	36°45'41" R	338.392	217.115	112.44

LEGEND
CONSTRUCT 50 mm AC over 100 mm AB

0 20 40 60
1:500 (IN METERS)

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
Project Engineer Registered Civil Engineer — JUNE 30, 2003 (Date)

Underground Service Alert
CALL TOLL FREE 1-800 422-4133
TWO DAYS BEFORE YOU DIG

APPROVED July 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO: 48041
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 9+60.00 TO STA 13+40.00

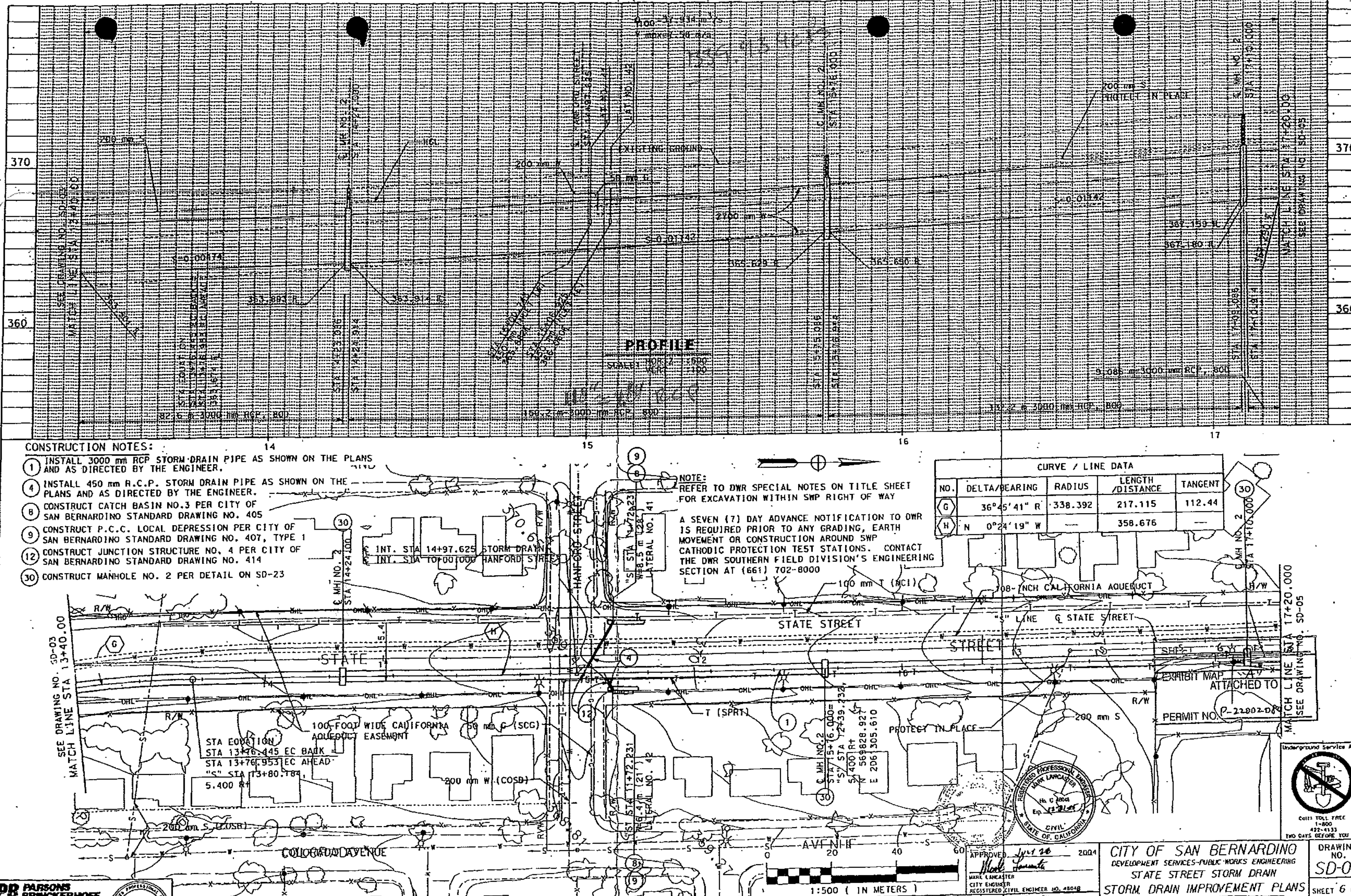
DRAWING NO. SD-03
SHEET 5 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842

$Q_{100} = 37.934\ m^3/s$

PROP. HGL @ 3' ABOVE PIPE
4.9' OF COVER 366.9 368.4



CONSTRUCTION NOTES:

1. INSTALL 3000 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
4. INSTALL 450 mm R.C.P. STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
8. CONSTRUCT CATCH BASIN NO.3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405
9. CONSTRUCT P.C.C. LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1
12. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414
30. CONSTRUCT MANHOLE NO. 2 PER DETAIL ON SD-23

NOTE:
REFER TO DWR SPECIAL NOTES ON TITLE SHEET FOR EXCAVATION WITHIN SWP RIGHT OF WAY

A SEVEN (7) DAY ADVANCE NOTIFICATION TO DWR IS REQUIRED PRIOR TO ANY GRADING, EARTH MOVEMENT OR CONSTRUCTION AROUND SWP CATHODIC PROTECTION TEST STATIONS. CONTACT THE DWR SOUTHERN FIELD DIVISION'S ENGINEERING SECTION AT (661) 702-8000

CURVE / LINE DATA

NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
G	36°45'41" R	338.392	217.115	112.44
H	N 0°24'19" W	—	358.676	—

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

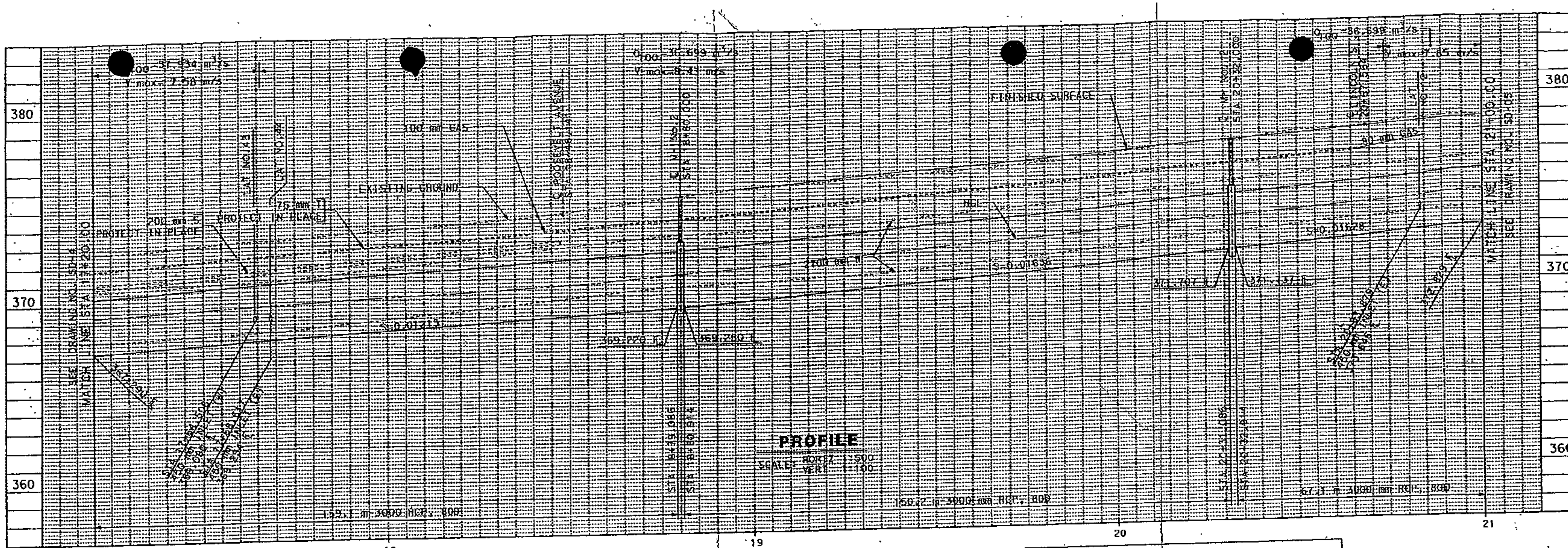
APPROVED 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48048

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 13+40.00 TO STA 17+20.00

DRAWING NO. SD-04
SHEET 6 OF 31 SHEETS

MARK	REVISIONS	BY	APPR.	DATE

DRAWING NO. 10842



NOTE:
REFER TO DWR SPECIAL NOTES ON TITLE SHEET FOR EXCAVATION WITHIN SWP RIGHT OF WAY

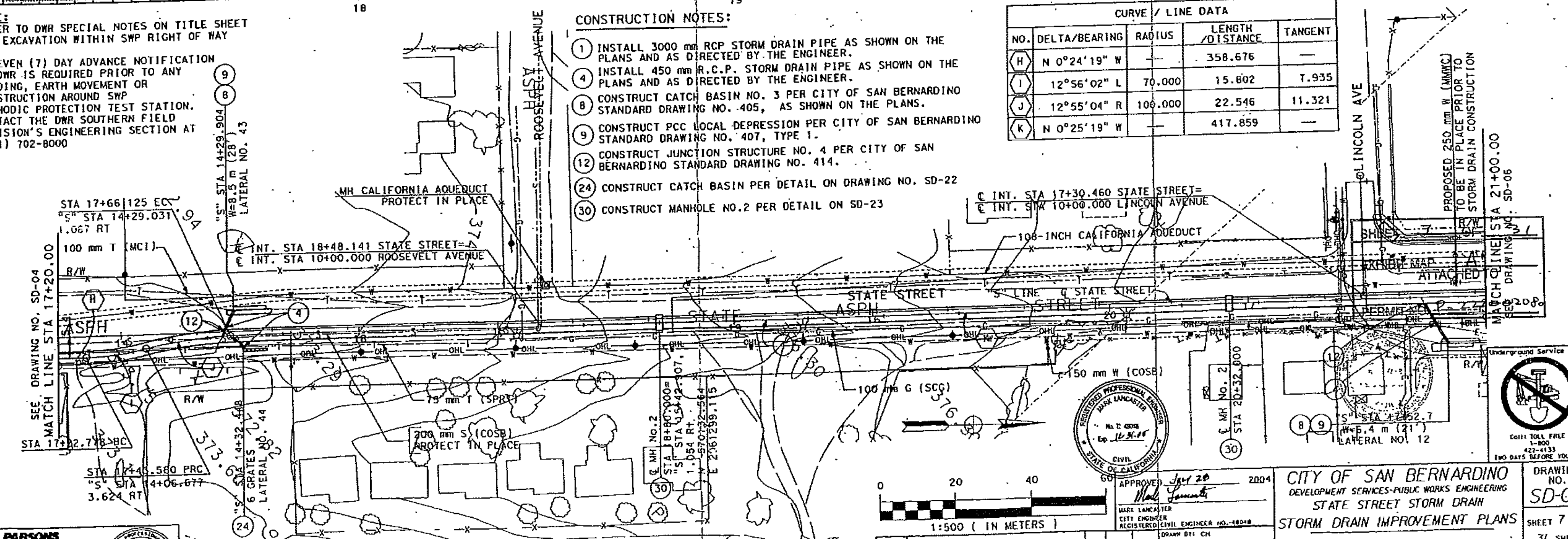
A SEVEN (7) DAY ADVANCE NOTIFICATION TO DWR IS REQUIRED PRIOR TO ANY GRADING, EARTH MOVEMENT OR CONSTRUCTION AROUND SWP CATHODIC PROTECTION TEST STATION. CONTACT THE DWR SOUTHERN FIELD DIVISION'S ENGINEERING SECTION AT (661) 702-8000

CONSTRUCTION NOTES:

1. INSTALL 3000 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
4. INSTALL 450 mm R.C.P. STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
8. CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS.
9. CONSTRUCT PCC LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.
12. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414.
24. CONSTRUCT CATCH BASIN PER DETAIL ON DRAWING NO. SD-22
30. CONSTRUCT MANHOLE NO.2 PER DETAIL ON SD-23

CURVE / LINE DATA

NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
H	N 0°24'19" W	—	358.676	—
I	12°56'02" L	70.000	15.602	7.935
J	12°55'04" R	100.000	22.546	11.321
K	N 0°25'19" W	—	417.859	—



0 20 40
1:500 (IN METERS)

PB PARSONS BRINCKERHOFF
505 EAST CARNEGIE DRIVE SUITE 210 SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

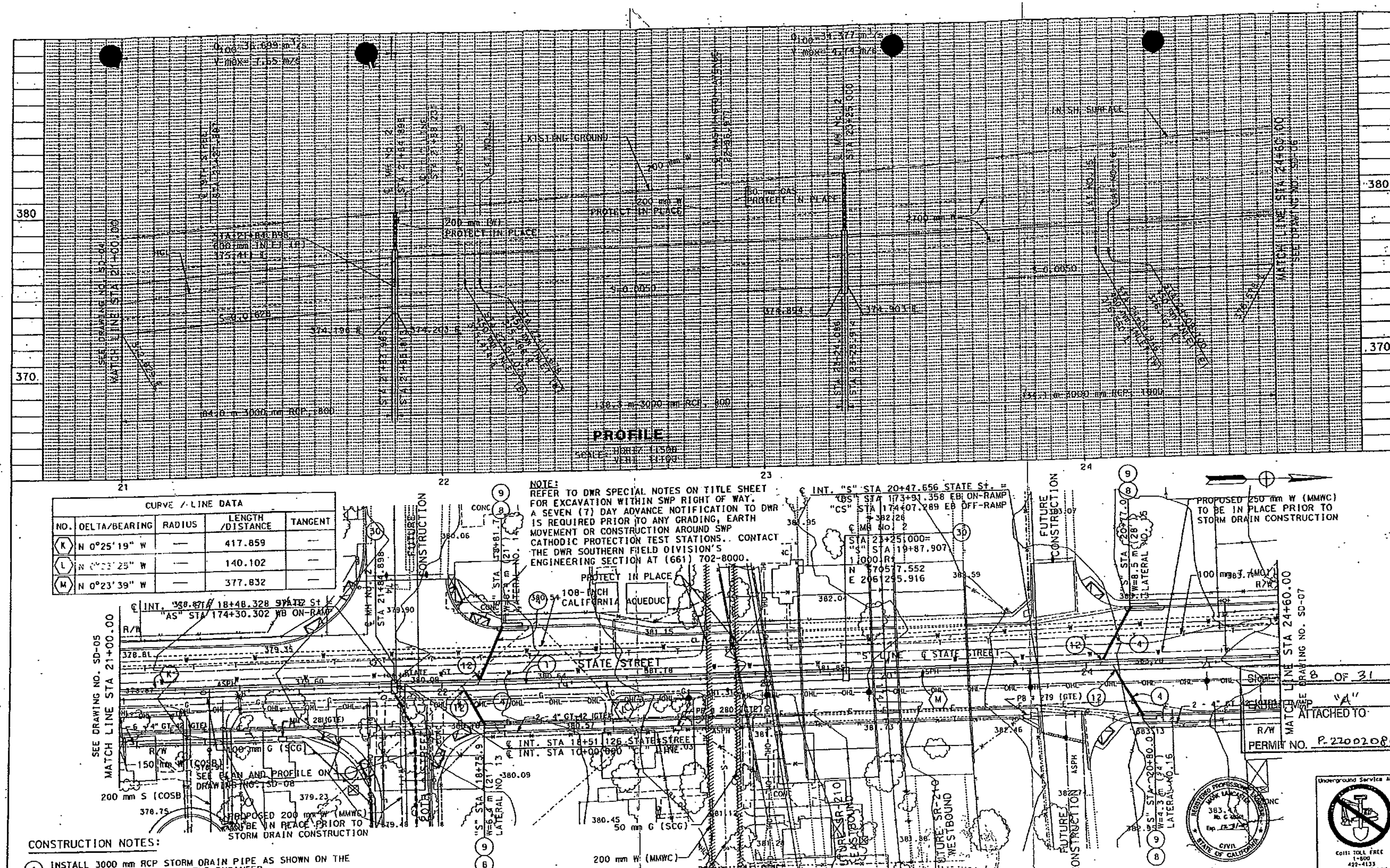
APPROVED June 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: ME

MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 17+20.000 TO STA 21+00.000
FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. SD-05
SHEET 7 OF 31 SHEETS

DRAWING NO. 10842



CURVE / LINE DATA				
NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
K	N 0°25'19" W	—	417.859	—
L	N 0°23'25" W	—	140.102	—
M	N 0°23'39" W	—	377.832	—

NOTE:
REFER TO DWR SPECIAL NOTES ON TITLE SHEET FOR EXCAVATION WITHIN SWP RIGHT OF WAY. A SEVEN (7) DAY ADVANCE NOTIFICATION TO DWR IS REQUIRED PRIOR TO ANY GRADING, EARTH MOVEMENT OR CONSTRUCTION AROUND SWP CATHODIC PROTECTION TEST STATIONS.. CONTACT THE DWR SOUTHERN FIELD DIVISION'S ENGINEERING SECTION AT (661) 702-8000.

CONSTRUCTION NOTES:

1. INSTALL 3000 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER
4. INSTALL 450 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER
8. CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS
9. CONSTRUCT PCC LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.
12. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414.
30. CONSTRUCT MANHOLE NO.2 PER DETAIL ON SD-23

PARSONS BRINCKERHOFF
605 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

0 20 40 60
1:500 (IN METERS)

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48043
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 21+00.00 TO STA 24+60.00

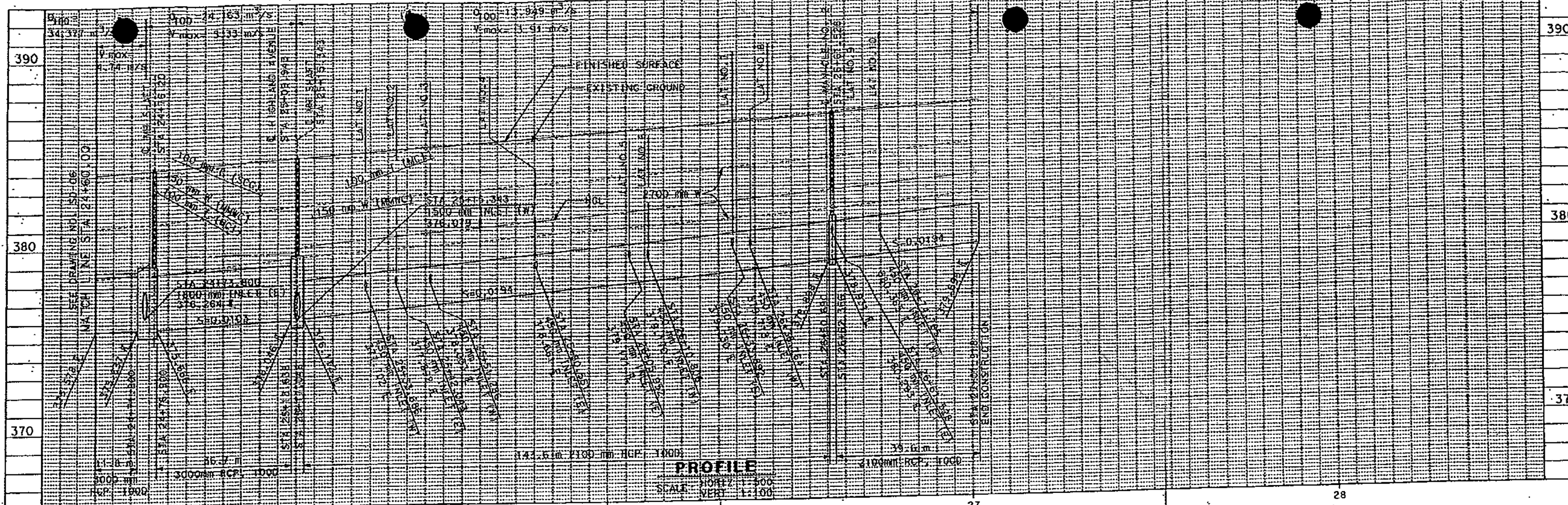
FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

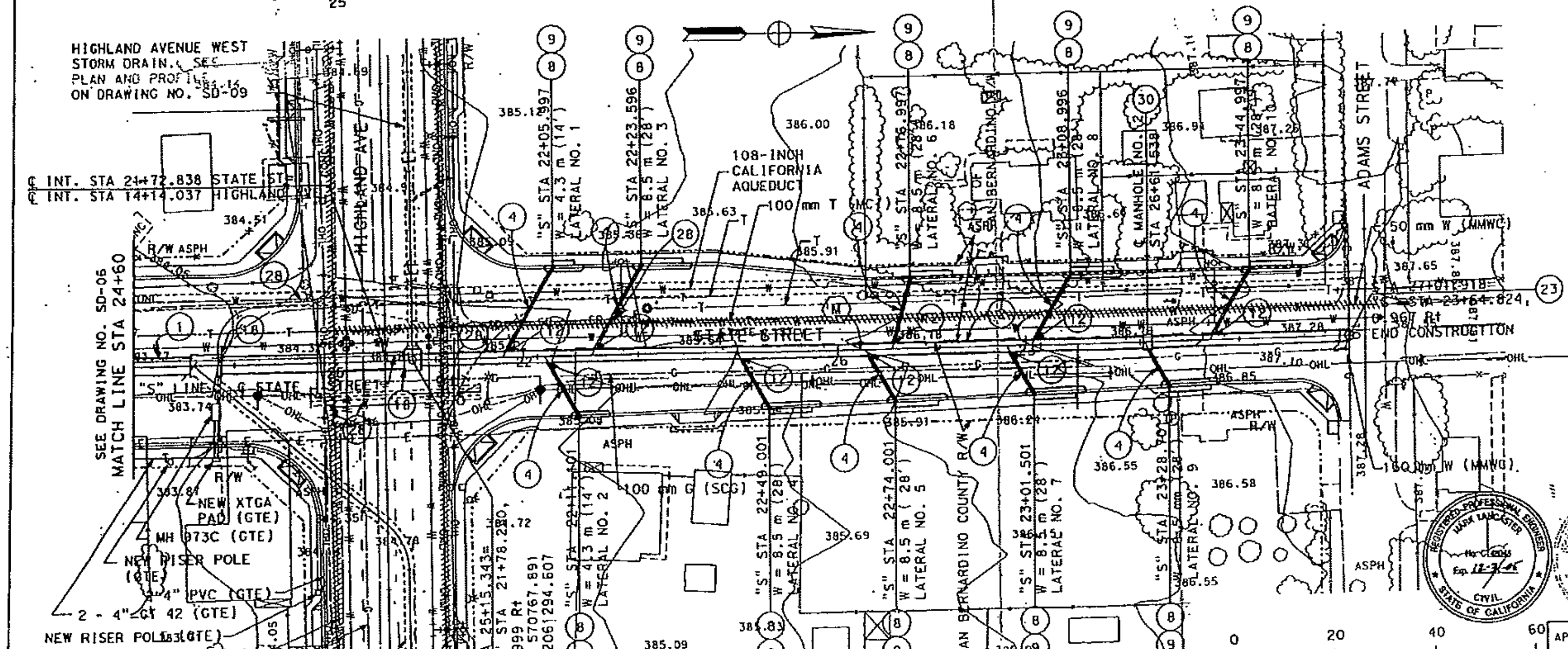
DRAWING NO. SD-06
SHEET 8 OF 31 SHEETS

Underground Service Alert
Call: TOLL FREE 1-800 422-4133
TWO DAYS BEFORE YOU DIG

SHEET 8 OF 31
"A"
ATTACHED TO
PERMIT NO. P.22002080

DRAWING NO. 10842





NOTE:
REFER TO DWR SPECIAL NOTES ON TITLE SHEET FOR EXCAVATION WITHIN SWP RIGHT OF WAY. A SEVEN (7) DAY ADVANCE NOTIFICATION IS REQUIRED PRIOR TO ANY GRADING, EARTH MOVEMENT OR CONSTRUCTION AROUND SWP CATHODIC PROTECTION TEST STATIONS. CONTACT THE DWR SOUTHERN FIELD DIVISION'S ENGINEERING SECTION AT (661) 702-8000

CONSTRUCTION NOTES:

1. INSTALL 3000 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
2. INSTALL 2100 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
4. INSTALL 450 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
8. CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS..
9. CONSTRUCT PCC LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.
12. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414.
18. CONSTRUCT MANHOLE NO. 4 PER DETAIL ON DRAWING NO. SD-20
23. CONSTRUCT BULKHEAD PER DETAIL ON DRAWING NO. SD-21
28. REMOVE EXISTING DRAINAGE FACILITIES.
30. CONSTRUCT MANHOLE NO. 2 PER DETAIL ON SD-23

SHEET 9 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

CURVE / LINE DATA				
NO	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
M	N 0°23' 39" W	—	377.832	—

Underground Service Alert
Call: TOLL FREE 1-800 422-4133 TWO DAYS BEFORE YOU DIG

APPROVED June 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 44018

DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MS

MARK	REVISIONS	BY	APPR.	DATE

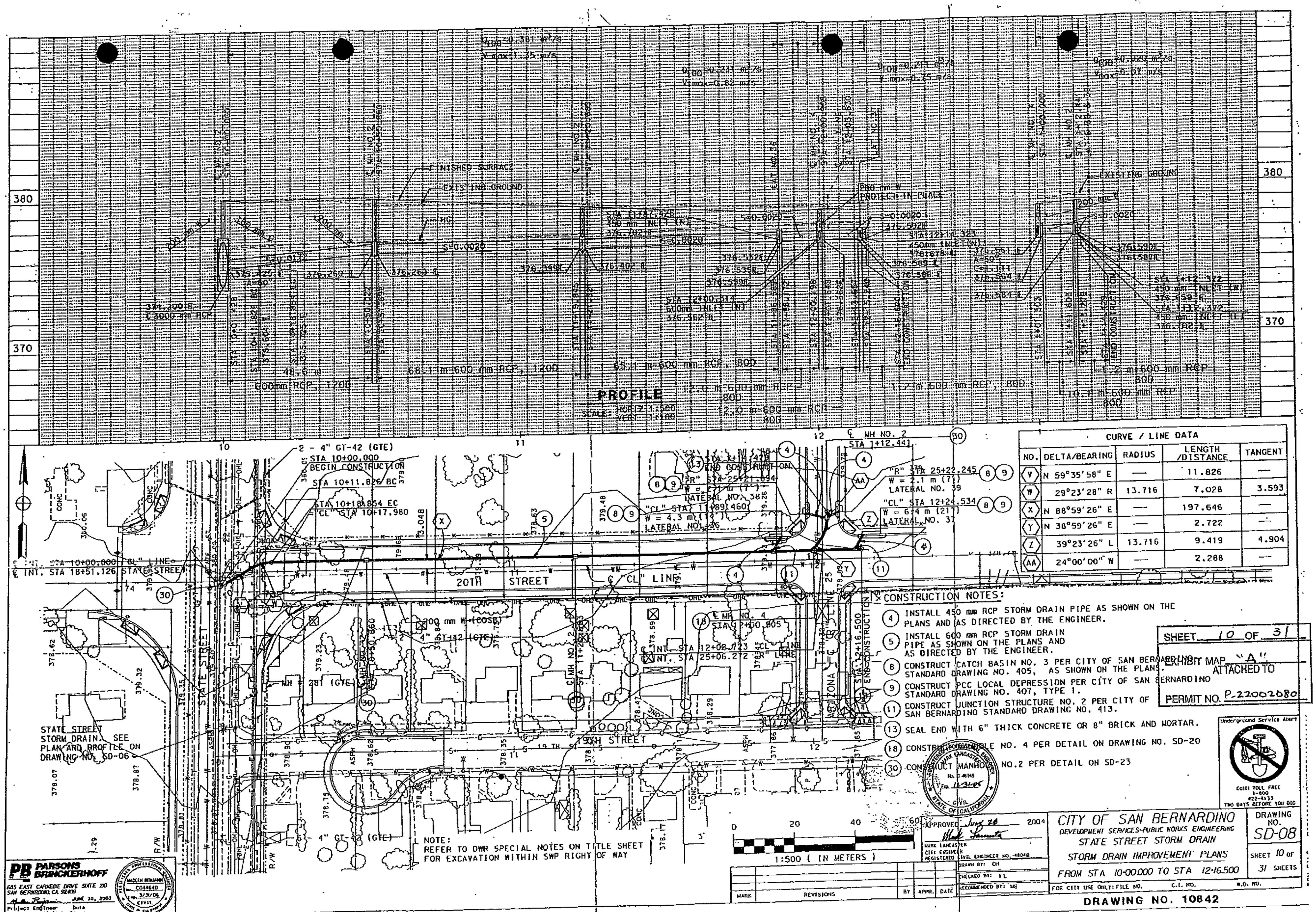
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 24+60.00 TO STA 27+01.918

DRAWING NO. SD-07
SHEET 9 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 100 SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer



CURVE / LINE DATA

NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
V	N 59°35'58" E	—	11.826	—
W	29°23'28" R	13.716	7.028	3.593
X	N 88°59'26" E	—	197.646	—
Y	N 38°59'26" E	—	2.722	—
Z	39°23'26" L	13.716	9.419	4.904
AA	24°00'00" W	—	2.288	—

CONSTRUCTION NOTES:

4. INSTALL 450 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
5. INSTALL 600 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
6. CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS.
9. CONSTRUCT PCC LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.
11. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 413.
13. SEAL END WITH 6" THICK CONCRETE OR 8" BRICK AND MORTAR.
18. CONSTRUCT MANHOLE NO. 4 PER DETAIL ON DRAWING NO. SD-20
30. CONSTRUCT MANHOLE NO.2 PER DETAIL ON SD-23

SHEET 10 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

Underground Service Alert
CALL TOLL FREE 1-800 422-4133
TWO DAYS BEFORE YOU DIG

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210 SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

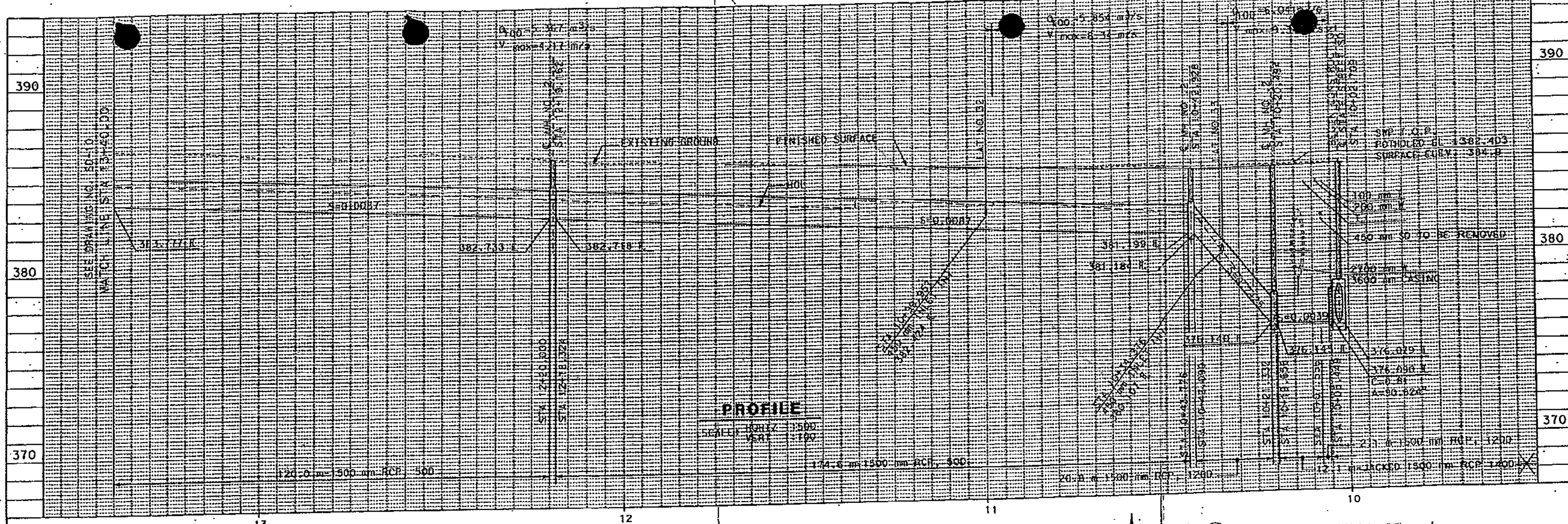
APPROVED June 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 46948
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 10+00.000 TO STA 12+16.500
FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. SD-08
SHEET 10 OF 31 SHEETS

MARK | REVISIONS | BY | APPR. | DATE

DRAWING NO. 10842



CONSTRUCTION NOTES:

(3) INSTALL 1500 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.

(4) INSTALL 450 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND DIRECTED BY THE ENGINEER.

(8) CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS.

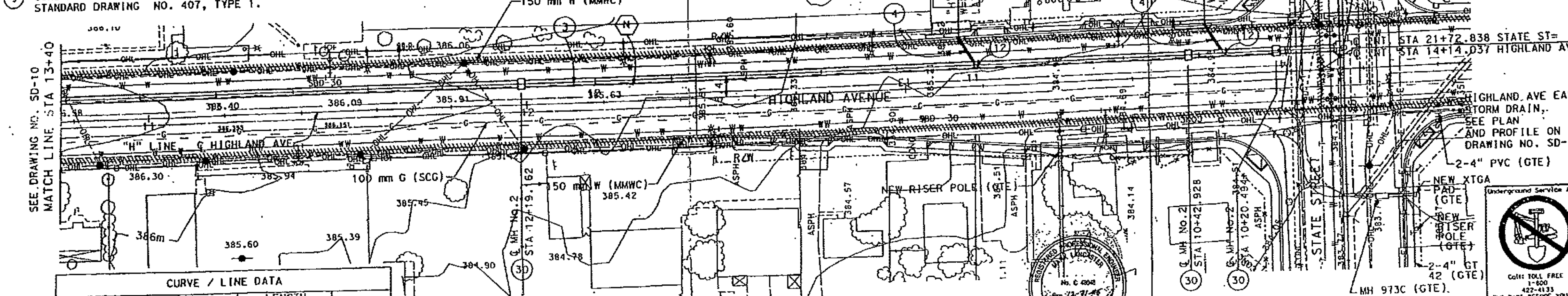
(9) CONSTRUCT PCC LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.

(12) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414.

(18) CONSTRUCT MANHOLE NO. 4 PER DETAIL ON DRAWING NO. SD-20

(28) REMOVE EXISTING DRAINAGE FACILITIES.

(30) CONSTRUCT MANHOLE NO. 2 PER DETAIL ON SD-23



CURVE / LINE DATA				
NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
(N)	S 88°58'54" W	—	386.464	—

NOTE:
REFER TO OWR SPECIAL NOTES ON TITLE SHEET FOR EXCAVATION WITHIN SWP RIGHT OF WAY

SEE OWR NOTES ON DRAWING NO. SD-01

1:500 (IN METERS)

Underground Service Alert — Call: TOLL FREE 1-800 422-4133 TWO DAYS BEFORE YOU DIG

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 80
SAN BERNARDINO, CA 92408
Project Engineer Date JUNE 30, 2003
Registered Civil Engineer

APPROVED July 26 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 46048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

MARK	REVISIONS	BY	APPR.	DATE

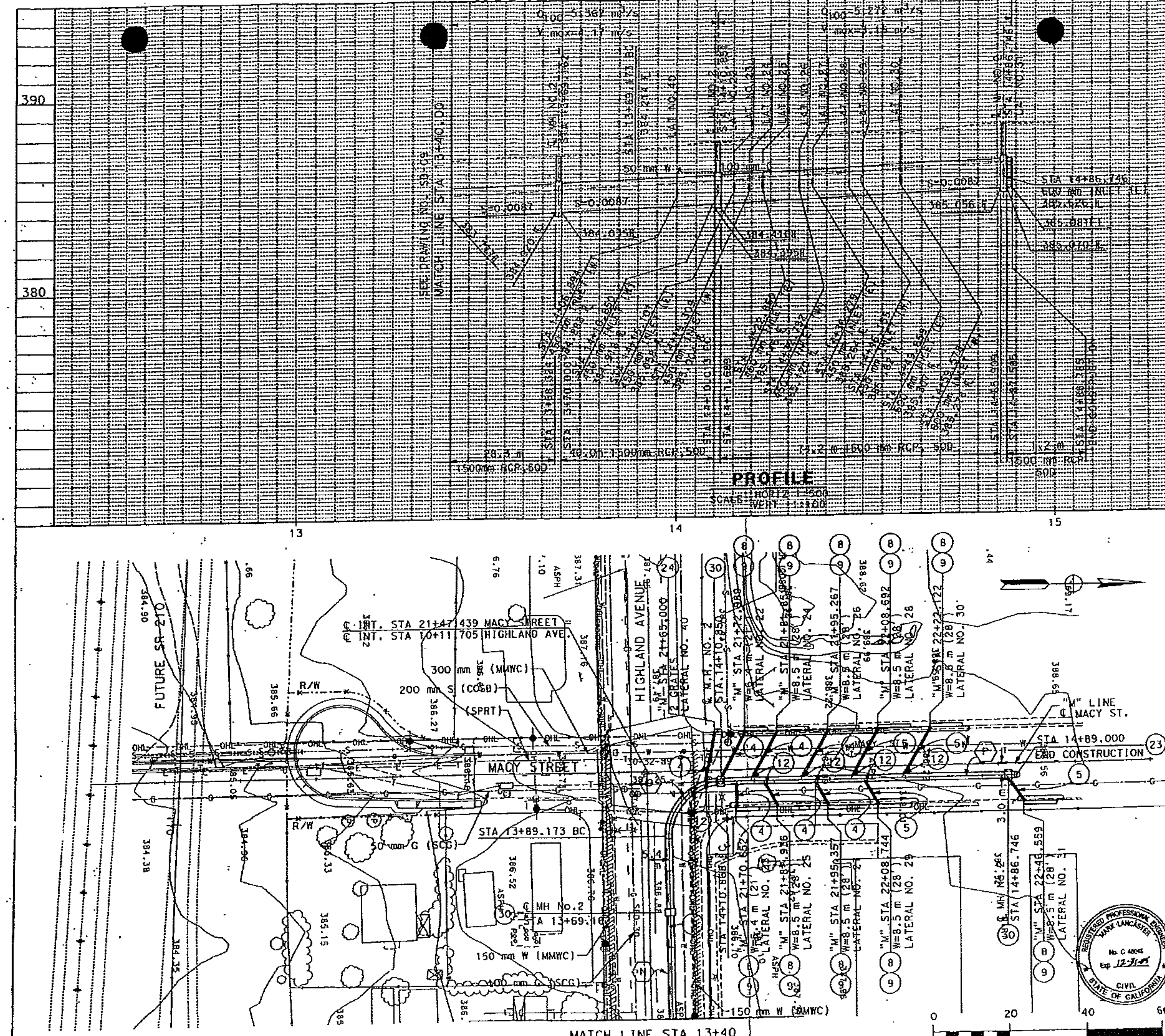
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 10+02.709 TO STA 13+40.00

EXHIBIT MAP "A"
SHEET 31 OF

DRAWING NO. SD-09
SHEET 11 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842



CONSTRUCTION NOTES:

(3) INSTALL 1500 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.

(4) INSTALL 450 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.

(5) INSTALL 600 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER

(8) CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS.

(9) CONSTRUCT PCC LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.

(12) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414.

(23) CONSTRUCT BULKHEAD PER DETAIL ON DRAWING NO. SD-21.

(24) CONSTRUCT CATCH BASIN PER DETAIL ON DWG NO. SD-22.

(30) CONSTRUCT MANHOLE NO. 2 PER DETAIL ON SD-23.

SHEET 12 OF 31
EXHIBIT MAP "A"
ATTACHED TO
PERMIT NO. P.22002080

CURVE / LINE DATA

NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
N	S 88°58'54" W	—	386.464	—
O	90°37'33" R	13.716	21.695	13.867
P	N 0°23'33" W	—	78.132	—

Underground Service Alert
Call: TOLL FREE 1-800 422-4133 TWO DAYS BEFORE YOU DIG

REGISTERED PROFESSIONAL ENGINEER MARK LANCASTER No. C 48045 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

0 20 40 60
1:500 (IN METERS)

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48049
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

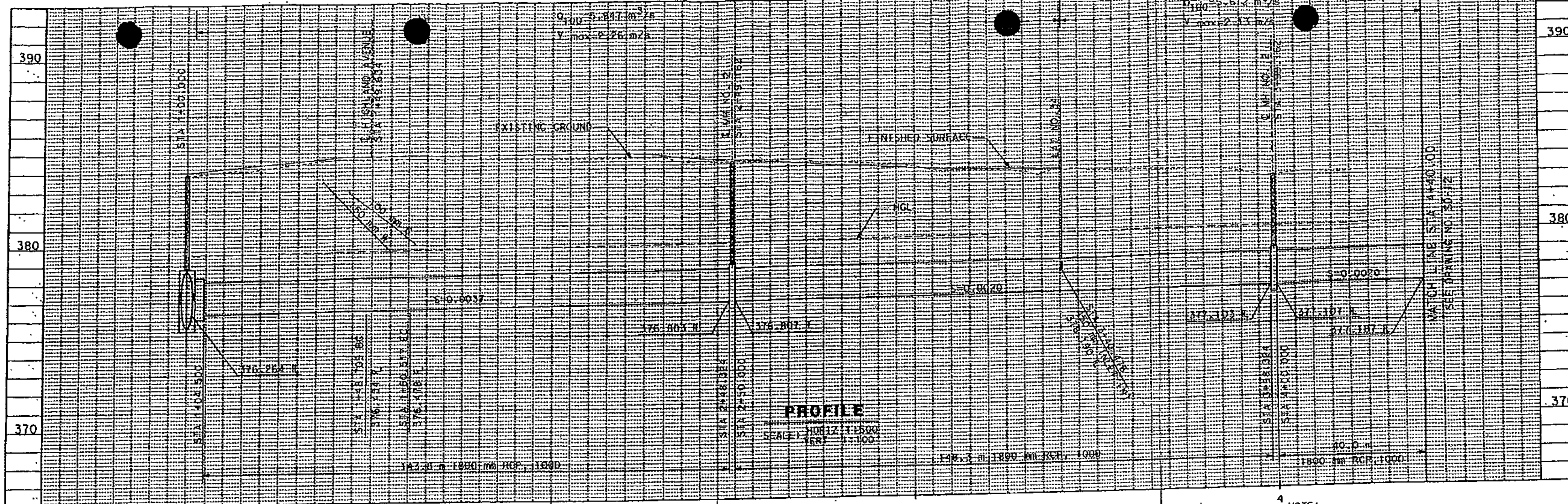
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 13+40.000 TO STA 14+88.785

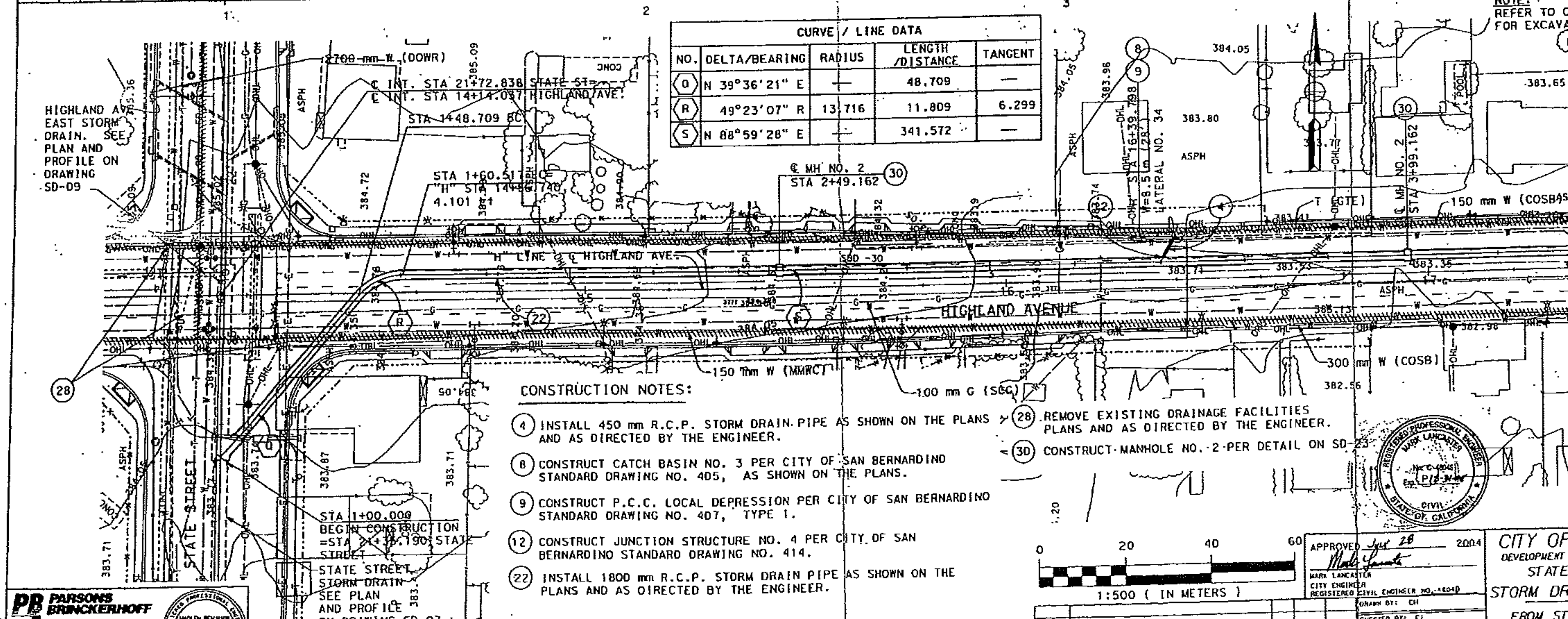
DRAWING NO. SD-10
SHEET 12 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842

PB PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 80
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer





NOTE: REFER TO OWR SPECIAL NOTES ON TITLE SHEET FOR EXCAVATION WITHIN SWP RIGHT OF WAY

CURVE / LINE DATA				
NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
Q	N 39°36'21" E	—	48.709	—
R	49°23'07" R	13.716	11.809	6.299
S	N 88°59'28" E	—	341.572	—

CONSTRUCTION NOTES:

4. INSTALL 450 mm R.C.P. STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
8. CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS.
9. CONSTRUCT P.C.C. LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.
12. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414.
22. INSTALL 1800 mm R.C.P. STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
28. REMOVE EXISTING DRAINAGE FACILITIES PLANS AND AS DIRECTED BY THE ENGINEER.
30. CONSTRUCT MANHOLE NO. 2 PER DETAIL ON SD-23

SHEET 13 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

Underground Service Alert
Call: TOLL FREE 1-800 422-4133
TWO DAYS BEFORE YOU DIG

0 20 40 60
1:500 (IN METERS)

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

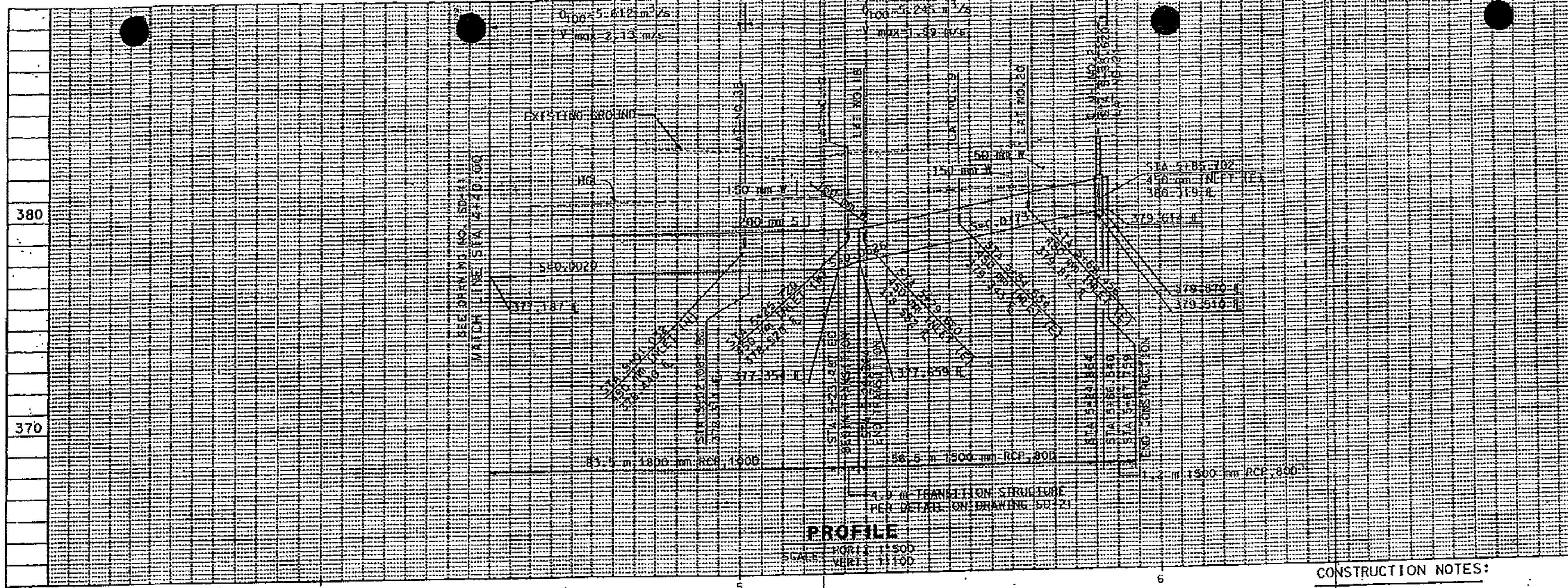
APPROVED July 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48040
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

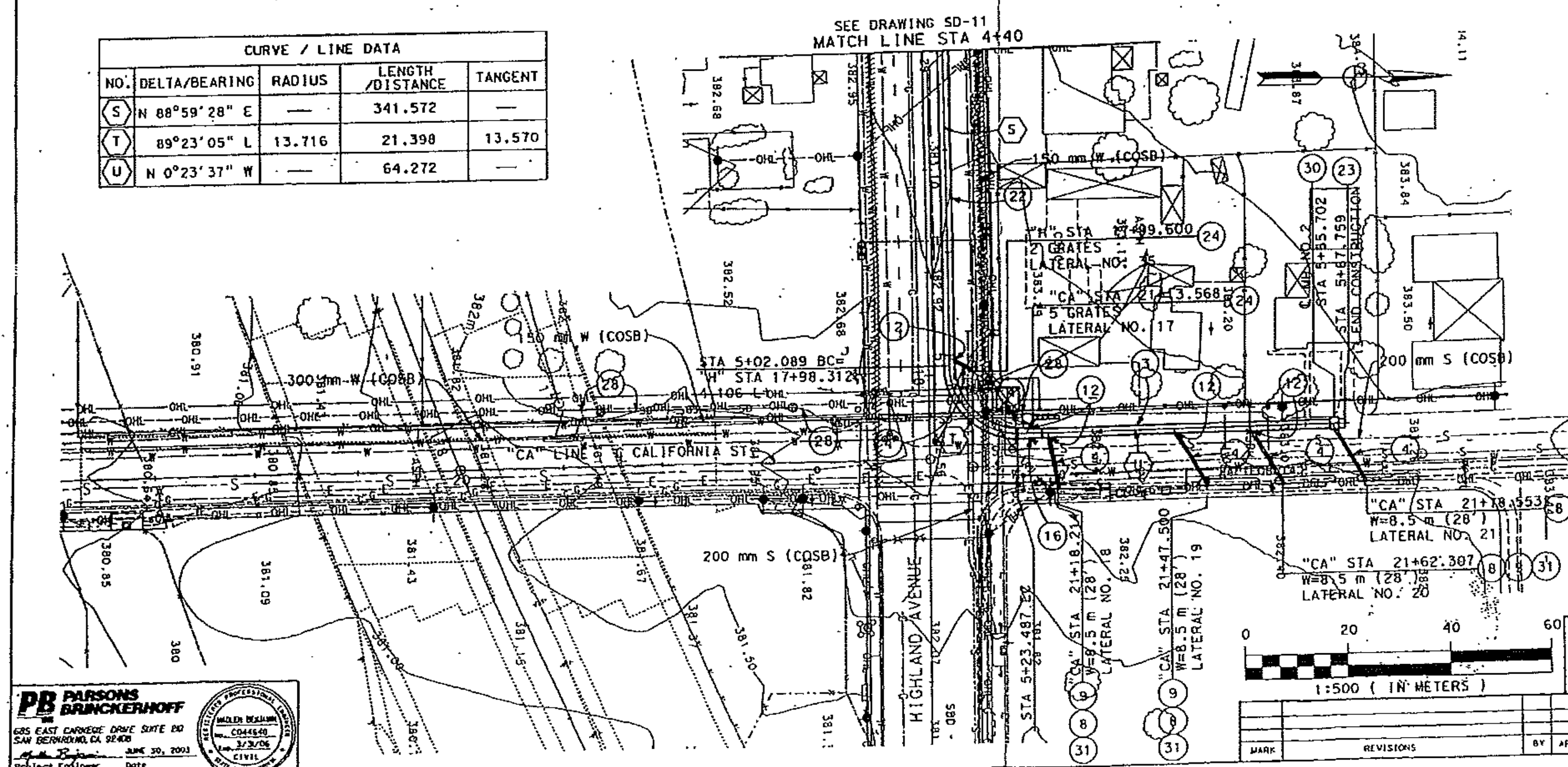
MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 1+00.000 TO STA 4+40.000

DRAWING NO. SD-11
SHEET 13 OF 31 SHEETS
FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842





NO.	DELTA/BEARING	RADIUS	LENGTH /DISTANCE	TANGENT
S	N 88°59'28" E	—	341.572	—
T	89°23'05" L	13.716	21.398	13.570
U	N 0°23'37" W	—	64.272	—

CONSTRUCTION NOTES:

3. INSTALL 1500 mm RCP STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
4. INSTALL 450 mm R.C.P. STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
8. CONSTRUCT CATCH BASIN NO. 3 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 405, AS SHOWN ON THE PLANS.
9. CONSTRUCT P.C.C. LOCAL DEPRESSION PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 407, TYPE 1.
12. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 414.
16. COSTRUCT TRANSITION STRUCTURE (RCP TO RCP) PER DETAIL ON SD-21
22. INSTALL 1800 mm R.C.P. STORM DRAIN PIPE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
23. CONSTRUCT BULKHEAD PER DETAIL ON DRAWING NO. SD-21
24. CONSTRUCT CATCH BASIN PER DETAIL ON DRAWING NO. SD-22
28. REMOVE EXISTING DRAINAGE FACITILITIES
30. CONSTRUCT MANHOLE NO. 2 PER DETAIL ON SD-23
31. CONSTRUCT CONCRETE ENCASEMENT PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 309.

SHEET 14 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

Underground Service Alert
Call: TOLL FREE 1-800 422-4133 TWO DAYS BEFORE YOU DIG

PB PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

APPROVED July 26 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: WB

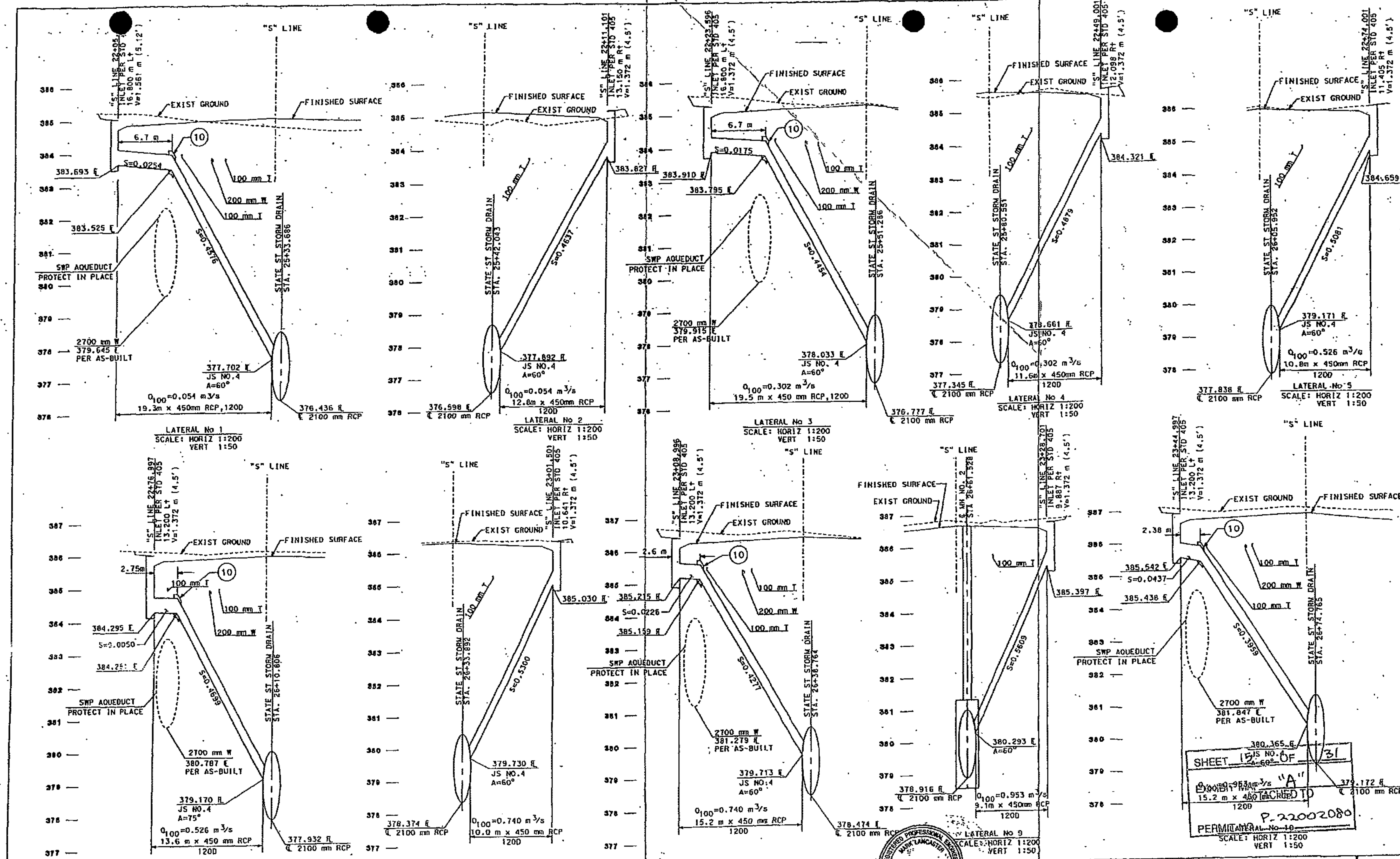
MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES–PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
FROM STA 4+40.000 TO STA 5+87.759

DRAWING NO. SD-12
SHEET 14 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842



LATERAL No 1
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 2
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 3
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 4
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 5
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 6
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 7
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 8
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 9
SCALE: HORIZ 1:200
VERT 1:50

LATERAL No 10
SCALE: HORIZ 1:200
VERT 1:50

SHEET 15 OF 31
EXHIBIT "A" ATTACHED TO
PERMIT NO. P-22002080

CONSTRUCTION NOTES:

(10) CONSTRUCT CONCRETE COLLAR PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 412

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 110
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

MARK	REVISIONS	BY	APPR.	DATE

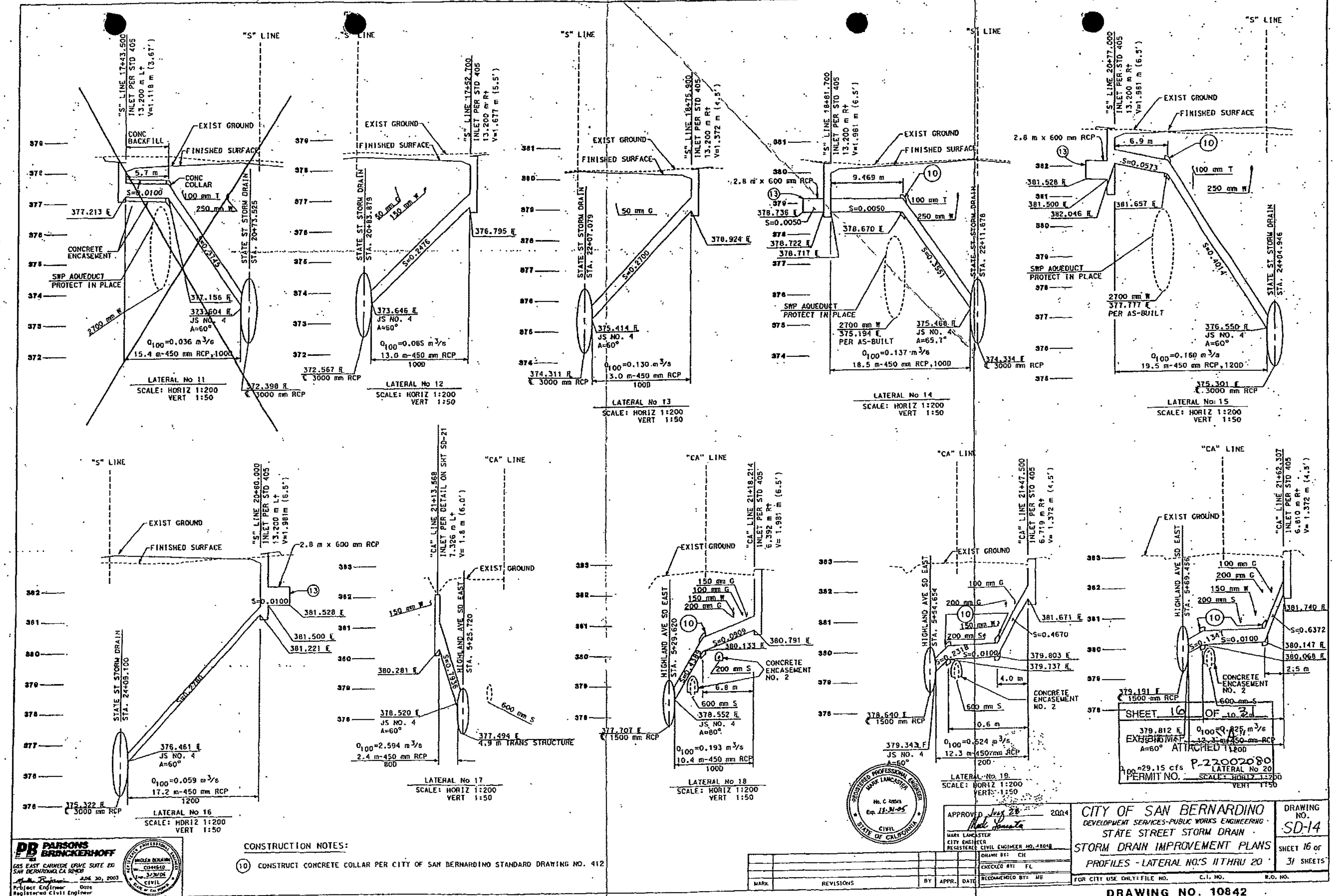
APPROVED July 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 43049
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
PROFILES - LATERALS NO. 1 THRU 10

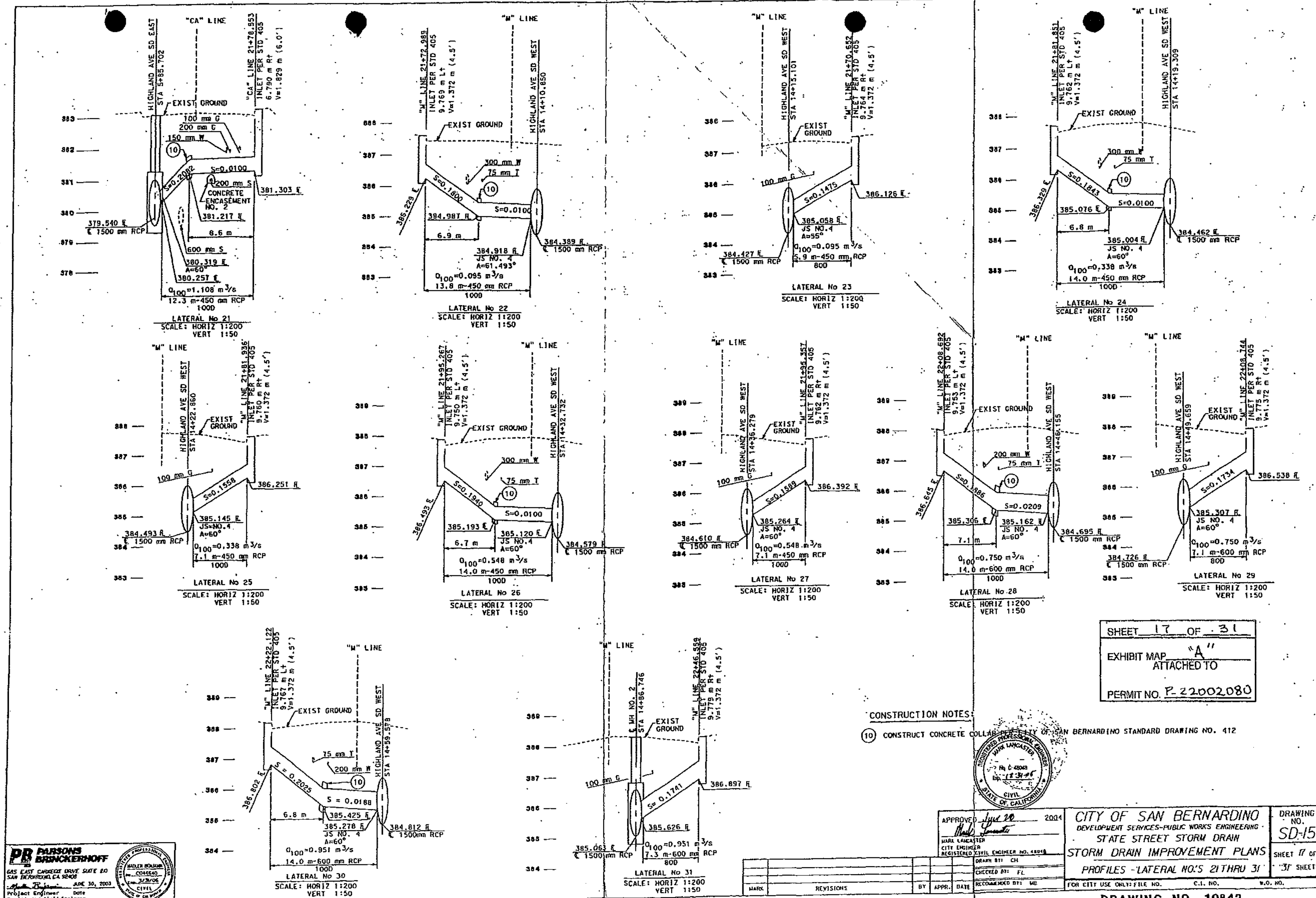
DRAWING NO. SD-13
SHEET 15 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842



LATERAL No 11
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 12
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 13
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 14
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 15
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 16
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 17
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 18
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 19
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 20
SCALE: HORIZ 1:200
VERT 1:50
"S" LINE
"CA" LINE
EXIST GROUND
FINISHED SURFACE
STATE ST STORM DRAIN
HIGHLAND AVE SD EAST
SWP AQUEDUCT PROTECT IN PLACE
CONCRETE ENCASEMENT
CONSTRUCTION NOTES:
(10) CONSTRUCT CONCRETE COLLAR PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 412
PARSONS BRINCKERHOFF
SHEET 16 OF 31
EXHIBIT ATTACHED TO
PERMIT NO. P-22002080
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
PROFILES - LATERAL NO.'S 11 THRU 20
DRAWING NO. SD-14
SHEET 16 of 31 SHEETS
MARK
REVISIONS
BY
APPR.
DATE
DRAWING NO. 10842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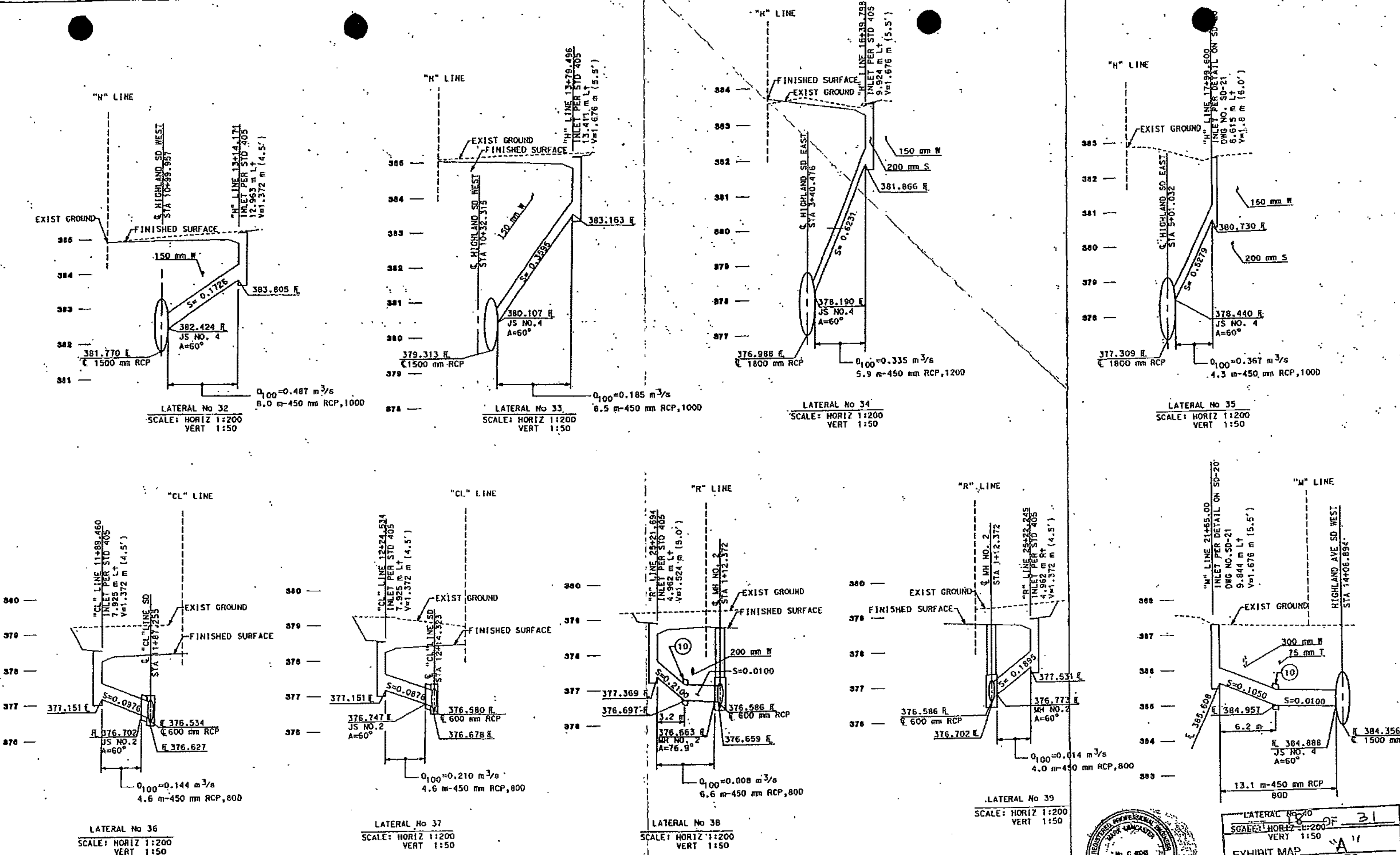
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 22
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 23
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 24
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 25
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 26
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 27
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 28
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 29
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 30
SCALE: HORIZ 1:200
VERT 1:50
LATERAL No 31
SCALE: HORIZ 1:200
VERT 1:50
EXIST GROUND
"M" LINE
"CA" LINE
SHEET 17 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080
CONSTRUCTION NOTES:
(10) CONSTRUCT CONCRETE COLLAR PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 412
PARSONS BRINCKERHOFF
Project Engineer Date
Registered Civil Engineer
APPROVED 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48048
MARK REVISIONS BY APPR. DATE
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
PROFILES - LATERAL NO.'S 21 THRU 31
DRAWING NO. SD-15
SHEET 17 OF 31 SHEETS
FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.
DRAWING NO. 10842



18 OF 31

EXHIBIT MAP "A" ATTACHED TO

PERMIT NO. P-22002080

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 100
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

CONSTRUCTION NOTES:

(10) CONSTRUCT CONCRETE COLLAR PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 412

MARK	REVISIONS	BY	APPR.	DATE

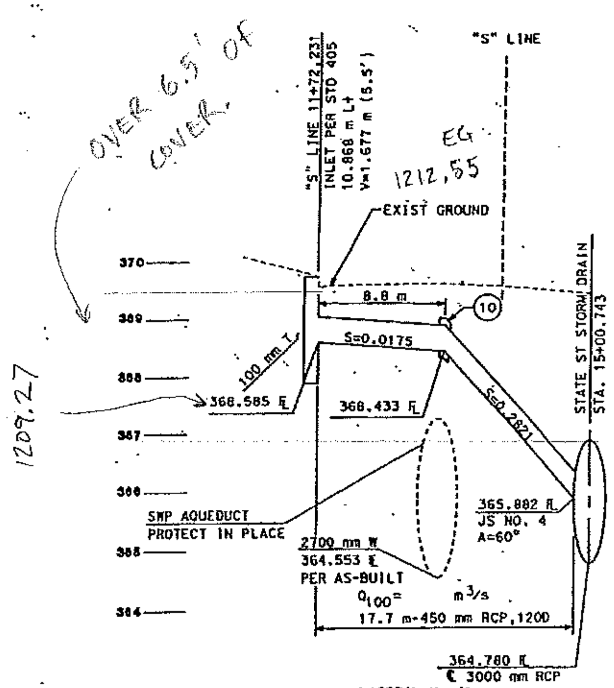
APPROVED June 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 41049
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
PROFILES - LATERAL NO:S 32 THRU 39

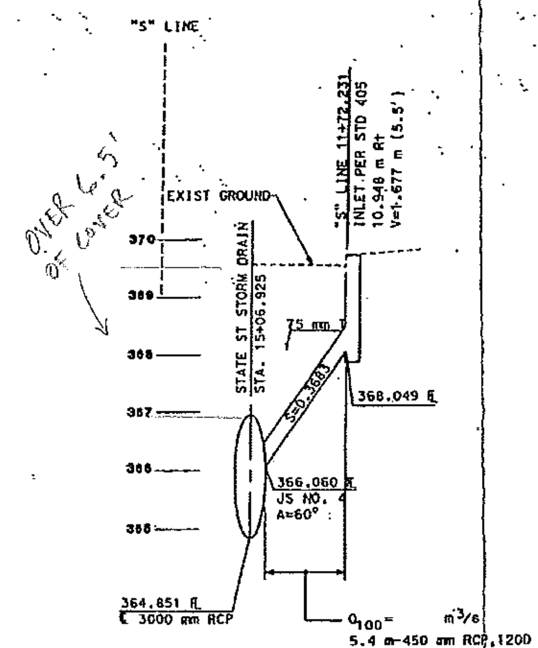
DRAWING NO. SD-16
SHEET 18 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842



LATERAL No 41
SCALE: HORIZ 1:200
VERT 1:50



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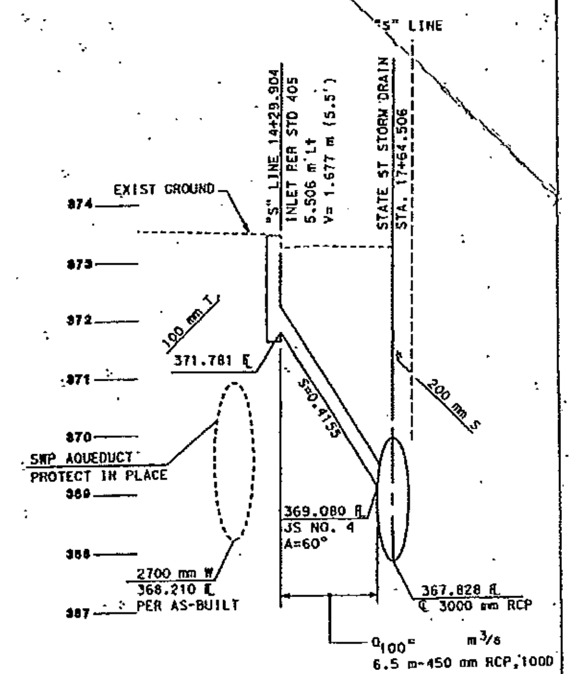
VERT 1:50



LATERAL No 43
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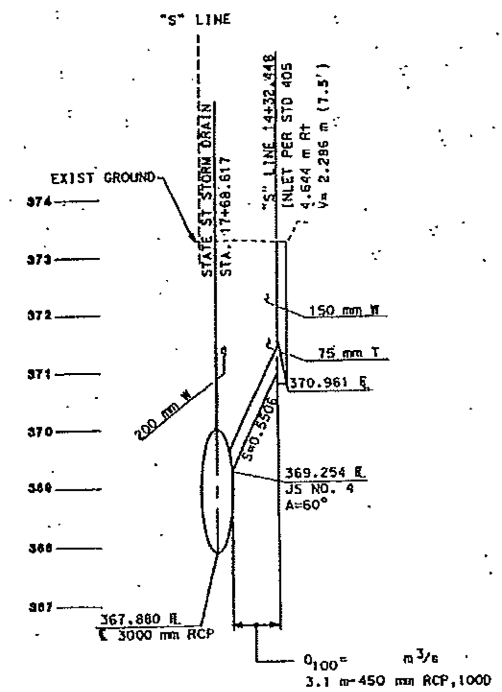
VERT 1:50



LATERAL No 44
SCALE: HORIZ 1:200
VERT 1:50

SHEET 19 OF 31

EXHIBIT MAP "A" ATTACHED TO

PERMIT NO. P-22002080

REGISTERED PROFESSIONAL ENGINEER — MARK LANCASTER — No. C 40048 — Exp. 12-31-05 — CIVIL — STATE OF CALIFORNIA

CONSTRUCTION NOTES:

(10) CONSTRUCT CONCRETE COLLAR PER CITY OF SAN BERNARDINO STANDARD DRAWING NO. 412

PB PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

APPROVED July 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 40048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

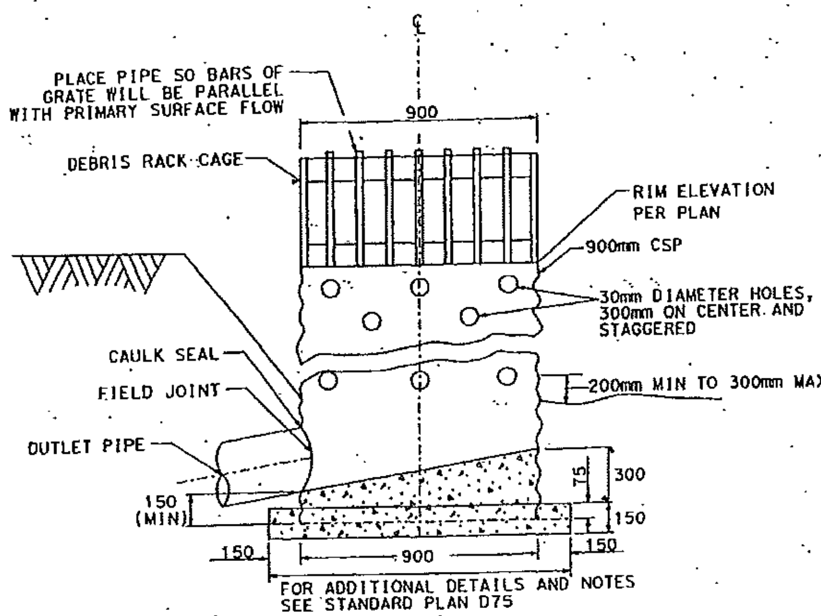
MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS, ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
PROFILES - LATERAL NO.'S 41 THRU 44

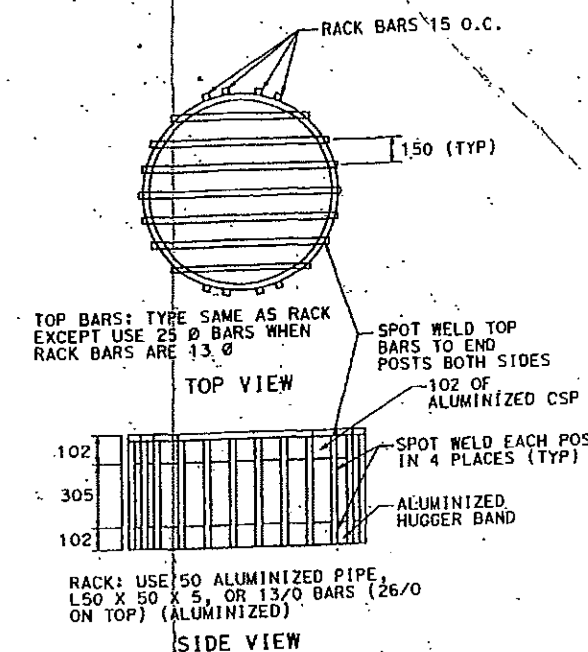
DRAWING NO. SD-17
SHEET 19 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

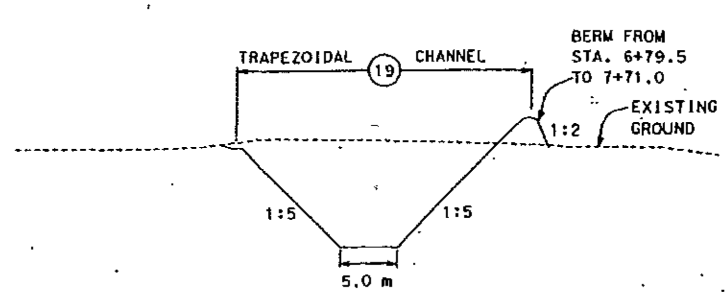
DRAWING NO. 10842



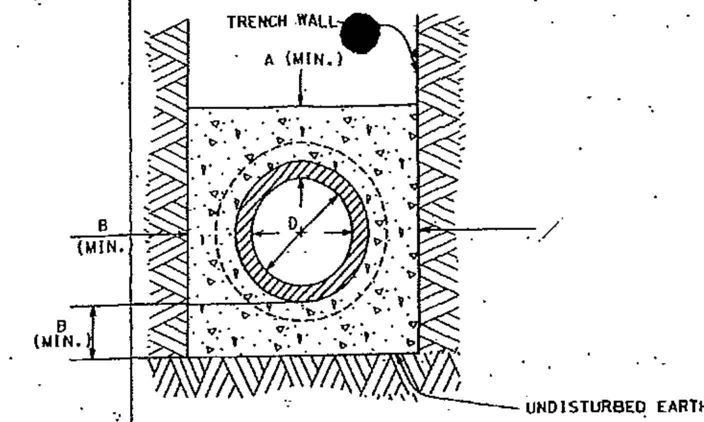
DRAIN PIPE RISER



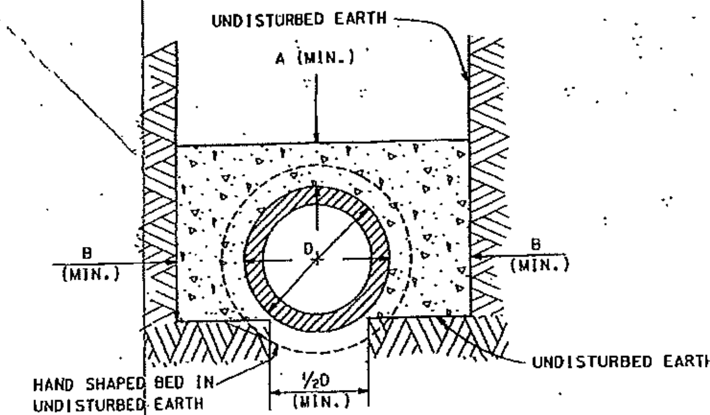
DEBRIS RACK CAGE



NATURAL TRAP CHANNEL
SECTION A-A
SCALE: HORIZ 1:250
VERT 1:50



CONCRETE ENCASEMENT NO.1



CONCRETE ENCASEMENT NO.2

PIPE I.D.	DIMENSIONS A	DIMENSIONS B
12"	4"	4"
15"	4"	4"
18"	5"	5"
24"	5"	5"
27"	6"	6"
30"	6"	6"

NOTES:

1. CONCRETE ENCASEMENT SHALL BE INSTALLED AS REQUIRED BY THE SPECIFICATIONS OR DIRECTED BY THE ENGINEER.
2. ALL STRUCTURAL CONCRETE TO BE USED WITHIN SBCFCD RIGHT-OF-WAY SHALL BE 4,000 PSI WITH 'A' GRADATION IN ALL INVERTS AND 4,000 PSI WITH 'B' GRADATION IN ALL WALLS. CONCRETE FOR ROCK INLET AND OUTLET STRUCTURES, BOTTOM CONTROLS, SPLASH PADS AND OTHER PROPOSED STRUCTURES SHALL BE 560B OR C3250. CONCRETE SHALL BE PER SECTION 201-1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION GREENBOOK

CITY OF SAN BERNARDINO - CONCRETE ENCASEMENT
STANDARD DRAWING NO.309

20 OF 31
EXHIBIT MAP "A"
ATTACHED TO
P-22002080

PB PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 100
SAN BERNARDINO, CA 92408
JUNE 30, 2005
Project Engineer Date
Registered Civil Engineer

APPROVED July 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 46048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MD

MARK	REVISIONS	BY	APPR.	DATE

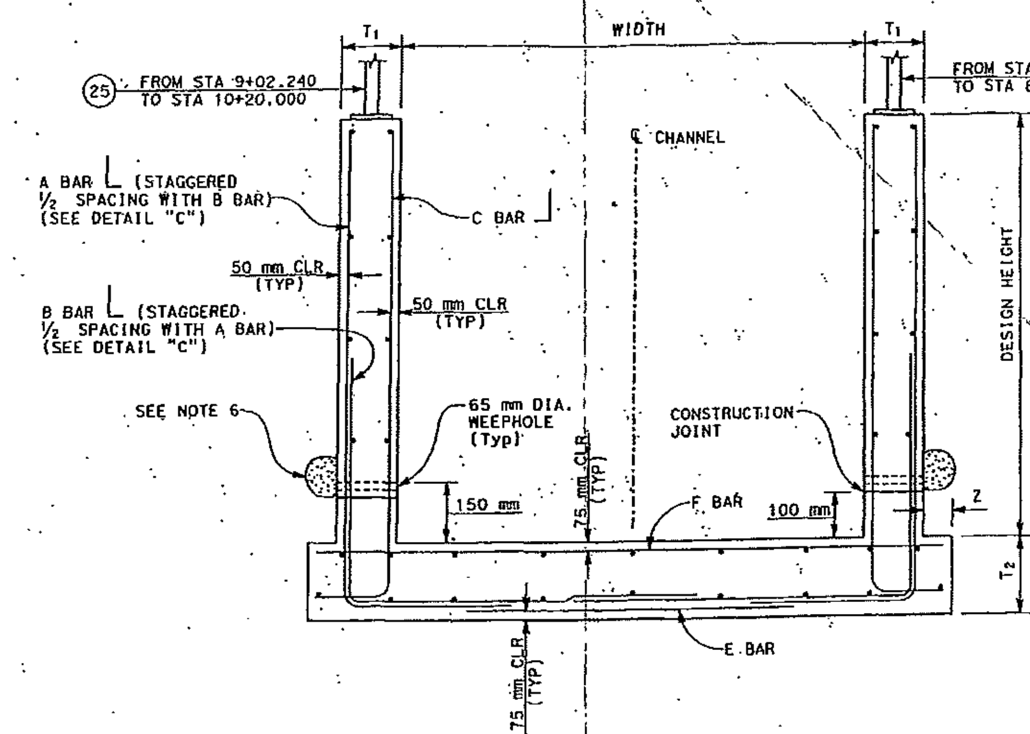
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS

DRAWING NO. SD-18
SHEET 20 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842

DATA	
WIDTH	3.962 m
DESIGN HEIGHT	2.134 m
WALL T_1	305 mm
BOTTOM SLAB T_2	457 mm
HEEL Z	152 mm
A BARS	#19 @ 610 mm
HORIZ. LENGTH	1.829 m
VERT. LENGTH	2.438 m
B BARS	#19 @ 610 mm
HORIZ. LENGTH	2.743 m
VERT LENGTH	1.500 m
C BARS	#13 @ 305 mm
HORIZ. LENGTH	356 mm
VERT. LENGTH	2.438 m
E BARS	#13 @ 305 mm
HORIZ. LENGTH	2.743 m
F BARS	#13 @ 305 mm
HORIZ. LENGTH	4.775 m
CONCRETE m^3/m	3.485
REINFORCING kg/m	112.295

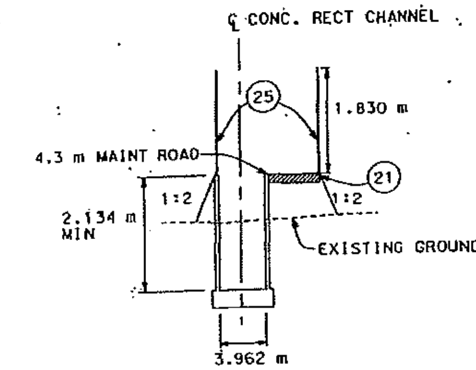


TYPICAL SECTION - TYPE II
NO SCALE

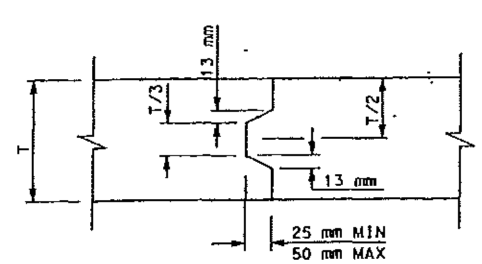
13'W - 7'H

NOTES

1. CONCRETE SHALL BE PER SECTION 201-1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. THE CHANNEL INVERT SHALL BE 385-A-28 CONCRETE AND THE CHANNEL WALLS SHALL BE 385-B-28 CONCRETE.
2. ALL LONGITUDINAL BARS SHALL BE #13 @ 460 mm UNLESS OTHERWISE NOTED. PLACE BARS IN BOTTOM SLAB SYMMETRICALLY ABOUT CENTERLINE. PLACE BARS IN WALLS STARTING AT TOP WITH 50 mm OF CLEAR COVER.
3. CLEAR COVER FOR STEEL SHALL BE 50 mm FOR WALLS AND 75 mm EACH FACE FOR BOTTOM SLAB.
4. FOR CONSTRUCTION ON CURVES, STRAIGHT TRANSVERSE BARS SHALL BE ALIGNED RADIALLY WITH SPACING MEASURED AT FACE OF WALL. FOR L-BARS IN WALLS, SPACING SHALL BE MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
5. ALL TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN A VERTICAL PLANE NORMAL TO THE CENTERLINE AND THE SPACING THEREOF SHALL NOT EXCEED 15.25m OR BE LESS THAN 3.05m. CONTINUOUS KEYWAYS SHALL BE CONSTRUCTED AS SHOWN IN DETAIL A. A COMPLETE CURTAIN OF TRANSVERSE STEEL SHALL BE PLACED 75mm FROM EACH FACE OF THE JOINT. LONGITUDINAL STEEL SHALL BE CONTINUOUS THROUGH THE JOINTS. EXPANSION JOINTS SHALL BE CONSTRUCTED ONLY BETWEEEN REINFORCED CONCRETE CHANNEL AND REINFORCED CONCRETE BOX OR TRANSITION SECTIONS AT STATIONS 8+65.240 AND 9+02.24 AS SHOWN IN DETAIL B. DOWELS SHALL BE PLACED AT 305mm SPACING CENTERED IN THE MIDDLE THIRD OF THE BOTTOM SLAB AND THE TOP THIRD OF THE SIDE WALL. A MINIMUM OF 3 DOWELS PER SLAB AND WALL SHALL BE PLACED.
6. WEEPHOLES SHALL BE FORMED AS SHOWN IN BOTH WALLS AT A SPACING OF 3.05 m WITH 0.03 CUBIC METER OF FILTER MATERIAL WRAPPED IN FILTER FABRIC PLACED AT EACH HOLE.
7. ALL QUANTITIES SHOWN ARE APPROXIMATE.
8. ALL SPLICES ARE SUBJECT TO APPROVAL BY THE ENGINEER.

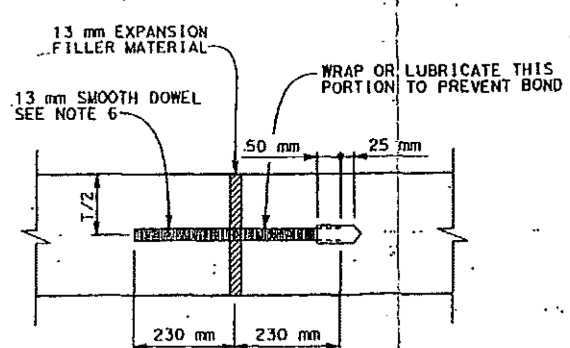


SECTION C-C
SCALE: HORIZ 1:250
VERT 1:50



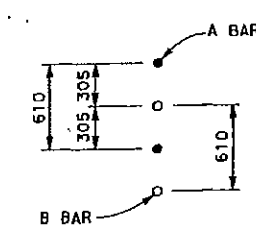
TRANSVERSE CONSTRUCTION JOINT

DETAIL A
NO SCALE



TRANSVERSE EXPANSION JOINT

DETAIL B
NO SCALE



DETAIL C
NO SCALE

CONSTRUCTION NOTES:

(21) CONSTRUCT MAINTENANCE ROAD 50 mm AC OVER 100 mm AB

(25) CONSTRUCT WROUGHT IRON FENCING PER DETAILS ON SD-29.

SHEET 21 OF 31

EXHIBIT MAP "A" ATTACHED TO

PERMIT NO. P-22002080

APPROVED July 28 2004

MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 43048

DRAWN BY: P.Tam
CHECKED BY: S.Xie
RECOMMENDED BY: R.Fares

MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
CONCRETE RECT CHANNEL TYPE II DETAILS

DRAWING NO. SD-19

SHEET 21 OF 31 SHEETS

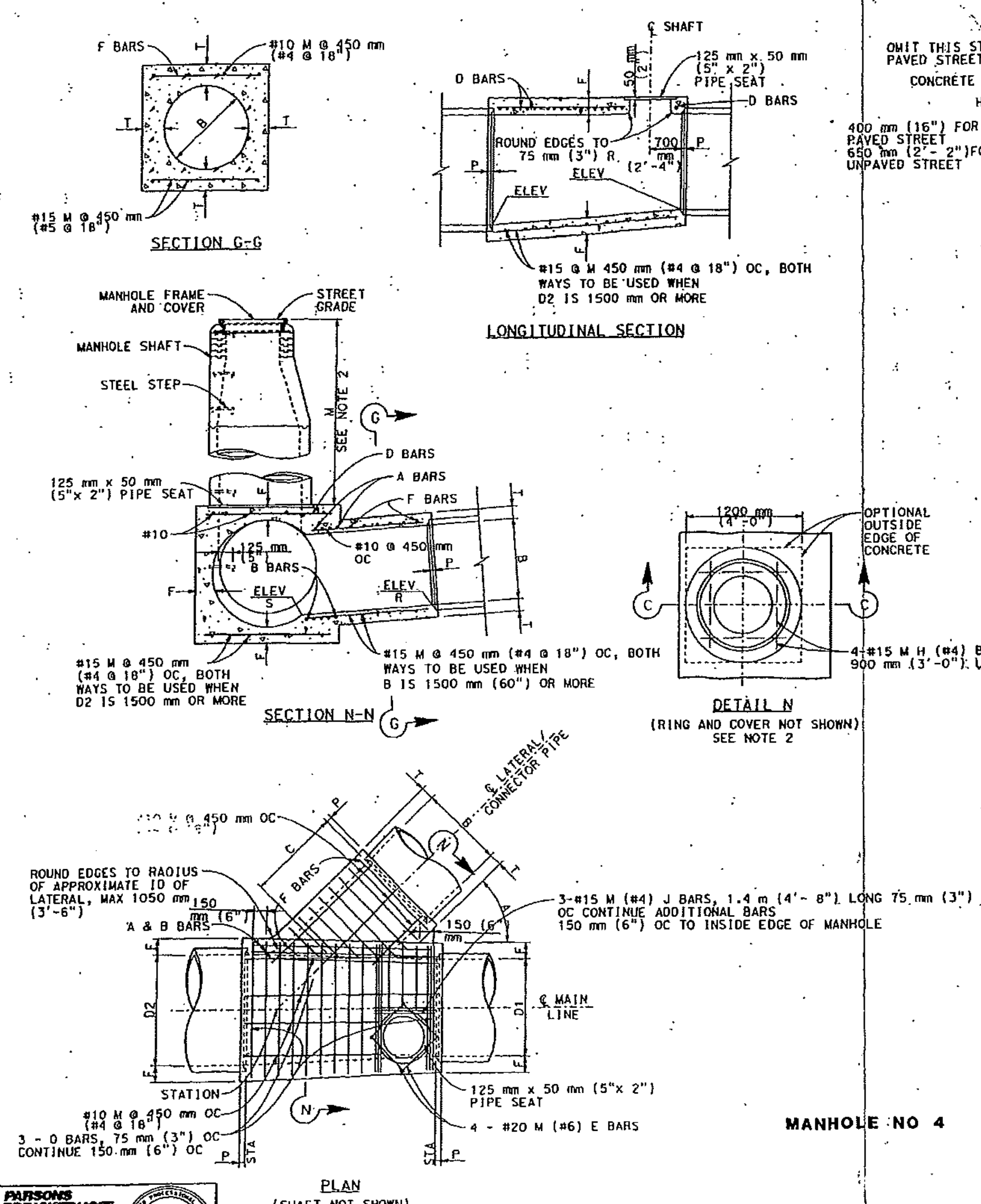
FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842

PB PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

RAYMOND FARES C49040 Exp. 9/30/04 CIVIL

MARK LANCASTER No. C 43048 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA



SECTION G-G

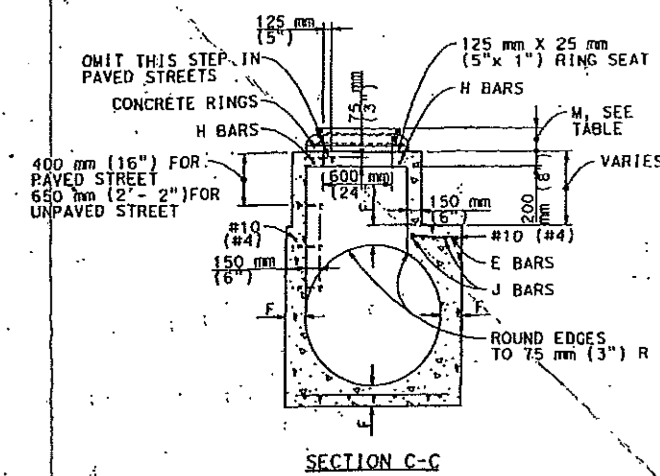
LONGITUDINAL SECTION

SECTION N-N

DETAIL N
(RING AND COVER NOT SHOWN)
SEE NOTE 2

PLAN
(SHAFT NOT SHOWN)

MANHOLE NO 4



SECTION C-C

TABLE FOR DIMENSIONS AND BAR SIZES				
D or B (mm)	F or T (mm)	A OR B BARS	D OR F BARS	P
450 (18")	115 (4 ½")	#15 @ 75 mm (#5 @ 3")	#15 @ 150 mm (#4 @ 6")	125 mm (5")
525 (21")	125 (5")			
600 (24")	140 (5 ½")			
675 (27")	140 (5 ½")			
750 (30")	160 (6 ½")			
825 (33")	160 (6 ½")			
900 (36")	165 (6 ½")			
975 (39")	180 (7")			
1050 (42")	190 (7 ½")	#20 @ 75 mm (#6 @ 3")	#15 @ 150 mm (#5 @ 6")	
1125 (45")	195 (7 ¾")			
1200 (48")	205 (8")			
1275 (51")	215 (8 ½")			
1350 (54")	230 (9")			
1425 (57")	240 (9 ½")			
1500 (60")	240 (9 ½")			
1650 (66")	260 (10 ¼")			
1800 (72")	280 (11")			
1950 (78")	300 (11¾")			
2100 (84")	320 (12 ½")			
2250 (90")	335 (13 ¼")	#25 @ 75 mm (#7 @ 3")	#20 @ 150 mm (#6 @ 6")	
2400 (96")	355 (14")			
2550 (102")	395 (15 ½")			200 mm (8")
2700 (108")	405 (16")			
2850 (114")	420 (16 ½")			
3000 (120")	430 (17")			
3150 (126")	430 (17")			
3300 (132")	445 (17 ½")			
3450 (138")	445 (17 ½")			
3600 (144")	455 (18")			

TABLE OF VALUES FOR M (SEE NOTE 2)				
SECTION	PAVED STREETS		UNPAVED STREETS	
	MAX	MIN	MAX	MIN
N-N		867 mm (2'-10 ½")		1060 mm (3'-6")
C-C	282 mm (11")	217 mm (8 ½")	410 mm (16")	380 mm (15")

NOTES:

1. VALUES FOR A, B, C, D1, D2, ELEVATION R AND ELEVATION S ARE SHOWN ON THE PROJECT DRAWINGS. ELEVATION S APPLIES AT INSIDE WALL OF STRUCTURE.
2. WHEN DEPTH M FROM STREET GRADE TO THE TOP OF THE BOX IS LESS THAN 867 mm (2'-10½") FOR PAVED STREETS OR 1060 mm (3'-6") FOR UNPAVED STREETS, CONSTRUCT MONOLITHIC SHAFT PER SECTION C-C AND DETAIL "N". SHAFT FOR ANY DEPTH OF MANHOLE MAY BE CONSTRUCTED PER SECTION C-C.
3. LENGTH OF MANHOLE MAY BE INCREASED AT OPTION TO MEET PIPE ENDS, BUT ANY CHANGE IN LOCATION OF SPUR MUST BE APPROVED BY THE ENGINEER.
4. P SHALL BE 125 mm (5") FOR D_2=2400 mm (96") OR LESS AND 200 mm (8") FOR D_2 OVER 2400 mm (96").
5. REINFORCEMENT SHALL CONFORM TO ASTM A 615M, GRADE 300 (ASTM A 615, GRADE 40) AND TERMINATE 40 mm (1-1/2") CLEAR OF CONCRETE SURFACE UNLESS OTHERWISE SHOWN.
6. FLOOR OF MANHOLE SHALL BE STEEL TROWELED TO SPRING LINE.
7. BODY OF MANHOLE SHALL BE POURED IN ONE CONTINUOUS OPERATION EXCEPT THAT A CONSTRUCTION JOINT WITH A LONGITUDINAL KEYWAY MAY BE PLACED AT SPRING LINE.
8. THICKNESS OF THE DECK SHALL VARY WHEN NECESSARY TO PROVIDE A LEVEL SEAT BUT SHALL NOT BE LESS THAN THE TABULAR VALUES OF F SHOWN ON TABLE.
9. IF LATERALS ENTER ON BOTH SIDES OF MANHOLE, SHAFT SHALL BE LOCATED ON SIDE RECEIVING THE SMALLER LATERAL.
10. STEPS SHALL BE 19 mm (3/4") ROUND GALVANIZED STEEL AND ANCHORED NOT LESS THAN 150 mm (6") IN THE WALLS OF STRUCTURE. UNLESS OTHERWISE SHOWN, THE SPACING SHALL BE 406 mm (16") OR 431 mm (17") O.C. THE LOWEST STEP SHALL NOT BE MORE THAN 760 mm (2'-6").
11. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES~~, EXCEPT REINFORCING BAR SIZES IN ENGLISH UNITS MAY BE SUBSTITUTED FOR METRIC BAR SIZES. IF ENGLISH UNITS ARE USED ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.~~

EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

PARSONS BRINCKERHOFF
505 EAST CARNEGIE DRIVE SUITE 2D
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

APPROVED June 28 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48040

DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

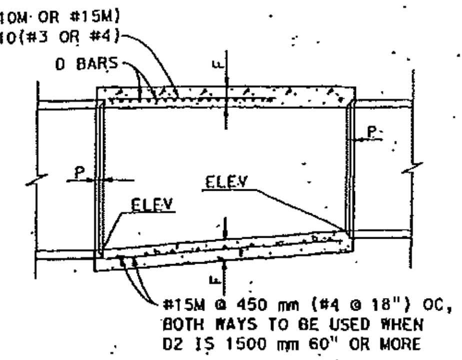
MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS

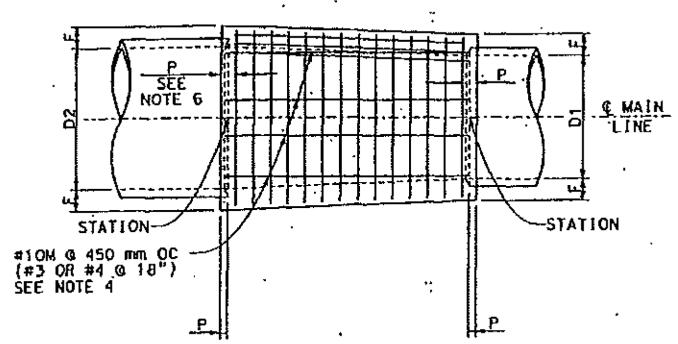
DRAWING NO. SD-20
SHEET 22 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842



LONGITUDINAL SECTION



PLAN
(SHAFT NOT SHOWN)

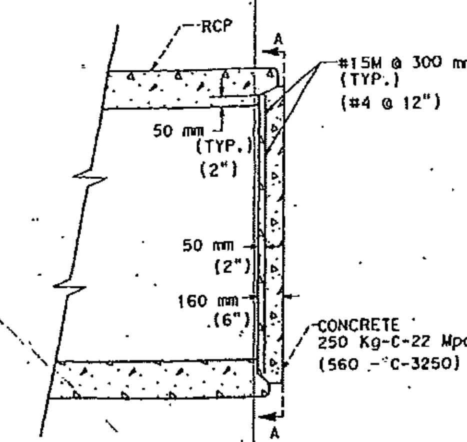
TRANSITION STRUCTURE - R.C.P. TO R.C.P.

NOTES:

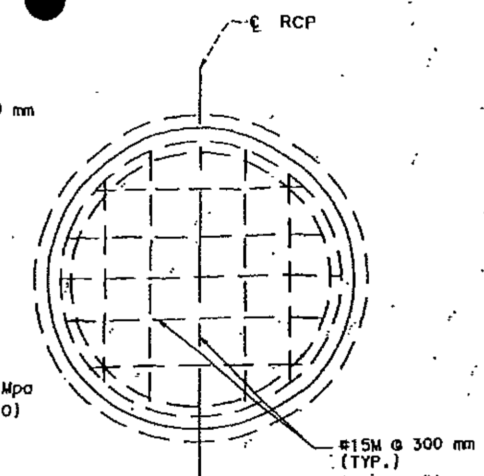
1. VALUES FOR D1 AND D2, ARE SHOWN ON THE PROJECT DRAWINGS.
2. FLOOR OF STRUCTURE SHALL BE STEEL TROWELED TO SPRING LINE.
3. REINFORCEMENT STEEL SHALL CONFORM TO ASTM A 615 m (A 615). GRADE 300(40). AND SHALL TERMINATE 40 mm (1 ½") CLEAR OF CONCRETE SURFACES UNLESS OTHERWISE SHOWN. LONGITUDINAL BARS SHALL BE 10M @ 450 mm (#3 OR #4 @ 18") OC OR LESS.
4. TRANSITION STRUCTURE SHALL BE POURED IN ONE CONTINUOUS OPERATION; EXCEPT THAT THE CONTRACTOR SHALL HAVE THE OPTION OF PLACING AT THE SPRING LINE A CONSTRUCTION JOINT LONGITUDINAL KEYWAY.
5. THE LENGTH OF THE STRUCTURE MAY BE INCREASED AT THE OPTION OF THE CONTRACTOR TO MEET RCP END, USING D BARS, LONGITUDINAL AND BOTTOM REINFORCEMENT IN EXTENDED PORTION OF SAME DIAMETER AND SPACING AS SPECIFIED IN THE TABLE.
6. EMBEDMENT P SHALL BE AS SPECIFIED IN THE TABLE, UNLESS OTHERWISE SHOWN ON THE PROJECT DRAWINGS.

TABLE
FOR DIMENSIONS
AND BAR SIZES

D_2 (mm)	D_2 (INCHES)	F (mm)	F (INCHES)	D BARS	P (RCP)
300	12	110	4	#15M@150 mm (#4@6") OC	125 mm (5")
375	15	110	4 ¼		
450	18	120	4 ½		
525	21	130	5		
600	24	140	5 ¼		
675	27	140	5 ½		
750	30	160	6		
825	33	160	6 ¼		
900	36	170	6 ½	#15M@150 mm (#5@6") OC	
975	39	180	7		
1050	42	190	7 ½		
1125	45	200	7 ¾		
1200	48	210	8		
1275	51	220	8 ½		
1350	54	230	9		
1425	57	240	9 ¼		
1500	60	250	9 ½		
1575	63	260	10		
1650	66	260	10 ¼		
1725	69	280	10 ¾	#20M@150 mm (#6@6") OC	
1800	72	280	11		
1950	78	300	11 ¾		200 mm (8")
2100	84	320	12 ½		
2250	90	340	13 ¼		
2400	96	360	14		
2550	102	400	15 ½		
2700	108	410	16		
2850	114	420	16 ½		
3000	120	440	17		
3150	126	440	17		
3300	132	450	17 ½		
3450	138	450	17 ½		
3600	144	460	18		



BULKHEAD DETAIL
NOT TO SCALE



SECTION A - A

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 120
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

SHEET 23 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

REGISTERED PROFESSIONAL ENGINEER MARK LANCASTER No. C 40049 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 40049
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS

DRAWING NO. SD-21
SHEET 23 OF 31 SHEETS

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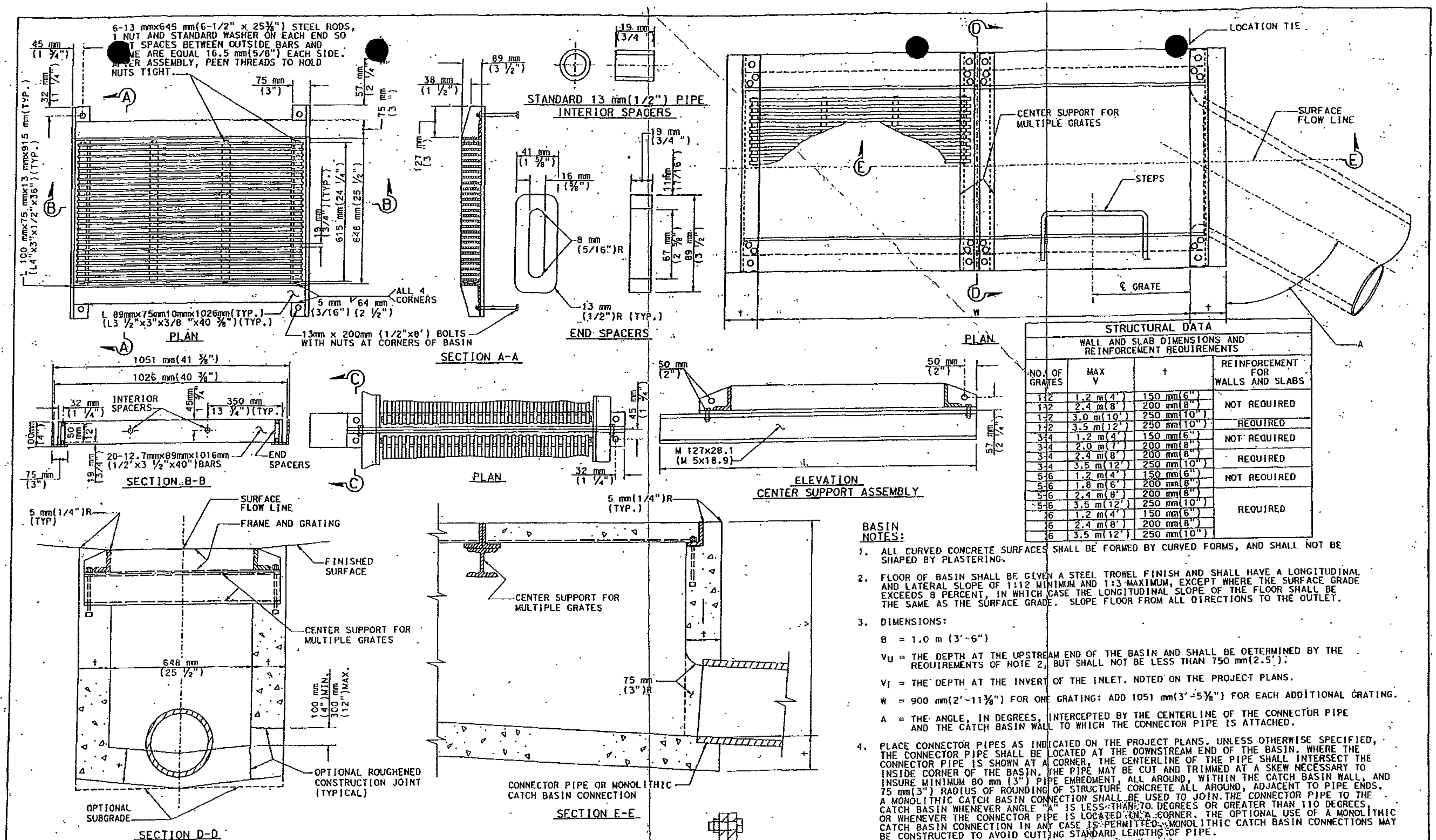
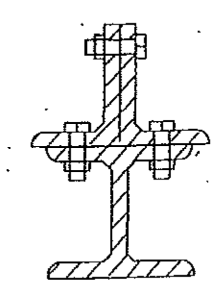
DRAWING NO. 10842





STRUCTURAL DATA

WALL AND SLAB DIMENSIONS AND REINFORCEMENT REQUIREMENTS

NO. OF GRATES	MAX V	t	REINFORCEMENT FOR WALLS AND SLABS
1-2	1.2 m(4')	150 mm(6")	NOT REQUIRED
1-2	2.4 m(8')	200 mm(8")	
1-2	3.0 m(10')	250 mm(10")	
1-2	3.5 m(12')	250 mm(10")	REQUIRED
3-4	1.2 m(4')	150 mm(6")	NOT REQUIRED
3-4	2.0 m(7')	200 mm(8")	
3-4	2.4 m(8')	200 mm(8")	REQUIRED
3-4	3.5 m(12')	250 mm(10")	
5-6	1.2 m(4')	150 mm(6")	NOT REQUIRED
5-6	1.8 m(6')	200 mm(8")	
5-6	2.4 m(8')	200 mm(8")	REQUIRED
5-6	3.5 m(12')	250 mm(10")	
>6	1.2 m(4')	150 mm(6")	
>6	2.4 m(8')	200 mm(8")	
>6	3.5 m(12')	250 mm(10")	

BASIN NOTES:

1. ALL CURVED CONCRETE SURFACES SHALL BE FORMED BY CURVED FORMS, AND SHALL NOT BE SHAPED BY PLASTERING.
2. FLOOR OF BASIN SHALL BE GIVEN A STEEL TROWEL FINISH AND SHALL HAVE A LONGITUDINAL AND LATERAL SLOPE OF 1:12 MINIMUM AND 1:3 MAXIMUM, EXCEPT WHERE THE SURFACE GRADE EXCEEDS 8 PERCENT, IN WHICH CASE THE LONGITUDINAL SLOPE OF THE FLOOR SHALL BE THE SAME AS THE SURFACE GRADE. SLOPE FLOOR FROM ALL DIRECTIONS TO THE OUTLET.
3. DIMENSIONS:

   B = 1.0 m (3'-6")

   V_U = THE DEPTH AT THE UPSTREAM END OF THE BASIN AND SHALL BE DETERMINED BY THE REQUIREMENTS OF NOTE 2, BUT SHALL NOT BE LESS THAN 750 mm(2.5').

   V_I = THE DEPTH AT THE INVERT OF THE INLET. NOTED ON THE PROJECT PLANS.

   W = 900 mm(2'-11⅜") FOR ONE GRATING: ADD 1051 mm(3'-5⅜") FOR EACH ADDITIONAL GRATING.

   A = THE ANGLE, IN DEGREES, INTERCEPTED BY THE CENTERLINE OF THE CONNECTOR PIPE AND THE CATCH BASIN WALL TO WHICH THE CONNECTOR PIPE IS ATTACHED.
4. PLACE CONNECTOR PIPES AS INDICATED ON THE PROJECT PLANS. UNLESS OTHERWISE SPECIFIED, THE CONNECTOR PIPE SHALL BE LOCATED AT THE DOWNSTREAM END OF THE BASIN. WHERE THE CONNECTOR PIPE IS SHOWN AT A CORNER, THE CENTERLINE OF THE PIPE SHALL INTERSECT THE INSIDE CORNER OF THE BASIN. THE PIPE MAY BE CUT AND TRIMMED AT A SKEW NECESSARY TO INSURE MINIMUM 80 mm (3") PIPE EMBEDMENT, ALL AROUND, WITHIN THE CATCH BASIN WALL, AND 75 mm(3") RADIUS OF ROUNDING OF STRUCTURE CONCRETE ALL AROUND, ADJACENT TO PIPE ENDS. A MONOLITHIC CATCH BASIN CONNECTION SHALL BE USED TO JOIN THE CONNECTOR PIPE TO THE CATCH BASIN WHENEVER ANGLE "A" IS LESS THAN 70 DEGREES OR GREATER THAN 110 DEGREES, OR WHENEVER THE CONNECTOR PIPE IS LOCATED IN A CORNER. THE OPTIONAL USE OF A MONOLITHIC CATCH BASIN CONNECTION IN ANY CASE IS PERMITTED. MONOLITHIC CATCH BASIN CONNECTIONS MAY BE CONSTRUCTED TO AVOID CUTTING STANDARD LENGTHS OF PIPE.
5. STEPS SHALL BE LOCATED AS SHOWN. IF THE CONNECTOR PIPE INTERFERES WITH THE STEPS, THEY SHALL BE LOCATED ON THE OPPOSITE WALL AT THE CENTERLINE OF THE DOWNSTREAM GRATING. STEPS SHALL BE SPACED 300 mm(12") APART. THE TOP STEP SHALL BE 175 mm (7") BELOW THE TOP OF THE GRATING AND PROJECT 65 mm(2 ½"). ALL OTHER STEPS SHALL PROJECT 130 mm(5").

GRATING NOTES:

1. ALL PARTS SHALL BE STEEL, EXCEPT THAT END SPACERS MAY BE CAST IRON.
2. ALL PARTS SHALL BE GALVANIZED AFTER FABRICATION, EXCEPT THAT GRATINGS SHALL BE ASSEMBLED AFTER COMPONENT PARTS ARE GALVANIZED.
3. ALL DIMENSIONS ARE FINISHED DIMENSIONS AND INCLUDE GALVANIZING.
4. ALL BOLT HOLES SHALL BE 16 mm(5/8") DIAMETER.
5. ALL THREADS SHALL BE NATIONAL COARSE SERIES(NC).
6. CENTER SUPPORT ASSEMBLY REQUIRED WHEN TWO OR MORE GRATINGS ARE SPECIFIED ON PLANS.

PB PARSONS BRINCKERHOFF
505 EAST CARNEGIE DRIVE SUITE 100
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER MARK LANCASTER No. C 45048 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	BY	APPR.	DATE

APPROVED Jul 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 45048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS

DRAWING NO. SD-22
SHEET 24 OF 31 SHEETS

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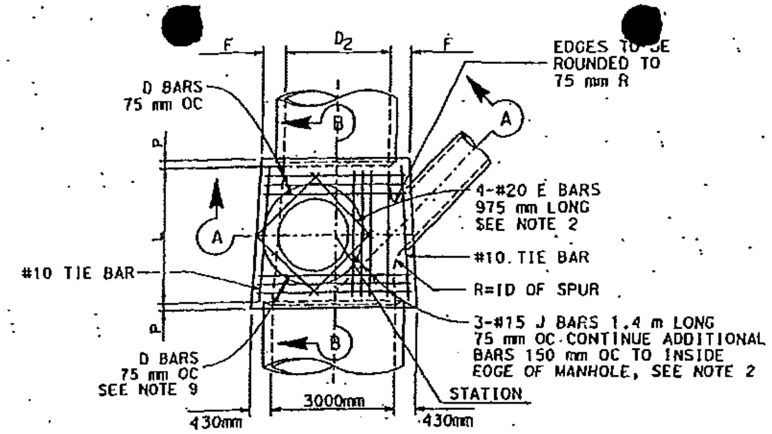
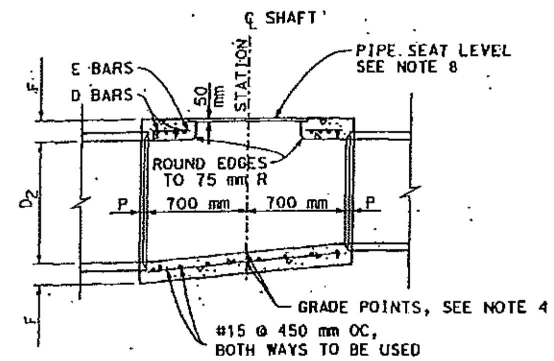
EXHIBIT "A" ATTACHED TO

DRAWING NO. 10842

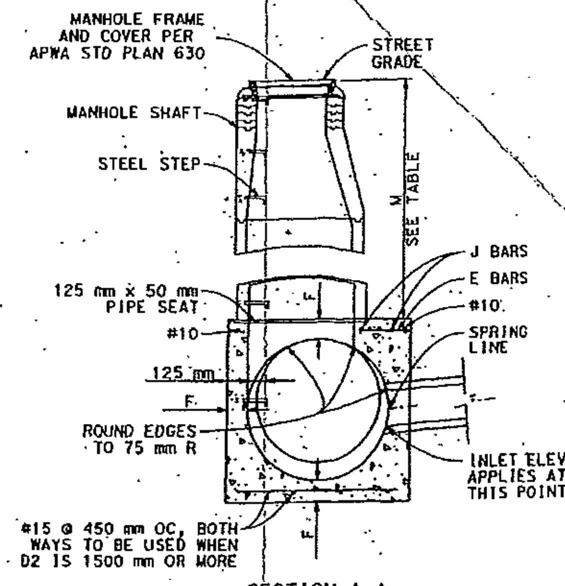
P-22002080



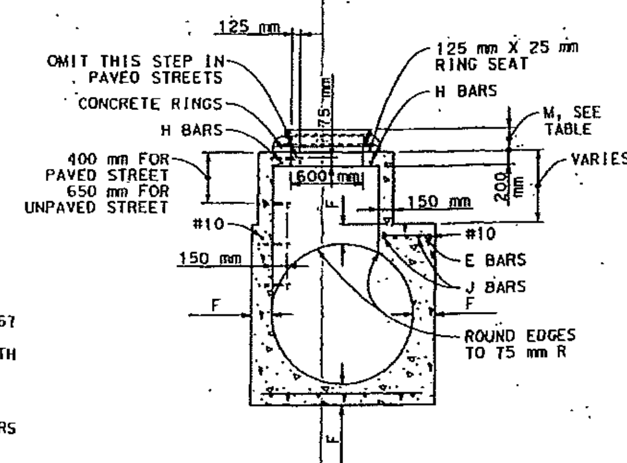
PLAN
(SHAFT NOT SHOWN)



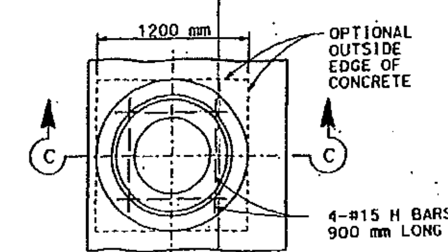
SECTION B-B



SECTION A-A



SECTION C-C



DETAIL N
(RING AND COVER NOT SHOWN)
SEE NOTE 1

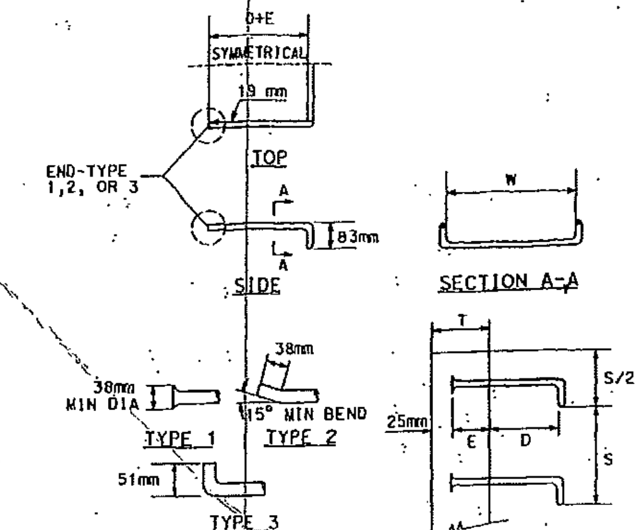
NOTES:

1. WHEN DEPTH M FROM STREET GRADE TO THE TOP OF THE BOX IS LESS THAN 867 mm FOR PAVED STREETS OR 1060 mm FOR UNPAVED STREETS, CONSTRUCT MONOLITHIC SHAFT PER SECTION C-C AND DETAIL "N". SHAFT FOR ANY DEPTH OF MANHOLE MAY BE CONSTUCTED PER SECTION C-C. WHEN DIAMETER D1 IS 1200 mm OR LESS, CENTER OF SHAFT MAY BE LOCATED PER NOTE 2.
2. CENTER OF MANHOLE SHAFT SHALL BE LOCATED OVER CENTER LINE OF STORM DRAIN WHEN DIAMETER D1 IS 1200 mm OR LESS, IN WHICH CASE PLACE E BARS SYMMETRICALLY AROUND SHAFT AT 45° WITH CENTER LINE.
3. L AND P SHALL HAVE THE FOLLOWING VALUES UNLESS OTHERWISE SHOWN ON PROJECT PLANS:
   A. D2=2400 mm OR LESS, L=1.7 m , P=130 mm
   B. D2 OVER 2400, L=1.8 m, P=210 mm
   L MAY BE INCREASED OR LOCATION OF MANHOLE SHIFTED TO MEET PIPE ENDS. WHEN L GREATER THAN THAT SHOWN ABOVE IS SPECIFIED, D BARS SHALL BE CONTINUED 150 mm OC.
4. STATIONS OF MANHOLES SHOWN ON PROJECT DRAWINGS APPLY AT CENTER LINE OF SHAFT. SPUR ELEVATIONS ARE SHOWN AT INSIDE WALL OF STRUCTURE.
5. REINFORCEMENT SHALL CONFORM TO ASTM A 615, GRADE 300, AND TERMINATE 40 mm CLEAR OF CONCRETE SURFACE UNLESS OTHERWISE SHOWN.
6. FLOOR OF MANHOLE SHALL BE STEEL TROWELED TO SPRING LINE.
7. BODY OF MANHOLE SHALL BE POURED IN ONE CONTINUOUS OPERATION EXCEPT THAT A CONSTRUCTION JOINT WITH A LONGITUDINAL KEYWAY MAY BE PLACED AT SPRING LINE.
8. THICKNESS OF THE DECK SHALL VARY WHEN NECESSARY TO PROVIDE A LEVEL SEAT BUT SHALL NOT BE LESS THAN THE TABULAR VALUES OF F SHOWN ON TABLE.
9. D BARS SHALL BE #15 FOR D2=2100 mm OR LESS, AND #20 FOR D2 OVER 2100 mm.
10. CENTER LINE OF INLET PIPE SHALL INTERSECT INSIDE FACE OF CONE AT SPRING LINE UNLESS OTHERWISE SHOWN.
11. STEPS SHALL BE UNIFORMLY SPACED 350 mm TO 375 mm OC. THE LOWEST STEP SHALL NOT BE MORE THAN 600 mm ABOVE THE INVERT.

TABLE OF VALUES FOR M
(SEE NOTE 1 OF MANHOLE DETAIL)

SECTION	PAVED STREETS		UNPAVED STREETS	
	MAX	MIN	MAX	MIN
A-A		867 mm		1060 mm
C-C	282 mm	217 mm	410 mm	380 mm

30 MANHOLE DETAIL



END DETAILS-SIDE VIEW

INSTALLATION DETAIL

UNLESS OTHERWISE NOTED:
D=175mm
E=150mm OR T-25mm, WHICHEVER IS LESS
MINIMUM E IS 75mm
S=400mm MAX, EVENLY SPACED
W=350mm MIN

TABLE OF VALUES FOR F

D2 (mm)	F (mm)
600	200
1500	250
1800	280
3000	430

STEEL STEP DETAIL

NOTES:

1. STEPS SHALL BE STEEL CONFORMING TO ASTM A307 AND SHALL BE GALVANIZED AFTER FABRICATION. UNLESS OTHERWISE NOTED, STEPS MAY ALSO BE POLYPROPYLENE STEPS, STEEL REINFORCED, CONFORMING TO APWA STD PLAN 636.
2. IF STAINLESS STEEL STEPS ARE REQUIRED, THE MATERIAL SHALL CONFORM TO ASTM A276, 300 SERIES.
3. STEP ENDS MAY BE TYPE 1,2, OR 3, AS SHOWN.
4. BOTTOM STEP SHALL BE A MAXIMUM OF 600mm ABOVE FLOOR OR SHELF.
5. STEPS WITH TYPE 1 OR 2 ENDS MAY BE CAST IN PLACE, OR PLACED IN THE CENTER OF 40mm MIN DIA DRILLED OR FORMED HOLES AND SET WITH HIGH STRENGTH NON-SHRINK GROUT, 40mPa (6000 PSI) MIN. STEPS WITH TYPE 3 ENDS SHALL BE CAST IN PLACE.

SHEET 25 OF 31

EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

REGISTERED PROFESSIONAL ENGINEER MARK LANCASTER No. C 46048 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

PB PARSONS BRINCKERHOFF
625 EAST CARNEGIE DRIVE SUITE 200
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 46048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS

DRAWING NO. SD-23
SHEET 25 OF 31 SHEETS

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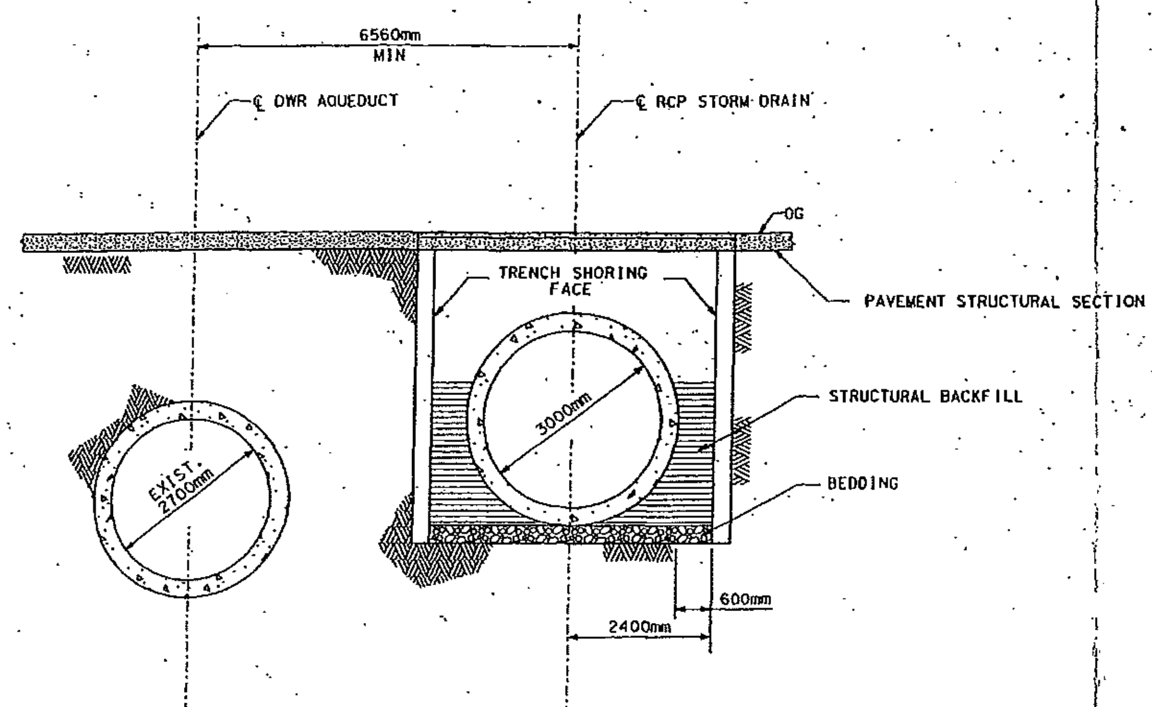
DRAWING NO. 10842

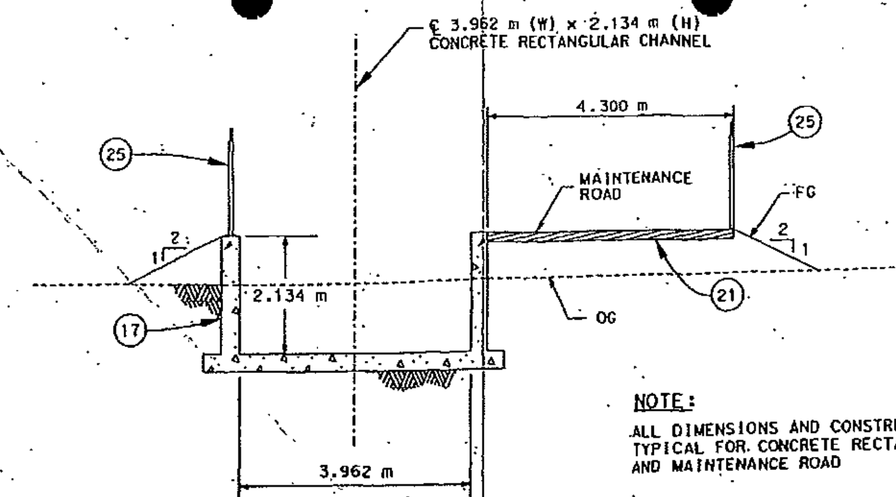


STATION 13+00
TRENCH DETAIL

NOTES:

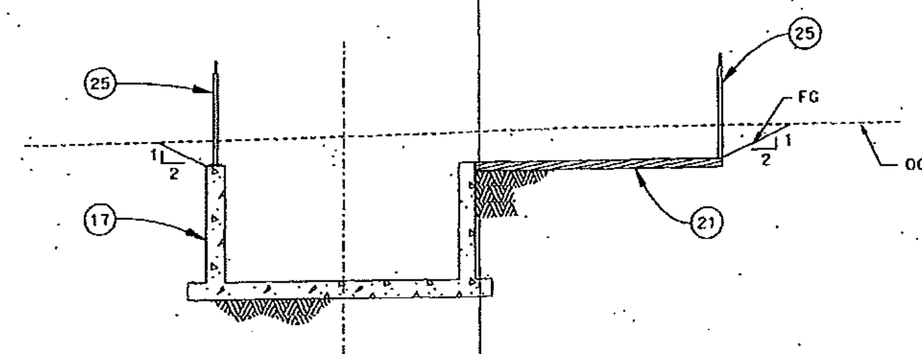
1. UNLESS OTHERWISE SHOWN ON THE PLANS OR SPECIFIED, THE CONTRACTOR SHALL HAVE THE OPTION OF SELECTING THE CLASS OF RCP AND THE TYPE OF INSTALLATION TO BE USED, PROVIDED THE HEIGHT OF COVER DOES NOT EXCEED THE VALUE FOR THE RCP SELECTED.
2. ALL MATERIALS USED FOR SHORING, SHEETING, AND LAGGING SHALL BE FREE FROM DEFECTS AND DAMAGE THAT MIGHT IN ANY WAY IMPAIR THEIR PROTECTIVE FUNCTION. THE GRADE OR STRUCTURAL PROPERTIES OF MATERIALS USED FOR SHORING SHALL CORRESPOND TO THAT SPECIFIED IN THE UNIFORM BUILDING COOE OR CURRENT STANDARO GRADING AND DRESSING RULES OF THE WEST COAST LUMBERMANS ASSOCIATION AS APPLICABLE FDR THE STRESSED USED.
3. SHORING FOR EXCAVATIONS SHALL CONSIST OF MAIN HORIZONTAL AND VERTICAL SPACING, WOOD SHORING MEMBERS IN CONTACT WITH THE GROUND SHALL BE NOT LESS THAN 50mm THICK AND 200mm WIDE, SPACED EVERY 2400mm EXTENDING FROM TOP TO BOTTOM.
4. SHORING FOR EXCAVATIONS SHALL BE DESIGNED BY A CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA. SHORING FOR EXCAVATIONS SHALL BE DESIGNED TO WITHSTAND NOT LESS THAN THE LOADS INDICATED FOR THE CASE INVOLVED.
5. ALLOWABLE DESIGN STRESSES FOR LUMBER USEO FOR SHORING FOR EXCAVATION SHALL BE PER THE CURRENT EDITION OF STANDARD GRADING AND DRESSING RULES OF THE WEST COAST LUMBERMANS ASSOCIATION, EXCEPT THEY MAY BE INCREASED BY 33% .
6. THE CONSTRACTOR SHALL OBTAIN APPROVAL FROM THE STATE OIVISION OF INDUSTRIAL SAFETY OF SHORING TO BE USED AND SHALL THEN FURNISH OETAILS OF SAIO SHORING TO THE CITY FOR USE IN THE INSPECTION OF THE PROJECT.

PB PARSONS BRINCKERHOFF
505 EAST CARNEGIE DRIVE SUITE 200
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer



NOTE:
ALL DIMENSIONS AND CONSTRUCTION NOTES TYPICAL FOR CONCRETE RECTANGULAR CHANNEL AND MAINTENANCE ROAD

SECTION C-C
STATION 9+40



SECTION D-D
STATION 10+12

CONSTRUCTION NOTES:

(17) CONSTRUCT CONCRETE RECTANGULAR CHANNEL TYPE II PER DETAILS ON DRAWING NO. SD-29

(21) CONSTRUCT MAINTENANCE ROAD 50 mm AC OVER 100 mm AB

(25) CONSTRUCT WROUGHT IRON FENCING PER DETAILS ON SD-29

SHEET 26 OF 31
EXHIBIT MAP "A"
ATTACHED TO
PERMIT NO. P-22002080

3.962 m (W) x 2.134 m (H)
CONCRETE RECTANGULAR CHANNEL
TYPICAL CROSS SECTIONS

SCALE: HORIZ 1:50
VERT 1:50

REGISTERED PROFESSIONAL ENGINEER MARK LANCASTER No. C 48048 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	BY	APPR.	DATE

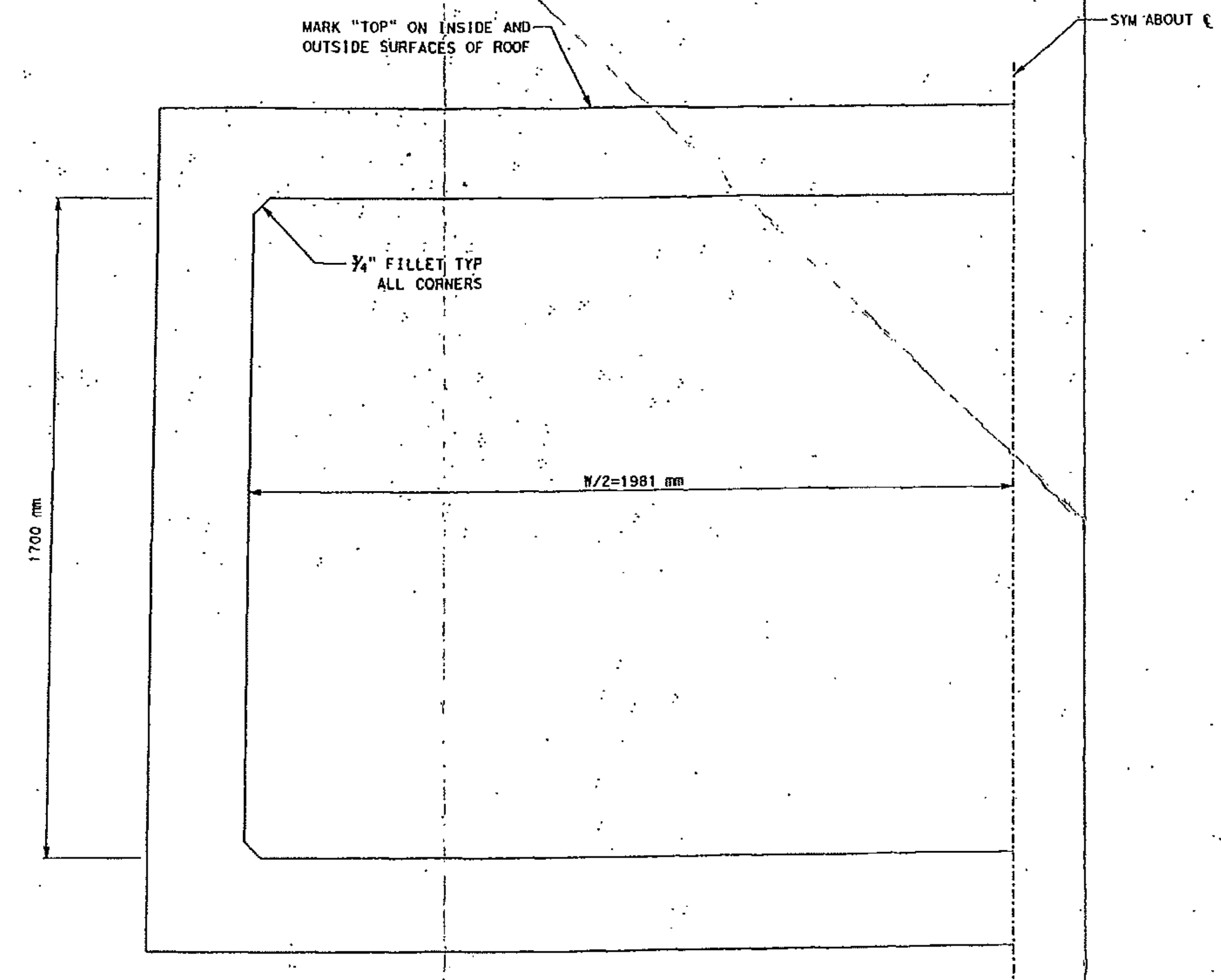
APPROVED July 26 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48048
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MB

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
DETAILS & CROSS SECTIONS

DRAWING NO. SD-24
SHEET 26 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842



TYPICAL PRECAST
3962 mm (13') W x 1700 mm (5'-7") H
RC BOX SECTION

NO SCALE

NOTES:

SEE CALTRANS STANDARD PLAN NO. D80.
FOR REINFORCING AND OTHER DETAILS
SEE DRAWING NO. SD-26 FOR JOINT DETAILS

SHEET 27 OF 31

EXHIBIT MAP "A" ATTACHED TO

PERMIT NO. P-22002080

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408

JUNE 30, 2003

Project Engineer Date
Registered Civil Engineer

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 20 2004

MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48046

DRAWN BY: MS
CHECKED BY: RD
RECOMMENDED BY: SG

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS

PRECAST RCB DETAIL

DRAWING NO. SD-25

SHEET 27 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. 10842

GENEREAL NOTES

DESIGNATION:
CAST-IN-PLACE
CAST-IN-PLACE BOX CULVERTS ARE SHOWN ON PLANS AS SPAN TIMES HEIGHT AND SECTION NO. THUS: RCB STATION NO. XX

PRECAST
PRECAST BOX CULVERTS ARE SHOWN ON PLAN. THUS: PRECAST 8x5 RCB SECTION NO. XX.

QUANTITIES
QUANTITIES ARE APPROXIMATED AND ARE FOR DESIGN PURPOSES ONLY AND DO NOT INCLUDE SPLICES ON LONGITUDINAL BARS, NOR CONCRETE OR REINFORCEMENT FOR PARAPETS, CUT-OFF WALLS OR PAVING NOTCHES.

REINFORCEMENT PLACEMENT
TRANSVERSE REINFORCEMENT IS TO BE PLACED PERPENDICULAR TO THE BOX CENTERLINE OR FOR THE CURVED CULVERTS, RADIALLY.

THE SPACING OF STRAIGHT TRANSVERSE BARS IN TOP AND BOTTOM SLABS SHALL BE MEASURED AT THE CENTERLINE OF CONSTRUCTION.

THE SPACING OF STRAIGHT BARS AND L-BARS IN WALL SHALL BE MEASURED BETWEEN THE VERTICAL LEGS OF BARS.

AT THE BEGINNING AND ENDING OF ALL POURS, A CURTAIN OF REINFORCEMENT COMPOSED OF B, C, C2, D, F, G AND H BARS SHALL BE PLACED THREE INCHES FROM THE TRANSVERSE CONSTRUCTION JOINT.

D-BARS MAY BE SPLICED 30 BAR DIAMETERS AT THE LOWER LONGITUDINAL CONSTRUCTION JOINT, AT CONTRACTOR'S OPTION.

IN ALL SECTIONS LAP C AND C2 BARS. THE VERTICAL LENGTH OF C AND C2 HAS BEEN CALCULATED FOR A FOUR INCH STARTER WALL. IF THE HEIGHT OF THE STARTER WALL IS VARIED, THE VERTICAL LENGTH OF THE C AND C2 BARS SHALL BE VARIED CORRESPONDINGLY SO AS TO MAINTAIN THE LAP LENGTH BETWEEN THE TWO BARS.

THE TRANSVERSE REINFORCING STEEL SHALL TERMINATE ONE AND ONE-HALF INCHES FROM THE CONCRETE SURFACES UNLESS OTHERWISE SHOWN ON THE STRUCTURAL DETAILS.

NO SPLICES IN TRANSVERSE STEEL REINFORCEMENT WILL BE PERMITTED OTHER THAN SHOWN ON THE DRAWING WITHOUT APPROVAL OF THE ENGINEER.

NO MORE THAN TWO SPLICES WILL BE PERMITTED IN ANY LONGITUDINAL BAR BETWEEN TRANSVERSE JOINTS, SPLICES SHALL BE STAGGERED.

LONGITUDINAL STEEL SHALL BE LAPPED 30 BAR DIAMETERS AT SPLICES EXCEPT AS NOTED.

LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL CONSTRUCTION JOINTS.

CONCRETE PLACEMENT
CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONTALLY OR VERTICALLY ON THE PROFILE, AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN.

CONSTRUCTION JOINTS
TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.

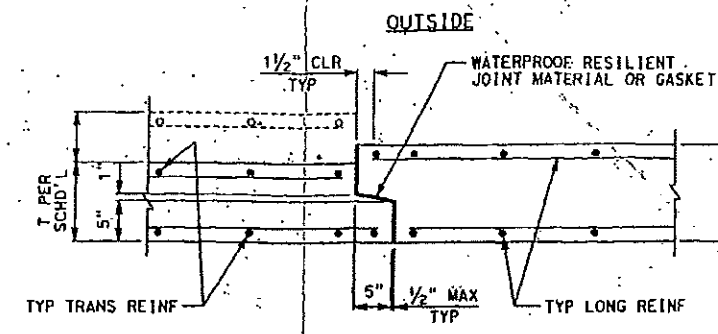
TRANSVERSE CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO THE CENTERLINE OF CONSTRUCTION.

UNLESS OTHERWISE SHOWN ON THE DRAWINGS, TRANSVERSE CONSTRUCTION JOINTS (IN SLABS AND WALLS) SHALL BE PLACED AT THE END OF EACH POUR, GRADE BREAK, AND BC AND EC. BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET OR BE LESS THAN 10 FEET EXCEPT AS NOTED.

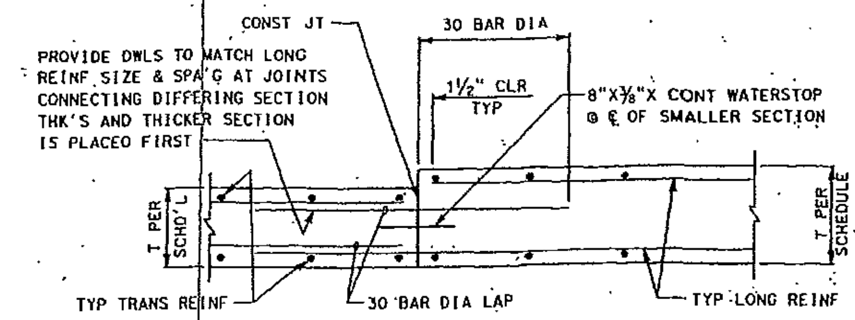
BACKFILLING
DIFFERENCE IN LEVEL OF BACKFILL AGAINST WALLS SHALL NOT EXCEED 2 FT.

PRECAST BOX SECTIONS
SECTION THICKNESS AND REINFORCING SHOWN ARE DESIGNED TO BE ADEQUATE FOR CONDITIONS AFTER PLACEMENT. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL STRENGTHENING AND BRACING REQUIRED FOR TRANSPORTING, LIFTING AND PLACING THE SECTIONS IN THEIR FINAL POSITION. THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS AND CALCULATIONS FOR ALL PROPOSED MODIFICATIONS OF THE DESIGN SECTIONS TO THE ENGINEER FOR REVIEW PRIOR TO BEGINNING FABRICATION.

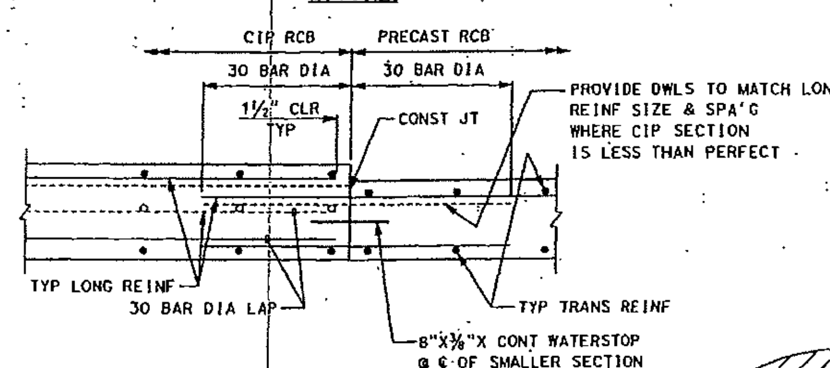
ALL JOINTS SHALL BE SEALED OR GASKETED TO PROVIDE A WATERTIGHT SEAL TO WITHSTAND A MINIMUM WATER HEAD OF 25 FT.



PRECAST RCB TRANSVERSE JOINT
NO SCALE

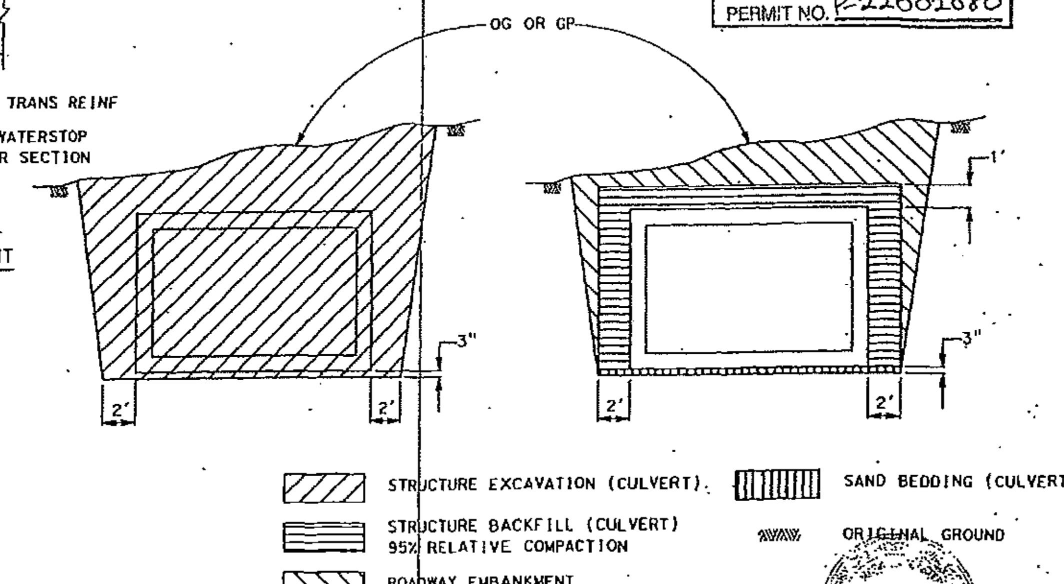


CIP RCB TRANSVERSE JOINT
NO SCALE



CIP/PRECAST RCB TRANSVERSE JOINT
NO SCALE

SHEET 28 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080



PRECAST RCB EXCAVATION AND BACKFILL DETAILS
NO SCALE

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 20 2004
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 46018
DRAWN BY: CH
CHECKED BY: FL
RECOMMENDED BY: MD

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
RCB DETAILS

DRAWING NO. SD-26
SHEET 28 OF 31 SHEETS

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

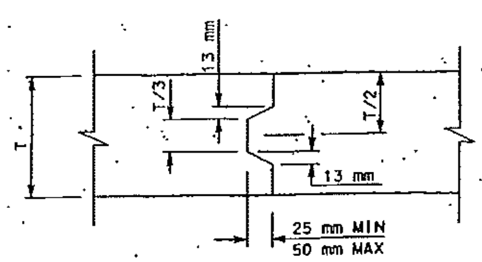
DRAWING NO. 10842

PB PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 110
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

A **	
WIDTH	3.962 m
HEIGHT	2.134 m
WALL T_1	305 mm
BOTTOM SLAB T_2	457 mm
HEEL Z	152 mm
A BARS	#19 @ 450 mm *
HORIZ. LENGTH	1.829 m
VERT. LENGTH	2.438 m
B BARS	#19 @ 450 mm
HORIZ. LENGTH	2.743 m
VERT LENGTH	1.067 m
C BARS	#16 @ 305 mm *
HORIZ. LENGTH	356 mm
VERT. LENGTH	2.438 m
E BARS	#13 @ 305 mm
HORIZ. LENGTH	2.743 m
F BARS	#13 @ 305 mm
HORIZ. LENGTH	4.775 m
CONCRETE m^3/m	3.912
REINFORCING kg/m	458.168

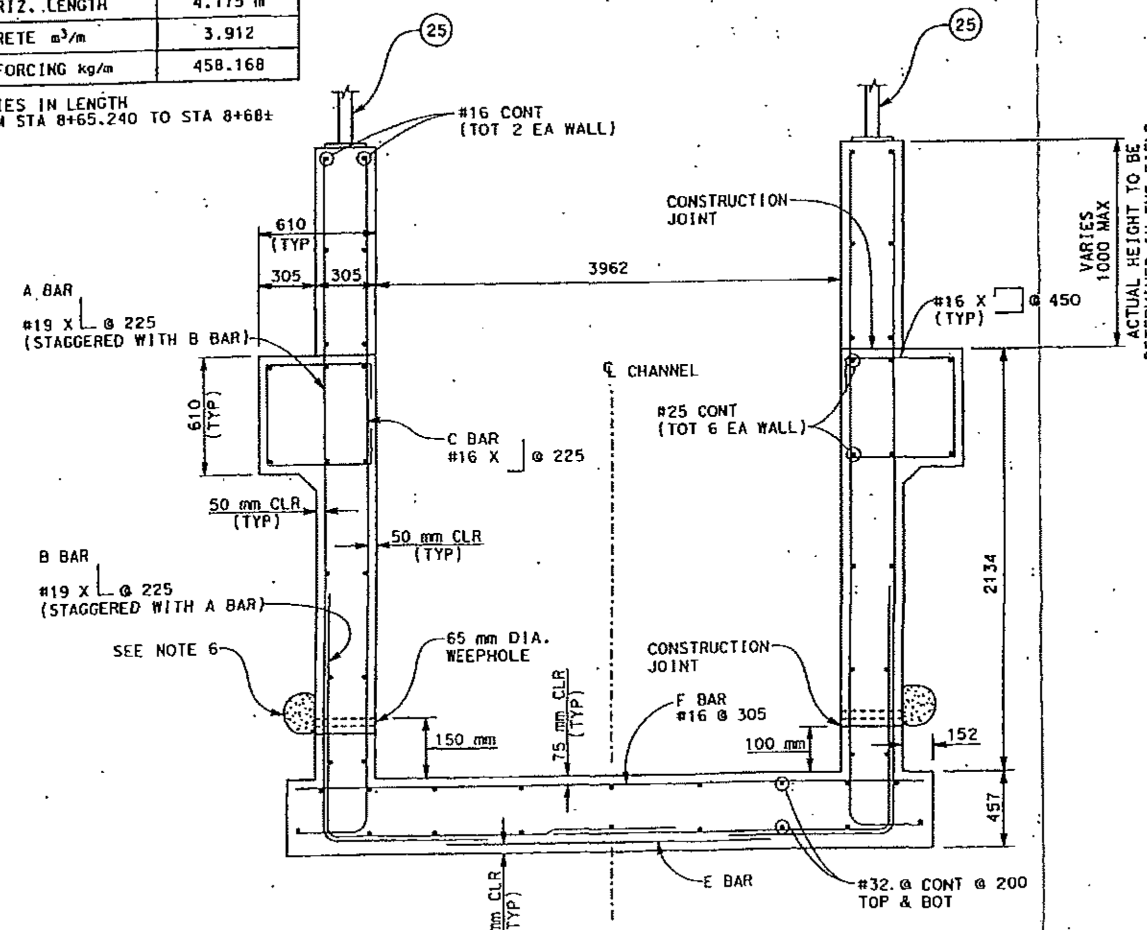
* VARIES IN LENGTH FROM STA 8+65.240 TO STA 8+68±

** CHANNEL TYPE I FROM STA 8+65.24 TO STA STA 9+02.24



TRANSVERSE CONSTRUCTION JOINT

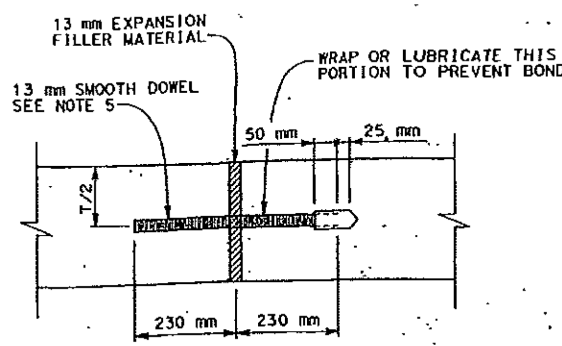
DETAIL A
NO SCALE



CHANNEL TYPE I FROM
STA 8+65.24 TO STA 8+68±
NO SCALE

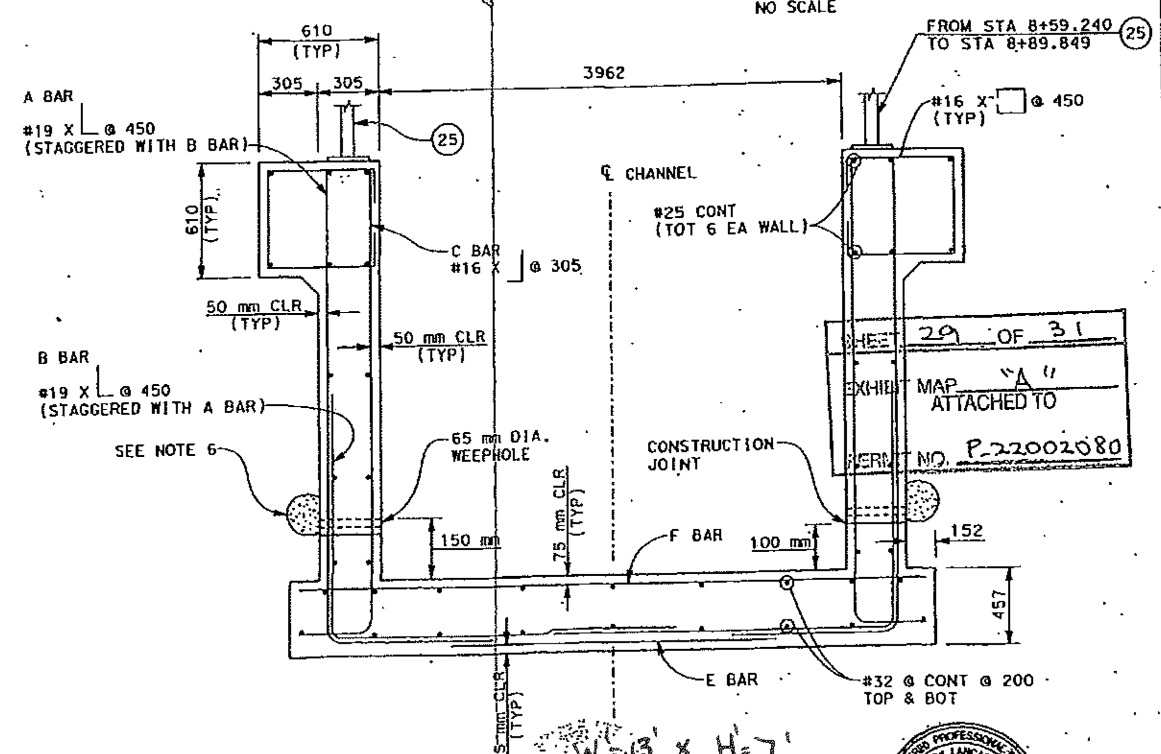
NOTES

1. CONCRETE SHALL BE PER SECTION 201-1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. THE CHANNEL INVERT SHALL BE 385-A-28 CONCRETE AND THE CHANNEL WALLS SHALL BE 385-B-28 CONCRETE.
2. ALL LONGITUDINAL BARS SHALL BE #13 @ 460 mm UNLESS OTHERWISE NOTED. PLACE BARS IN BOTTOM SLAB SYMMETRICALLY ABOUT CENTERLINE. PLACE BARS IN WALLS STARTING AT TOP WITH 50 mm OF CLEAR COVER.
3. CLEAR COVER FOR STEEL SHALL BE 50 mm FOR WALLS AND 75 mm EACH FACE FOR BOTTOM SLAB.
4. FOR CONSTRUCTION ON CURVES, STRAIGHT TRANSVERSE BARS SHALL BE ALIGNED RADIALLY WITH SPACING MEASURED AT FACE OF WALL. FOR L-BARS IN WALLS, SPACING SHALL BE MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
5. ALL TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN A VERTICAL PLANE NORMAL TO THE CENTERLINE AND THE SPACING THEREOF SHALL NOT EXCEED 15.25m OR BE LESS THAN 3.05m. CONTINUOUS KEYWAYS SHALL BE CONSTRUCTED AS SHOWN IN DETAIL A. A COMPLETE CURTAIN OF TRANSVERSE STEEL SHALL BE PLACED 75mm FROM EACH FACE OF THE JOINT. LONGITUDINAL STEEL SHALL BE CONTINUOUS THROUGH THE JOINTS. EXPANSION JOINTS SHALL BE CONSTRUCTED ONLY BETWEEN REINFORCED CONCRETE CHANNEL AND REINFORCED CONCRETE BOX OR TRANSITION SECTIONS AT STATIONS 8+65.240 AND 9+02.24 AS SHOWN IN DETAIL B. DOWELS SHALL BE PLACED AT 305mm SPACING CENTERED IN THE MIDDLE THIRD OF THE BOTTOM SLAB AND THE TOP THIRD OF THE SIDE WALL. A MINIMUM OF 3 DOWELS PER SLAB AND WALL SHALL BE PLACED.
6. WEEPHOLES SHALL BE FORMED AS SHOWN IN BOTH WALLS AT A SPACING OF 3.05 m WITH .305 m^3 OF FILTER MATERIAL WRAPPED IN FILTER FABRIC PLACED AT EACH HOLE.
7. ALL QUANTITIES SHOWN ARE APPROXIMATE.
8. ALL SPLICES ARE SUBJECT TO APPROVAL BY THE ENGINEER.
9. NO SPLICES IN #32 LONGITUDINAL BARS IN INVERT BETWEEN STA 8+74.60 TO STA 8+90.90 (MIDDLE THIRD).



TRANSVERSE EXPANSION JOINT

DETAIL B
NO SCALE



SHEET 29 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

W=13' x H=7'

CHANNEL TYPE I FROM
STA 8+68± TO STA 9+02.240
NO SCALE

CONSTRUCTION NOTES:

(25) CONSTRUCT WROUGHT IRON FENCING PER DETAILS ON SD-29

MARK	REVISIONS	BY	APPR.	DATE

APPROVED July 28 2004
Mark Lancaster
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48048
DRAWN BY: PT
CHECKED BY: YS
RECOMMENDED BY: RF

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
CONCRETE RECT CHANNEL TYPE I

FOR CITY USE ONLY: FILE NO. | C.J. NO. | W.O. NO.

DRAWING NO. SD-27
SHEET 29 OF 31 SHEETS

DRAWING NO. 10842

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210
SAN BERNARDINO, CA 92408
JUNE 30, 2003
Project Engineer Date
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER MARK LANCASTER No. C48048 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

W=13'
H=7'

CONSTRUCTION NOTES:

(35) CONSTRUCT CAST-IN-PLACE 3962 mm (13') W x 1700 mm (5'-7") H REINFORCED CONCRETE BOX (MAX 3m COVER) PER CALTRANS STANDARD PLAN D80

(39) CONSTRUCT TYPE "A" BOX CULVERT WINGWALL PER CALTRANS STANDARD PLAN D84 WITH WROUGHT IRON FENCING

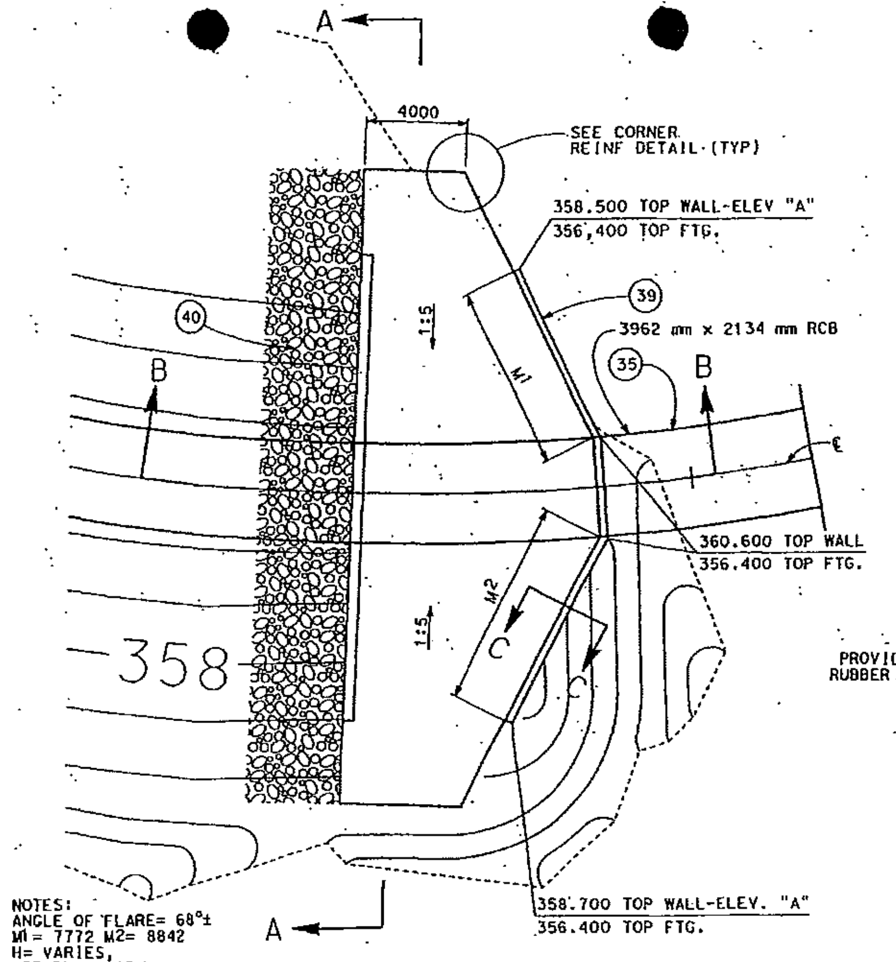
(40) CONSTRUCT 1/2T ROCK SLOPE PROTECTION METHOD "A" 1500 mm THICK LAYER OVER FILTER FABRIC. CONSTRUCT TYPE "A" BOX CULVERT WINGWALL PER CALTRANS STANDARD PLAN D84 WITH WROUGHT IRON FENCING

(42) CONSTRUCT SLOPED PROTECTION BARRIER (FOR RCB) PER AMERICAN PUBLIC WORKS ASSOCIATION STANDARD PLAN NO. 360-0

NOTES:

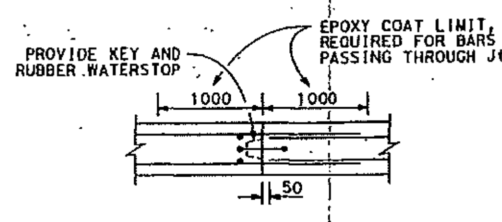
1. ALL STRUCTURAL CONCRETE TO BE USED WITHIN SBCFCD RIGHT-OF-WAY SHALL BE 4,000 PSI WITH 'A' GRADATION IN ALL INVERTS AND 4,000 PSI WITH 'B' GRADATION IN ALL WALLS. CONCRETE FOR ROCK INLET AND OUTLET STRUCTURES, BOTTOM CONTROLS, SPLASH PADS AND OTHER PROPOSED STRUCTURES SHALL BE 560B OR C3250. CONCRETE SHALL BE PER SECTION 201-1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION GREENBOOK

2. (B7-10 / U-2) CALTRANS STANDARD PLAN SHEET NO. / DETAIL NO.



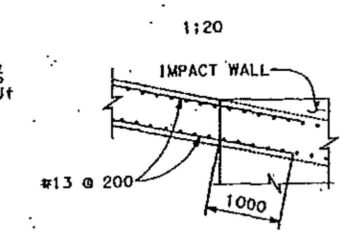
OUTLET/IMPACT STRUCTURE DETAIL - PLAN VIEW

1:125



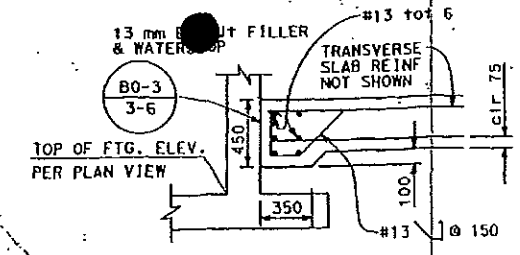
CONST. Jt DETAIL (TYPE A)

1:20

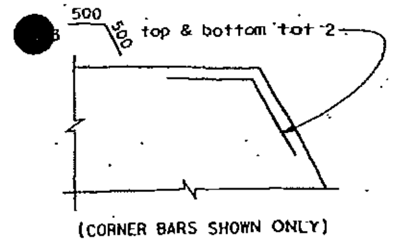


CONNECTION DETAIL BETWEEN IMPACT WALL & SLAB

1:40

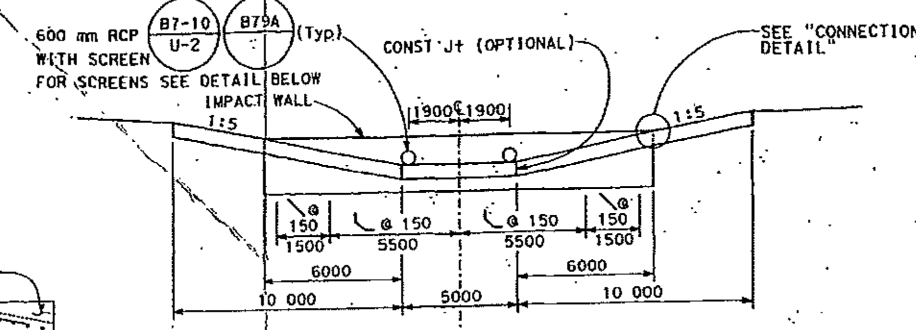


SECTION C-C



CORNER REINF DETAIL (TYP)

NO SCALE



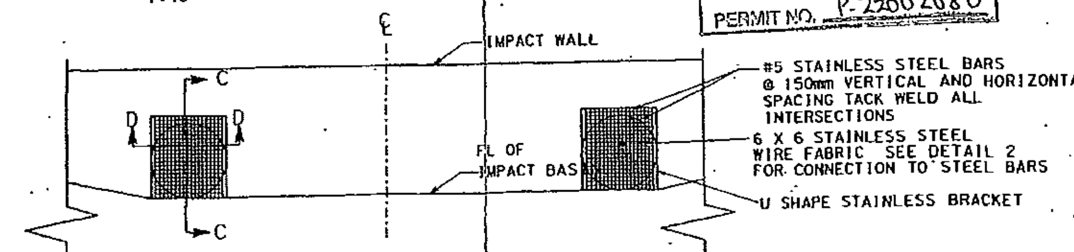
SECTION A-A

1:125

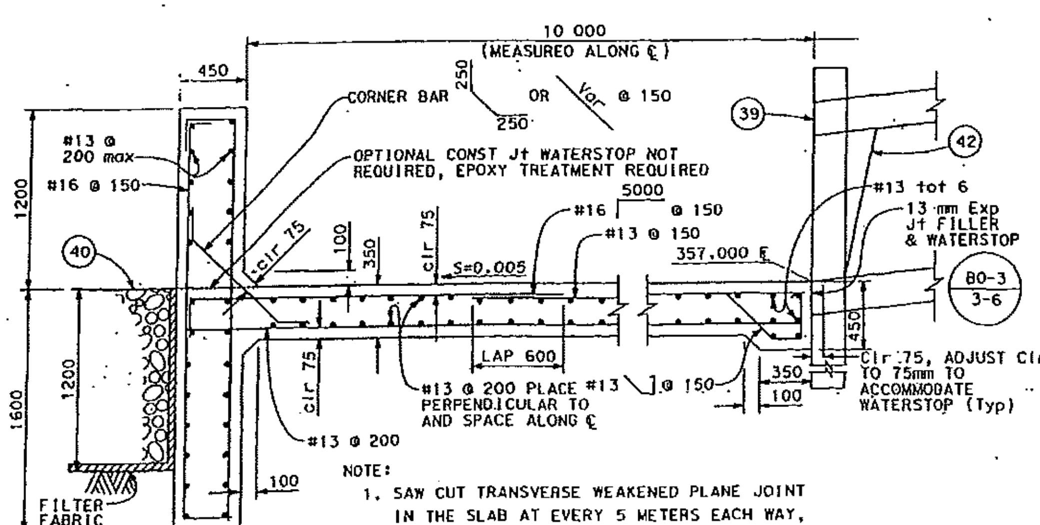
SHEET 30 OF 31

EXHIBIT MAP "A" ATTACHED TO

PERMIT NO. P-22002080



SCREEN DETAIL

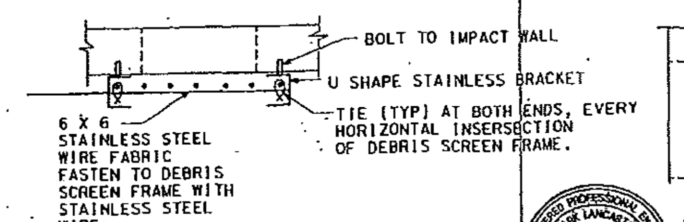


NOTE:

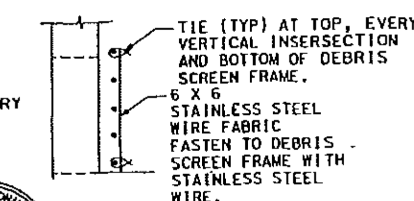
1. SAW CUT TRANSVERSE WEAKENED PLANE JOINT IN THE SLAB AT EVERY 5 METERS EACH WAY, SEE CALTRANS STANDARD PLAN (B0-3 / 3-6)

SECTION B-B

1:20



SECTION D-D



SECTION C-C

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 210 SAN BERNARDINO, CA 92408
Project Engineer Date JUNE-30, 2003
Registered Civil Engineer

APPROVED Jan 28 2004
MARK LANCASTER CITY ENGINEER REGISTERED CIVIL ENGINEER NO. 45048

DRAWN BY: PT
CHECKED BY: JL
RECOMMENDED BY: RF

MARK	REVISIONS	BY	APPR.	DATE

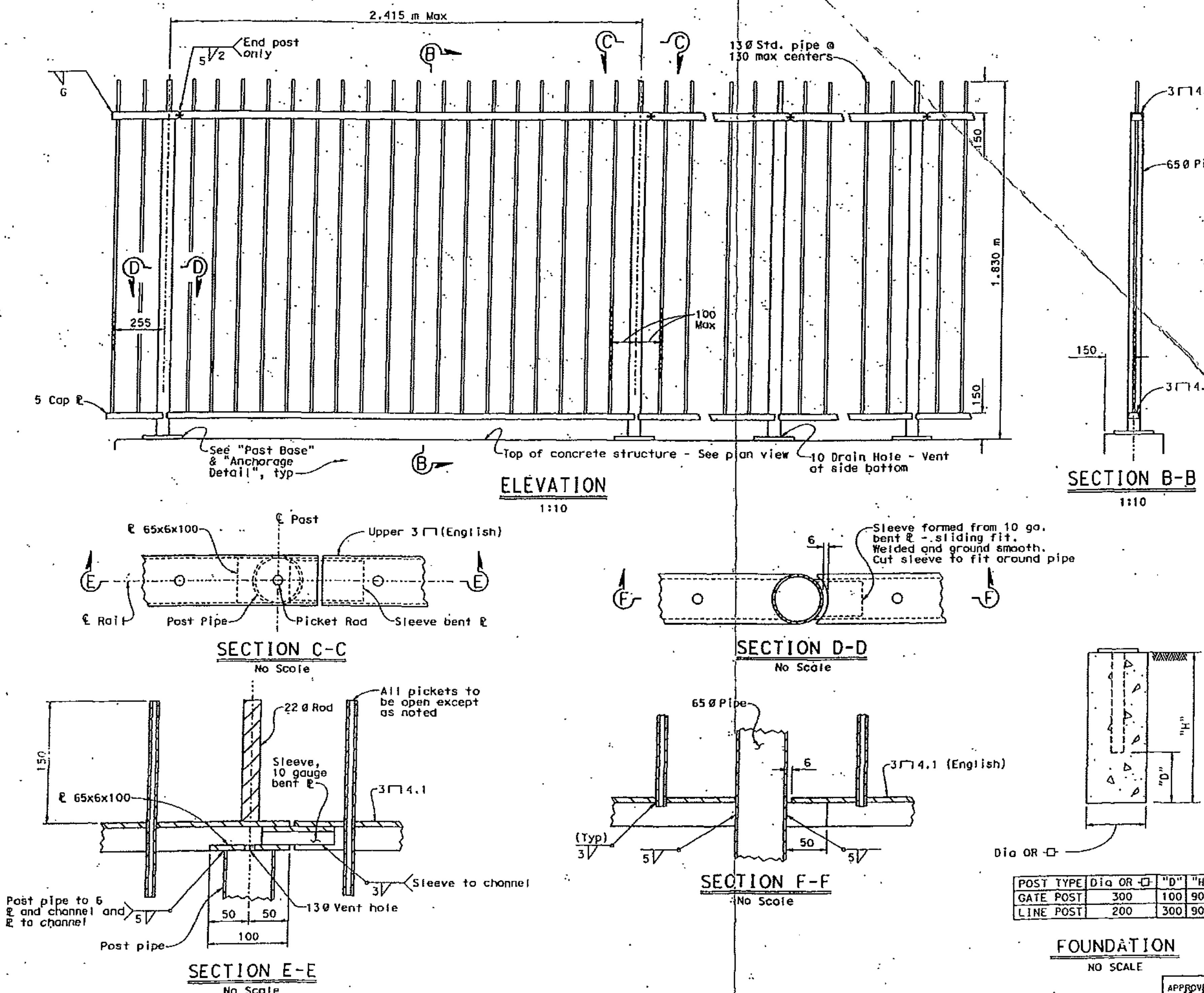
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
OUTLET/IMPACT STRUCTURE

FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

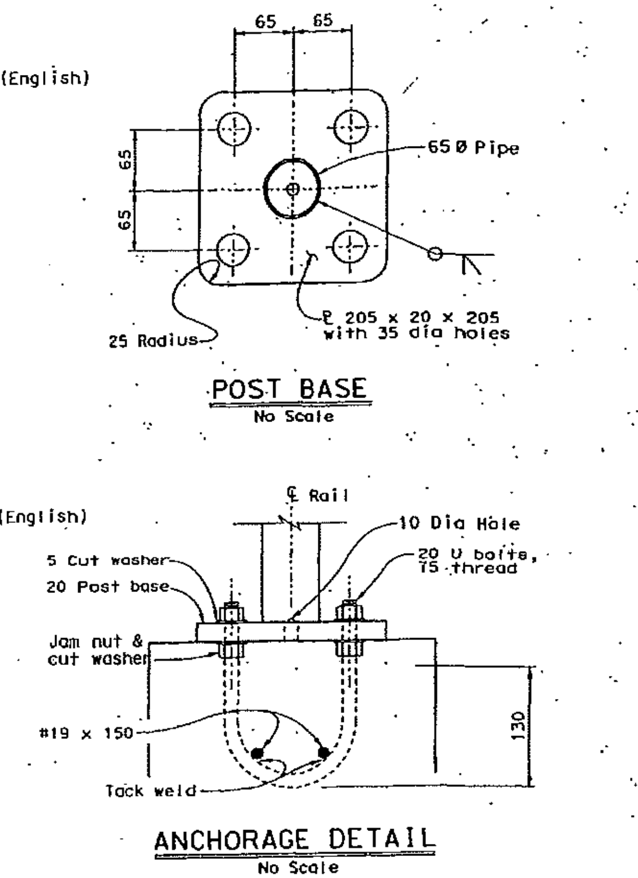
DRAWING NO. SD-28

SHEET 30 OF 31 SHEETS

DRAWING NO. 10842



POST TYPE	Dia OR ☐	"D"	"H"
GATE POST	300	100	900
LINE POST	200	300	900



Notes - Unless otherwise indicated:

1. Space posts to clear expansion jts. by 230 min. to ℄ of post. At expansion jts. in deck, rail jts. shall provide same allowance for movement with corresponding increase in length of sleeve.
2. Railing shall conform to horizontal and vertical alignment. Posts and balasters shall be vertical with a maximum deviation not to exceed 6 in 3.05 m.
3. Railing and all parts and fittings shall be galvanized after fabrication.
4. All fencing within S.B.C.F.C. District right-of-way shall be hot dip galvanized.

SHEET 31 OF 31
EXHIBIT MAP "A" ATTACHED TO
PERMIT NO. P-22002080

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

PARSONS BRINCKERHOFF
685 EAST CARNEGIE DRIVE SUITE 100 SAN BERNARDINO, CA 92408
Project Engineer Date JUNE 30, 2003
Registered Civil Engineer

APPROVED June 28 2004
Mark Lancaster
MARK LANCASTER
CITY ENGINEER
REGISTERED CIVIL ENGINEER NO. 48044
DRAWN BY: MS
CHECKED BY: RD
RECOMMENDED BY: SG

MARK	REVISIONS	BY	APPR.	DATE

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES-PUBLIC WORKS ENGINEERING
STATE STREET STORM DRAIN
STORM DRAIN IMPROVEMENT PLANS
WROUGHT IRON FENCE DETAILS
FOR CITY USE ONLY: FILE NO. C.I. NO. W.O. NO.

DRAWING NO. SD-29
SHEET 31 OF 31 SHEETS

DRAWING NO. 10842

Appendix H – Noise Study

Appendix I – Traffic Impact Analysis

State Street Extension Project
Traffic Impact Study

Prepared for:

City of San Bernardino
290 North "D" Street
San Bernardino, CA 92401

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EXECUTIVE SUMMARY

Purpose of the Report

The purpose of this Traffic Impact Study (TIS) report is to identify and document potential traffic impacts related to the proposed State Street Extension project (Project) in the City of San Bernardino. This technical report will also recommend transportation mitigation measures and improvements to address any potential Project impacts to the local transportation network within the study area.

Project Overview

The City of San Bernardino General Plan, adopted on November 1, 2015, identifies State Street as a north-south major arterial thoroughfare within the City of San Bernardino boundaries. Currently there is a gap in the State Street corridor between Hanford Street and East Foothill Boulevard. The City of San Bernardino is proposing to extend State Street by constructing the missing roadway segment through two (2) phases. Phase 1 will construct State Street to a four-lane major arterial roadway between 16th Street and Baseline Street; and Phase 2 will construct State Street to a four-lane major arterial roadway between Baseline Street and East Foothill Boulevard.

Project scenarios and study area were established in coordination with City staff to determine the potential Project impacts on the transportation network due to the change in traffic patterns in the vicinity of the proposed Project.

Project Scenarios:

- Existing Conditions (2019)
- Opening Year (2022) Phase 1 – Existing Traffic plus ambient growth (3% compounded for 3 years)
- Buildout Conditions (2040)

Study area Intersections:

1. State Street and Nolan Street/Short Street – *County of San Bernardino*
2. State Street and Highland Avenue – *City of San Bernardino*
3. State Street and I-210 WB Ramps – *Caltrans*
4. State Street and I-210 EB Ramps/20th Street – *Caltrans*
5. State Street and 16th Street – *City of San Bernardino*
6. State Street/University Parkway and Baseline Street – *City of San Bernardino*
7. Rancho Avenue and Foothill Boulevard – *City of San Bernardino*
8. Rancho Avenue and Rialto Avenue – *City of San Bernardino*
9. Rancho Avenue and Mill Street – *City of San Bernardino*
10. Rancho Avenue and Laurel Street – *City of Colton*
11. Rancho Avenue and Valley Boulevard – *City of Colton*

Analysis Results and Recommendations

Existing Conditions (2019)

The following intersections currently operate at an unacceptable LOS under Existing Conditions:

- Rancho Avenue and Foothill Boulevard

The following transportation improvements will mitigate the identified intersection operation deficiencies to less than significant:

- Rancho Avenue and Foothill Boulevard – construct a traffic signal

Opening Year (2022) Phase 1

All study intersections would operate at acceptable LOS under Opening Year Phase 1 Conditions.

Buildout Conditions (2040)

The following intersections would operate at an unacceptable LOS under Buildout Conditions:

- State Street and 16th Street
- State Street/University Parkway and Baseline Street
- Rancho Avenue and Foothill Boulevard
- Rancho Avenue and Valley Boulevard

The following transportation improvements will mitigate the identified intersection operation deficiencies to less than significant:

- State Street and 16th Street – construct a traffic signal
- State Street/University Parkway and Baseline Street – construct a northbound exclusive right turn lane and modify signal timing to add an overlap phase for this movement.
- Rancho Avenue and Foothill Boulevard – construct a traffic signal
- Rancho Avenue and Valley Boulevard – construct an eastbound exclusive right turn lane

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1.0 PROJECT INTRODUCTION

The purpose of this Traffic Impact Study (TIS) report is to identify and document potential traffic impacts related to the proposed State Street Extension project (Project) in the City of San Bernardino. This technical report will also recommend transportation mitigation measures and improvements to the local transportation network within the study area due to the anticipated change in traffic pattern along the corridor resulting from the proposed State Street roadway extension Project.

PROJECT DESCRIPTION

The City of San Bernardino General Plan, adopted on November 1, 2015, identifies State Street as a north-south major arterial thoroughfare within the City of San Bernardino boundaries. Currently there is a gap in the State Street corridor between Hanford Street and East Foothill Boulevard. The City of San Bernardino is proposing to extend State Street by constructing the missing roadway segment through two (2) phases. Phase 1 will construct State Street to a four-lane major arterial roadway between 16th Street and Baseline Street; and Phase 2 will construct State Street to a four-lane major arterial roadway between Baseline Street and East Foothill Boulevard.

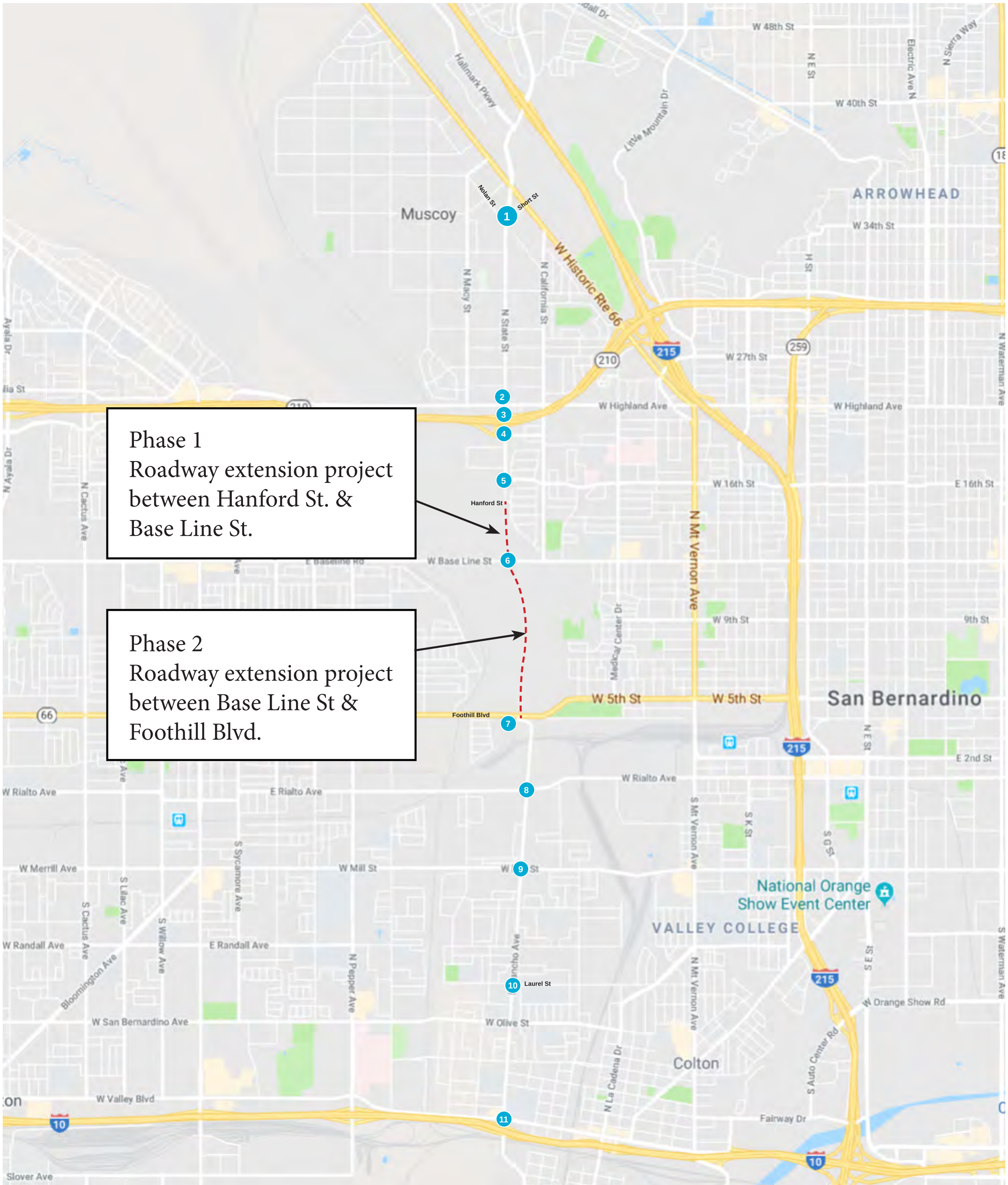
STUDY AREA

The study area for this Project includes those locations that are expected to be potentially affected by the Project. For the purposes of this analysis, the study area was developed in coordination with City staff and includes the following intersections locations:

Study Intersections

1. State Street and Nolan Street/Short Street – *County of San Bernardino*
2. State Street and Highland Avenue – *City of San Bernardino*
3. State Street and I-210 WB Ramps – *Caltrans*
4. State Street and I-210 EB Ramps/20th Street – *Caltrans*
5. State Street and 16th Street – *City of San Bernardino*
6. State Street/University Parkway and Baseline Street – *City of San Bernardino*
7. Rancho Avenue and Foothill Boulevard – *City of San Bernardino*
8. Rancho Avenue and Rialto Avenue – *City of San Bernardino*
9. Rancho Avenue and Mill Street – *City of San Bernardino*
10. Rancho Avenue and Laurel Street – *City of Colton*
11. Rancho Avenue and Valley Boulevard – *City of Colton*

Figure 1-1 shows the Project study area.



LEGEND

\# Existing Intersection

Roadway Extension

2.0 METHODOLOGIES

This section documents the methodologies and assumptions used to conduct the circulation impact analysis for the proposed Project. This section contains the following background information:

- Study scenarios
- Study time periods
- Analysis methodologies

STUDY SCENARIOS

This report presents an analysis of the intersection operating conditions during the peak periods, which were selected in consultation with City staff for the following anticipated timeframe scenarios:

- Existing Conditions (2019)
- Opening Year (2022) Phase 1 – Existing Traffic plus ambient growth (3% compounded for 3 years)
- Buildout Conditions (2040)

The San Bernardino County regional traffic model will be used to generate a growth factor that will be applied to the existing counts and utilizes NCHRP's "Directional Volume Forecast" methodology from the National Cooperative Highway Research Program (NCHRP) 255 – Highway Traffic Data for Urbanized Area Project Planning and Design, Chapter 8 to develop Buildout Conditions (2040) turning movement volumes.

STUDY TIME PERIODS

The City selected the following peak hours for analysis:

- Weekday AM (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM (peak hour between 4:00 PM and 6:00 PM)

ANALYSIS METHODOLOGIES

Street system operating conditions are typically described in terms of "level of service." Level of service is a report-card scale used to indicate the quality of traffic flow on roadway segments and at intersections. Level of service (LOS) ranges from LOS A (free flow, little congestion) to LOS F (forced flow, extreme congestion). **Table 2-1** describes generalized definitions of auto LOS A through F.

Table 2-1
Vehicular Level of Service Definitions

LOS	Characteristics
A	Primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Controlled delay at the boundary intersections is minimal. The travel speed exceeds 85% of the base free-flow speed.
B	Reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67% and 85% of the base free-flow speed.
C	Stable operation. The ability to maneuver and change lanes at mid-segment locations may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed.
D	Less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersections. The travel speed is between 40% and 50% of the base free-flow speed.
E	Unstable operation and significant delay. Such operations may be due to some combination of adverse signal progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30% and 40% of the base free-flow speed.
F	Flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30% or less of the base free-flow speed. Also, LOS F is assigned to the subject direction of travel if the through movement at one or more boundary intersections have a volume-to-capacity ratio greater than 1.0.

Source: Highway Capacity Manual, Transportation Research Board (2016)

Intersection Capacity Analysis
The analysis of peak hour intersection performance was conducted using the Synchro 10 software program, which uses methodologies defined in the Highway Capacity Manual (HCM) Sixth Edition to calculate LOS. Level of service (LOS) for intersections is determined by control delay. Control delay is defined as the total elapsed time from when a vehicle stops at the end of a queue to the time the vehicle departs from the stop line. The total elapsed time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

Signalized Intersections
The HCM analysis methodology for evaluating signalized intersections is based on the “operational analysis” procedure. This technique uses 1,900 passenger cars per hour of green per lane (pcphgpl) as the maximum saturation flow of a single lane at an intersection. This saturation flow rate is adjusted to account for lane width, on-street parking, conflicting pedestrian flow, traffic composition, (e.g., the percentage of vehicles that are trucks) and shared lane movements (e.g., through and right-turn movements from the same lane). Average control delay is calculated by taking a volume-weighted average of all the delays for all vehicles entering the intersection. Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates were used:

Existing and Opening Day Scenarios:

- Through lane: 1800
- Exclusive right lane: 1800
- Exclusive left lane: 1700
- Exclusive dual left: 1600

Buildout Scenarios:

- Through lane: 1900
- Exclusive right lane: 1900
- Exclusive left lane: 1800
- Exclusive dual left lane: 1700

Table 2-2 summarizes the level of service criteria for signalized intersections.

Table 2-2
Signalized Intersection Level of Service HCM Operational Analysis Method

Average Control Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
≤10.0	*LOS A* occurs when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
10.1 – 20.0	*LOS B* occurs when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
20.1 – 35.0	*LOS C* occurs when progression is favorable or the cycle length is moderate. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
35.1 – 55.0	*LOS D* occurs when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
55.1 – 80.0	*LOS E* occurs when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
>80.0	*LOS F* occurs when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Highway Capacity Manual, Transportation Research Board (2016)

All-way Stop-controlled (AWSC) Intersections

The HCM analysis methodology for evaluating all-way Stop-controlled intersections is based on the degree of conflict for each independent approach created by the opposing approach and each conflicting approach. Level of Service for AWSC intersections is also based on the average control delay. However, AWSC intersections have different threshold values than those applied to signalized intersections. This is based on the rationale that drivers expect AWSC intersections to carry lower traffic volumes than at signalized intersections. Therefore, a higher level of delay is acceptable at a signalized intersection for the same LOS.

Two-way Stop-controlled (TWSC) Intersections

The HCM analysis methodology for evaluating two-way Stop-controlled (TWSC) intersections is based on gap acceptance and conflicting traffic for vehicles stopped on the minor-street approaches. The critical gap (minimum gap that would be acceptable) is defined as the minimum time interval in the major-street traffic stream that allows intersection entry for one minor-street vehicle. Average control delay and LOS for the “worst approach” are reported. Level of service is not defined for the intersection as a whole. Table 2-3 summarizes the level of service criteria for unsignalized intersections.

Table 2-3
Level of Service Criteria for Stop Controlled Unsignalized Intersections

Average Control Delay Per Vehicle (sec)	Level of Service (LOS)
<u><</u>10.0	A
10.1 – 15.0	B
15.1 – 25.0	C
25.1 – 35.0	D
35.1 – 50.0	E
>50.0	F

Source: Highway Capacity Manual, Transportation Research Board (2016)

Roadway Segments
The weekday average daily traffic (ADT) volumes were developed based on the following equation, which utilizes the collected intersection PM peak hour turning movement counts: PM Peak Hour (Approach Volume + Exit Volume) x 11.5 = ADT Leg Volume. Roadway ADT calculations for all analyzed scenarios discussed in this report are provided for informational purpose only and could be found in **Appendix E.**

Traffic Signal Warrant Analysis
The Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD), amended with California MUTCD 2014 Edition, presents warrant criteria for justifying the installation of a traffic signal at an unsignalized intersection. The criteria include studying traffic conditions, pedestrian characteristics, and physical characteristics of the intersection location. The MUTCD indicates that satisfaction of one or more of the traffic signal warrants does not in itself require the installation of a traffic control signal.

For Existing Conditions, this study uses the Peak Hour Volume Warrant 3 to assess the need of a traffic signal at unsignalized intersection location shown below:

- Rancho Avenue and Foothill Boulevard

For all other scenarios that include forecasted traffic volumes, this study uses MUTCD Figure 4C-103 (CA), which is to be used for new intersections and locations where it is not reasonable to count actual traffic volumes. This was used for the unsignalized intersection location shown below:

- State Street and 16th Street

Traffic signal warrant analyses were performed at the above locations when operating at unacceptable LOS under any scenario studied in this report. Signal warrants worksheets are included in **Appendix G**.

Analysis of Significance
Traffic impacts are identified if the proposed Project will result in a significant change in traffic conditions on a roadway or intersection. A significant impact is normally defined when Project related

traffic would cause level of service to deteriorate to below the minimum acceptable level by a measurable amount. Impacts may also be significant if the location is already below the minimum acceptable level and Project related traffic causes a further decline.

Level of Service D is frequently identified as the minimum allowable "Standard" service level during peak hours at signalized intersections. Most arriving traffic will clear the intersection on the first allowable green cycle under this level of service. Mitigation measures shall be considered by development projects within the City of San Bernardino when traffic Conditions are forecasted to decline from a LOS D to poorer levels of service. In the case of existing deficiency where existing without Project Conditions is already below LOS D (i.e., LOS E or F), the Project will be required to mitigate its incremental transportation related impacts to level of service that's equal to or better than the LOS identified under without Project Conditions.

3.0 EXISTING CONDITIONS (2019)

This section documents the circulation system conditions and potential project related traffic impacts within the study area of the Project under the Existing Conditions scenario. The Existing Conditions (2019) traffic volumes analysis utilizes existing volume counts to evaluate the existing baseline traffic operations within the study area. No network improvements are assumed under this scenario.

EXISTING ROADWAY NETWORK

State Street – is classified as a four-lane Major Arterial roadway in the City of San Bernardino General Plan that extends south from the northern boundary of the City to Foothill Boulevard. Within the study area of the Project, State Street is configured as a two lane roadway between Nolan Street and Adam Street and widens to a four-lane major arterial roadway between Adams Street to Lincoln Street where it narrows down back to two lanes from Lincoln Street to its current terminus point at Hanford Street. Project is proposing to extend State Street from its current terminus point to Foothill Boulevard. Intermittent public improvements including curb, gutter sidewalks are provided within the study area of the Project. State Street is not a designated bicycle route in the City of San Bernardino General Plan. Dedicated bicycle facilities are not currently present along the corridor.

Rancho Avenue – is classified as a four-lane Major Arterial roadway in the City of San Bernardino General Plan that extends north from the southern boundary of the City to Foothill Boulevard. Within the study area of the Project, Rancho Avenue is configured as a four-lane arterial between Valley Boulevard to a point just north of Chestnut Street where it transitions to a two-lane roadway between Walnut Street and Foothill Boulevard. Intermittent public improvements including curb, gutter sidewalks are provided within the study area of the Project. Rancho Avenue is designated as a bicycle route in the City of San Bernardino General Plan. Dedicated bicycle facilities are not currently present along the corridor.

Figures 3-1 through 3-3 show City of San Bernardino General Plan Circulation Element, Roadway Cross-section, and trail systems.

TRAFFIC VOLUMES

The intersection turning movement counts were conducted during the weekday morning peak period from 7:00 AM to 9:00 AM and during the weekday evening peak period from 4:00 PM to 6:00 PM on February 12, 2019, while San Bernardino County United School District is in session, and included truck classification counts. The turning movement counts were utilized in Synchro to determine the LOS at all study intersections. Traffic count data is provided in **Appendix A.**

ANALYSIS RESULTS

Table 3-1 shows Existing Conditions intersection operation analysis results.

Table 3-1
Existing Conditions (2019) Intersection Operation Analysis

Intersection	Traffic Control	Existing Conditions (2019)	
		Delay (a)	LOS (b)
AM/PM Peak Hour			
1. State Street & Nolan Street/Short Street	Signalized	22.5/22.6	C/C
2. State Street & Highland Avenue	Signalized	23.7/24.4	C/C
3. State Street & I-210 WB Ramps	Signalized	13.4/14.0	B/B
4. State Street & I-210 EB Ramps/20th Street	Signalized	24.8/25.6	C/C
5. State Street & 16th Street	SSSC	10.0/9.8	B/A
6. State Street/University Parkway & Baseline Street	Signalized	24.2/15,4	C/B
7. Rancho Avenue & Foothill Boulevard	SSSC	24.9/102.5	C/**F**
8. Rancho Avenue & Rialto Avenue	Signalized	7.9/8.8	A/A
9. Rancho Avenue & Mill Street	Signalized	10.1/10.7	B/B
10. Rancho Avenue & Laurel Street	Signalized	21.3/15.1	C/B
11. Rancho Avenue & Valley Boulevard	Signalized	34.8/36.9	C/D

Notes:
***Bold** values indicate intersections operating at LOS E or F.*
SSSC = Side-street stop-controlled
(a) Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At unsignalized intersections with side street stop control, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

Per the analysis results shown in **Table 3-1**, all analyzed intersections are operating at an acceptable LOS under Existing Conditions, except for the following location:

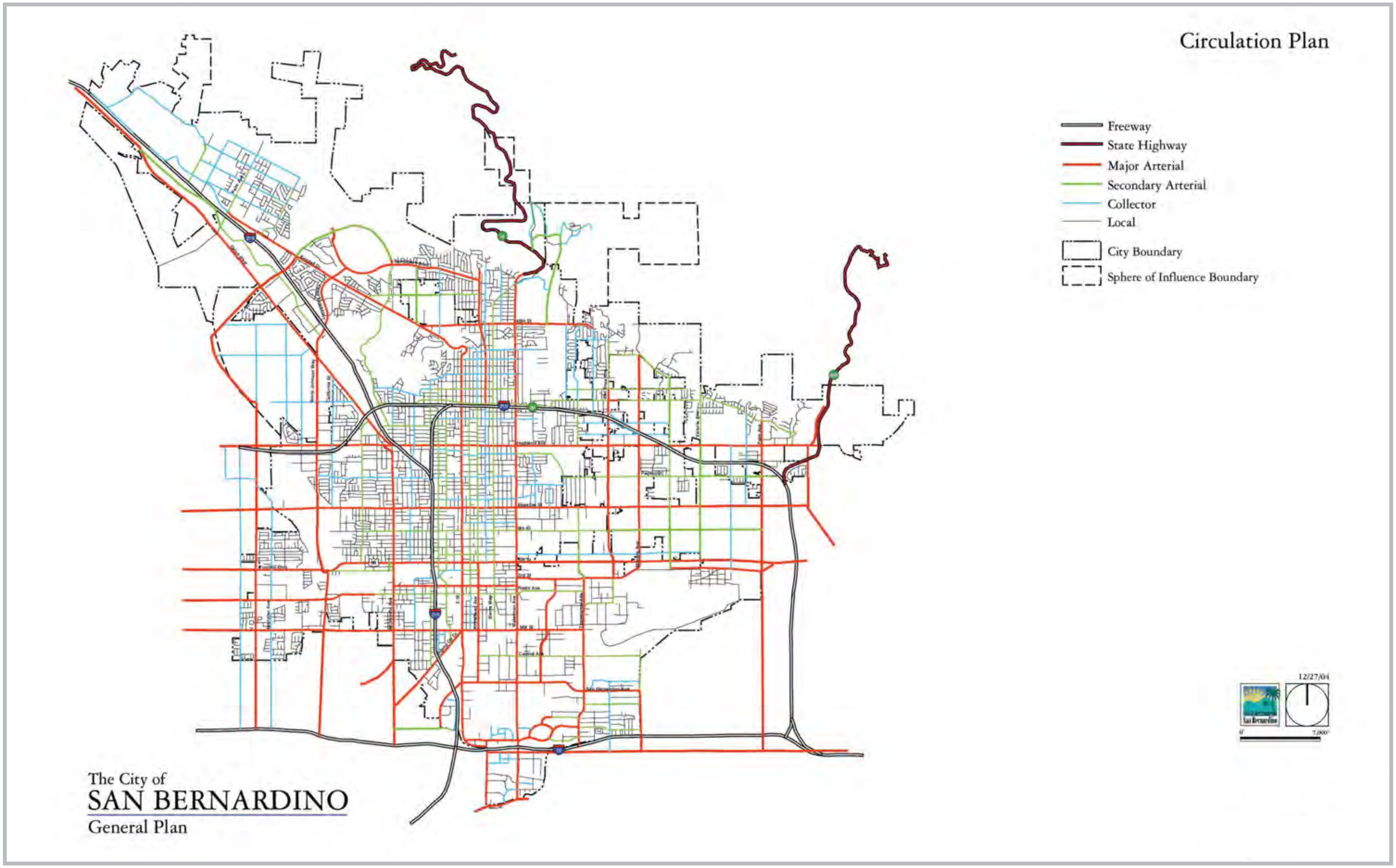
- Rancho Avenue and Foothill Boulevard

The following transportation improvements will mitigate the identified intersection operation deficiency to less than significant:

- Rancho Avenue and Foothill Boulevard – construct a traffic signal

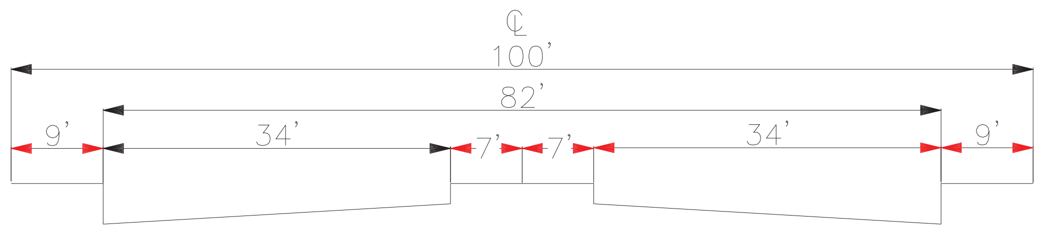
Figures 3-4 through 3-5 show study area intersections configurations and controls, and intersection turning movement volumes.

Existing Conditions peak hour analysis worksheets are provided in **Appendix B**.

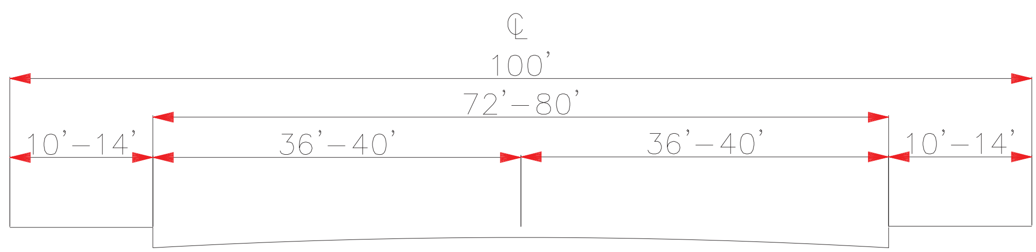


INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

City of San Bernardino General Plan
Circulation Element
Figure 3-1

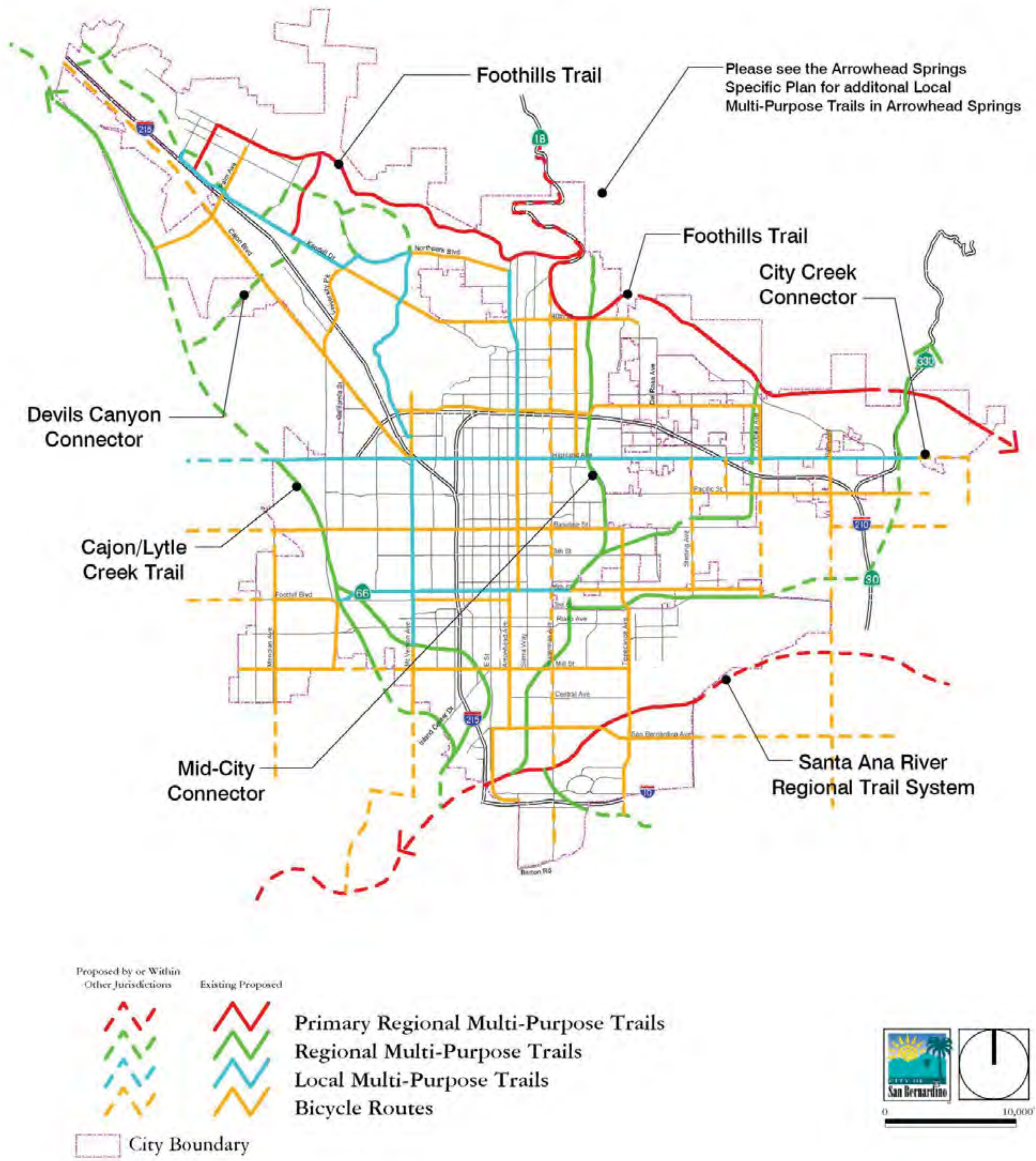


MAJOR DIVIDED HIGHWAYS



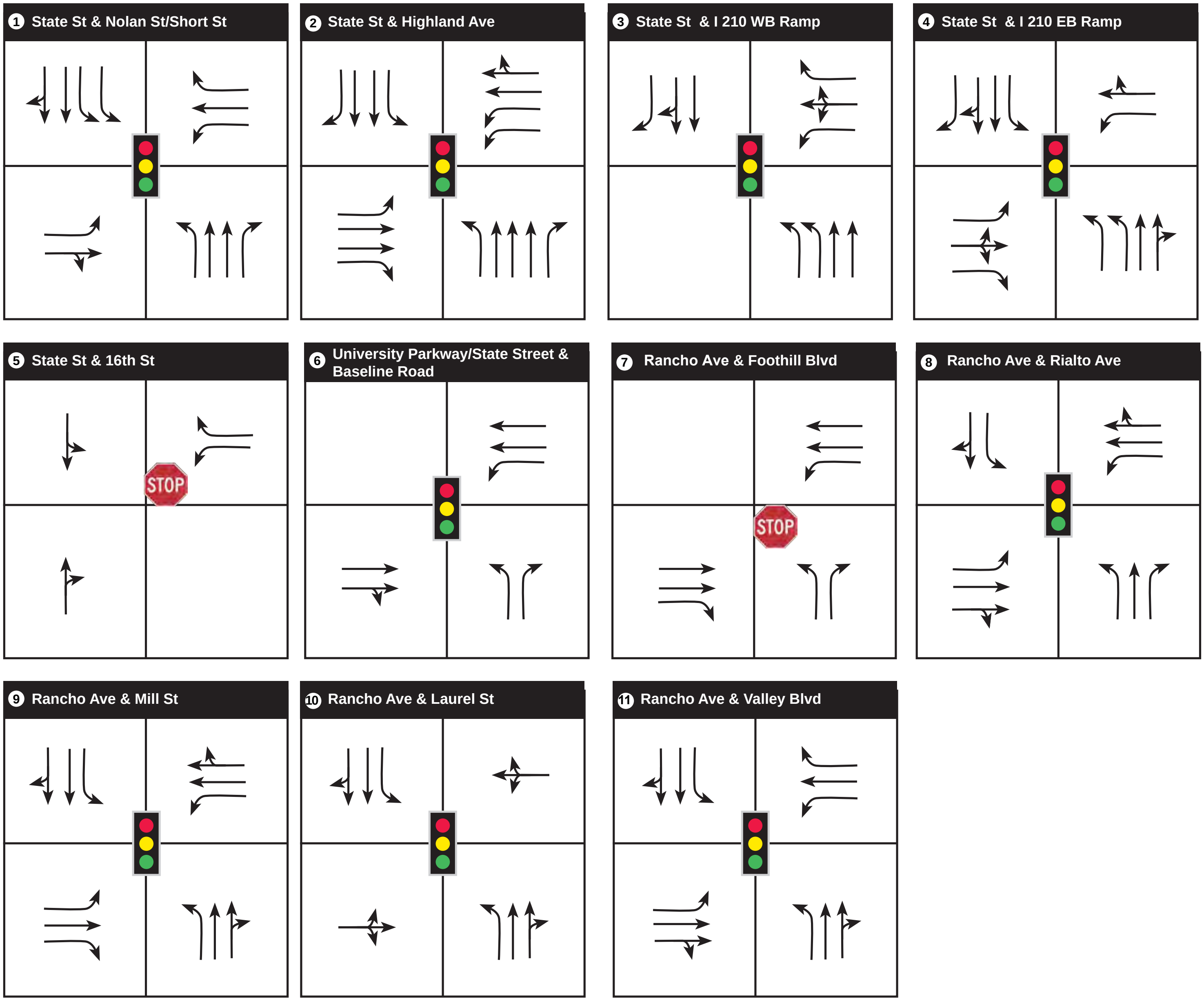
MAJOR HIGHWAY

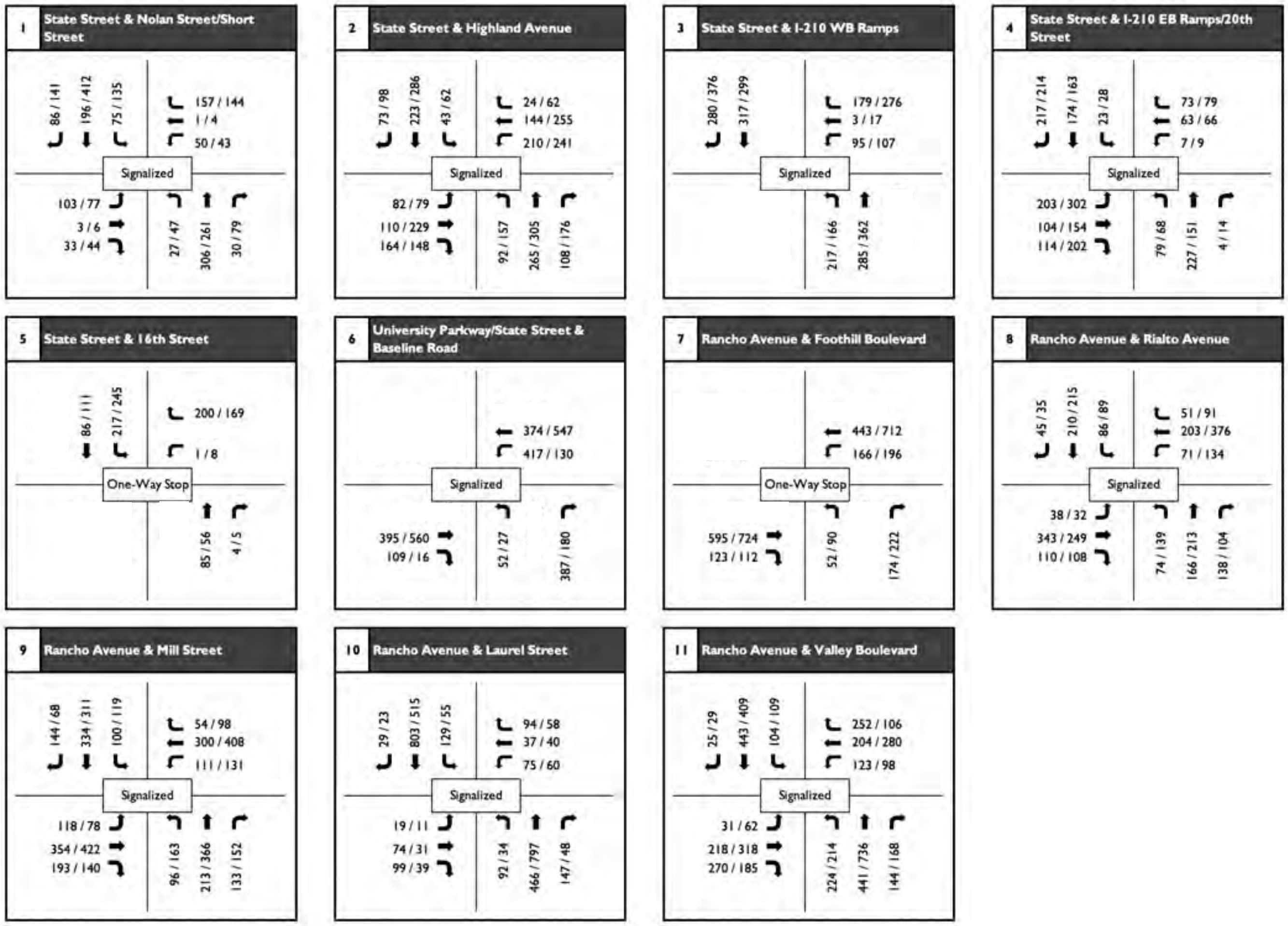
Conceptual Trail System



The City of
SAN BERNARDINO
General Plan

City of San Bernardino General Plan
Trail System
Figure 3-3


1 State St & Nolan St/Short St
2 State St & Highland Ave
3 State St & I 210 WB Ramp
4 State St & I 210 EB Ramp
5 State St & 16th St
STOP
6 University Parkway/State Street & Baseline Road
7 Rancho Ave & Foothill Blvd
STOP
8 Rancho Ave & Rialto Ave
9 Rancho Ave & Mill St
10 Rancho Ave & Laurel St
11 Rancho Ave & Valley Blvd



LEGEND

(AM/PM) Peak Hour Volumes

4.0 OPENING YEAR (2022) PHASE 1 CONDITIONS

This section documents the circulation system conditions and potential project related traffic impacts within the study area of the Project under Opening Year (2022) Phase 1 scenario of the State Street Extension project. The Opening Year Phase 1 traffic volumes were developed by adding a compounded 3% per year growth factor over a 3-year period to the existing counts.

No network improvements are assumed under Opening Year Phase 1 scenario except for the following:

- Construction of State Street to a four-lane major arterial roadway between 16th Street and Baseline Street
- Upgrade the existing traffic signal to serve the new north-leg of the intersection of State Street at Baseline Street.

The following two intersections were added and analyzed under this scenario to address potential project related traffic impacts due to traffic diversion created by the newly constructed State Street and Baseline Street intersection. This new intersection will be constructed as part of Phase 1 of the State Street Roadway Extension project:

- Pepper Avenue and Baseline Road
- Medical Center Drive and Baseline Street

ANALYSIS RESULTS

Table 4-1 shows Opening Year (2022) Phase 1 Conditions intersection operation analysis results.

Table 4-1
Opening Year (2022) Phase 1 Conditions Intersection Operation Analysis

Intersection	Traffic Control	Opening Year (2022) Phase 1	
		Delay (a)	LOS (b)
AM/PM Peak Hour			
1. State Street & Nolan Street/Short Street	Signalized	21.6/22.4	C/C
2. State Street & Highland Avenue	Signalized	23.0/25.3	C/C
3. State Street & I-210 WB Ramps	Signalized	13.6/13.9	B/B
4. State Street & I-210 EB Ramps/20th Street	Signalized	21.9/25.0	C/C
5. State Street & 16th Street	SSSC	9.6/9.7	A/A
6. State Street/University Parkway & Baseline Street	Signalized	49.8/35.0	D/C
12. Pepper Avenue & Baseline Road	Signalized	34.9/33.8	C/C
13. Medical Center Drive & Baseline Street	Signalized	16.9/15.1	B/B

Notes:
***Bold** values indicate intersections operating at LOS E or F.*
SSSC = Side-street stop-controlled
(a) Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At unsignalized intersections with side street stop control, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

Per the analysis results shown in **Table 4-1**, all analyzed intersections are operating at an acceptable LOS under Opening Year Phase 1 Conditions.

Additionally, the implementation of Phase 1 of the State Street Roadway Extension including construction of State Street and Baseline Street intersection (intersection 6) will change the traffic patterns in that area. Therefore, the two added intersections including Pepper Avenue/Baseline Road intersection (intersection 12) and Medical Center Drive/Baseline Street intersection (intersection 13) were analyzed to determine if the Project potential diverted trips from the newly constructed intersection 6 will create project related traffic impacts at those locations.

Table 4-2 shows intersection operation analysis results for Opening Year Phase 1 Conditions with diverted trips.

Table 4-2
Opening Year (2022) Phase 1 Conditions with Diverted Trips Intersection Operation Analysis

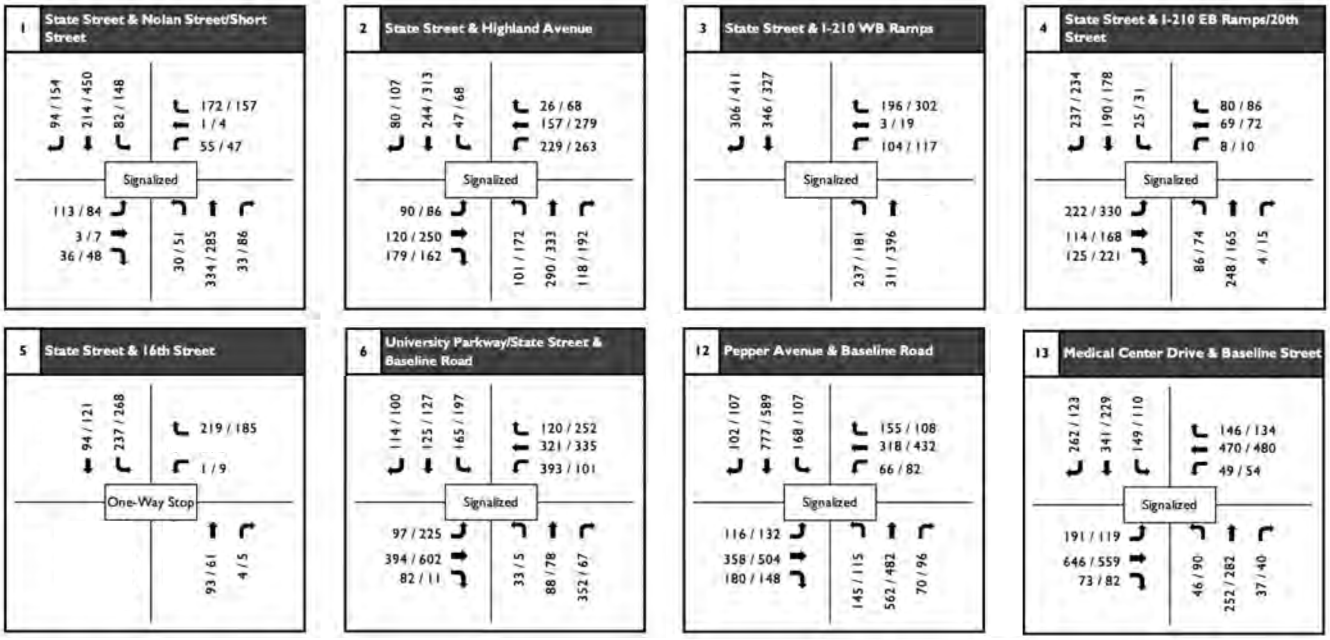
Intersection	**Traffic Control**	**Opening Year (2022) Phase 1 with Diverted Trips**	
		Delay (a)	**LOS (b)**
AM/PM Peak Hour			
12. Pepper Avenue & Baseline Road	Signalized	38.0/37.2	D/D
13. Medical Center Drive & Baseline Street	Signalized	19.7/17.6	B/B

Notes:
***Bold** values indicate intersections operating at LOS E or F.*
SSSC = Side-street stop-controlled
(a) Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At unsignalized intersections with side street stop control, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

As shown in **Figure 4-2,** Project diverted trips from the newly constructed intersection 6 will have no significant impact at intersections 12 and 13 respectively.

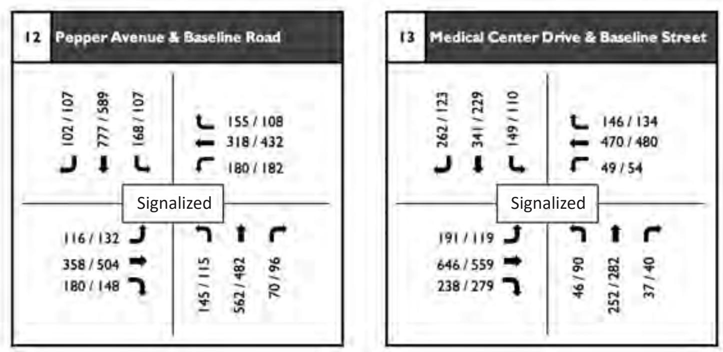
Figures 4-1 and 4-2 show Opening Year (2022) Phase 1 intersection turning movement volumes with and without diverted Project trips from intersection 6.

Opening Year (2022) Phase 1 with and without Project diverted trips peak hour analysis worksheets are provided in **Appendices C and D**, respectively.



LEGEND

(AM/PM) Peak Hour Volumes



LEGEND

(AM/PM) Peak Hour Volumes

5.0 BUILDOUT CONDITIONS (2040)

This section documents the circulation network conditions and potential project related traffic impacts within the study area of the Project under Buildout Conditions (2040). The Buildout volumes were developed utilizing the focused version of the San Bernardino County Transportation Analysis Model (SBTAM). The focused version of the SBTAM run that was specifically developed for the City of San Bernardino provides base and long-range average daily and peak period flow volumes. For the purpose of this analysis, the long-range peak hour intersection turning movement volumes were developed using NCHRP's "Directional Volume Forecast" methodology from the National Cooperative Highway Research Program (NCHRP) 255 – Highway Traffic Data for Urbanized Area Project Planning and Design, Chapter 8. This method utilizes existing intersection peak hour turning movements along with existing and long-range peak period flow volumes to calculate the long-range intersection turning movements. Existing peak hour intersection turning movements and existing peak period flow volumes are obtained from the existing counts where the long-range peak period flow volumes were developed using the SBTAM base and long-range forecast. Future turning movement volumes for each respective movement is derived using an iterative approach that balances the inflows and outflows for each approach. The post-processing procedure and supporting worksheets used for the development of the Buildout peak hour intersection turning movement volumes are included in **Appendices E**.

No network improvements are assumed under Buildout Conditions (2040) except for the following:

- Construction of State Street to a four-lane major arterial roadway between 16th Street and East Foothill Boulevard

ANALYSIS RESULTS

Table 5-1 shows Buildout Conditions intersection operation analysis results.

Table 5-1
Buildout Conditions (2040) Intersection Operation Analysis

Intersection	Traffic Control	Buildout Conditions (2040)	
		Delay (a)	LOS (b)
1. State Street & Nolan Street/Short Street	Signalized	22.4/28.0	C/C
2. State Street & Highland Avenue	Signalized	36.9/53.8	D/D
3. State Street & I-210 WB Ramps	Signalized	12.4/16.6	B/B
4. State Street & I-210 EB Ramps/20th Street	Signalized	25.3/29.4	C/C
5. State Street & 16th Street	SSSC	114.5/>180	**F/F**
6. State Street/University Parkway & Baseline Street	Signalized	86.3/45.1	**F**/D
7. Rancho Avenue & Foothill Boulevard	SSSC	>180/>180	**F/F**
8. Rancho Avenue & Rialto Avenue	Signalized	9.5/15.1	A/B
9. Rancho Avenue & Mill Street	Signalized	11.3/14.8	B/B
10. Rancho Avenue & Laurel Street	Signalized	19.3/15.7	B/B
11. Rancho Avenue & Valley Boulevard	Signalized	37.6/64.3	D/**E**

Notes:
__Bold__ values indicate intersections operating at LOS E or F.
SSSC = Side-street stop-controlled
(a) Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At unsignalized intersections with side street stop control, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

Per the analysis results shown in Table 5-1, all analyzed intersections are operating at an acceptable LOS under Buildout Conditions except for the following:

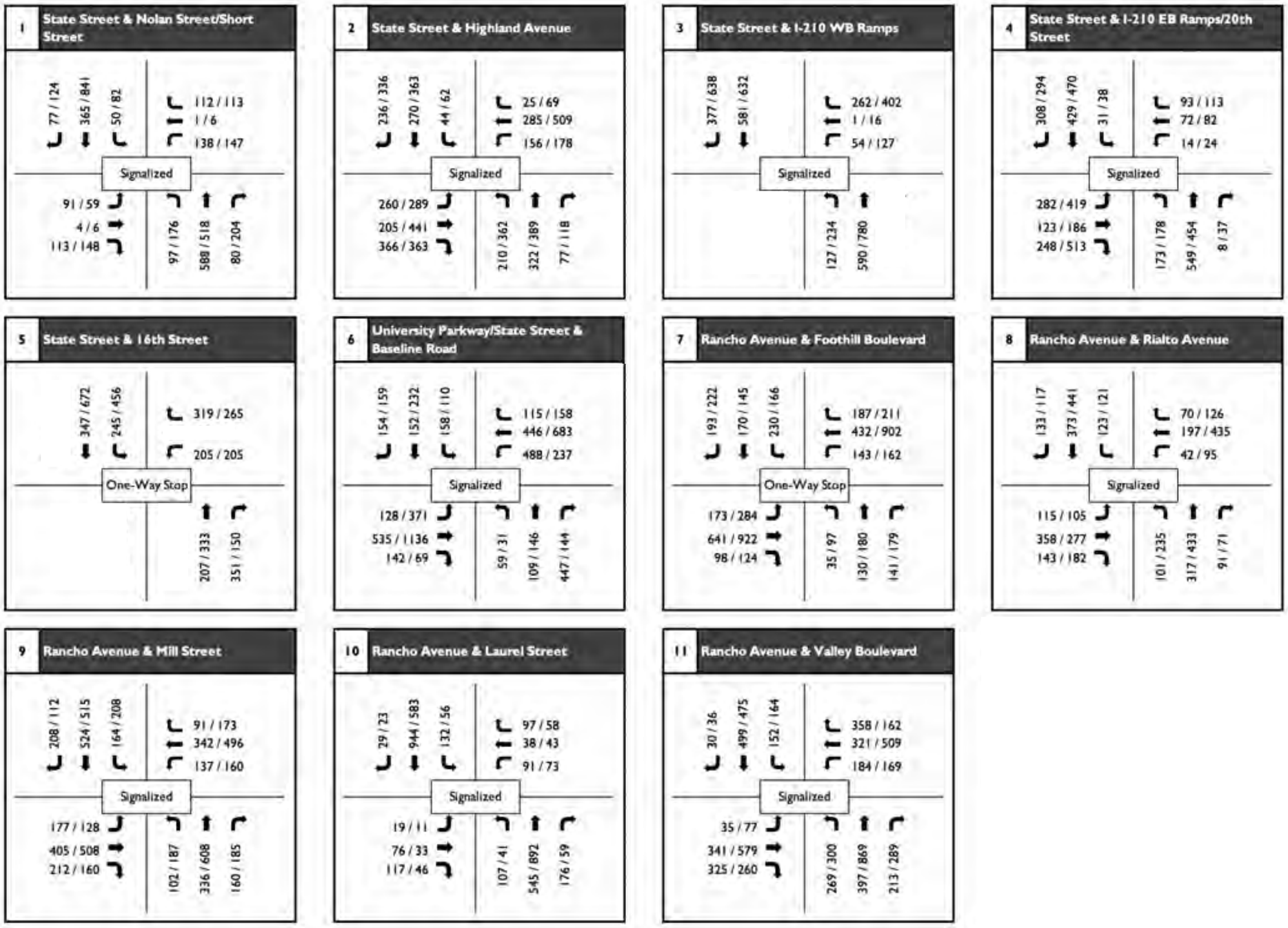
- State Street and 16th Street
- State Street/University Parkway and Baseline Street
- Rancho Avenue and Foothill Boulevard
- Rancho Avenue and Valley Boulevard

The following transportation improvements will mitigate the identified intersection operation deficiencies to less than significant:

- State Street and 16th Street – construct a traffic signal
- State Street/University Parkway and Baseline Street – construct a northbound exclusive right turn lane and modify signal timing to add an overlap phase for this movement.
- Rancho Avenue and Foothill Boulevard – construct a traffic signal
- Rancho Avenue and Valley Boulevard – construct an eastbound exclusive right turn lane

Figure 5-1 shows Buildout Conditions intersection turning movement volumes.

Buildout Conditions peak hour analysis worksheets are provided in **Appendix F**.



LEGEND
(AM/PM) Peak Hour Volumes

6.0 POST-MITIGATION ANALYSIS

This section provides post mitigation analysis results after the implementation of the recommended mitigation measures at impacted locations under all analyzed scenarios discussed in this report. **Table 6-1** shows the recommended improvements.

Table 6-1
Recommended Improvements

Intersection	Recommended Improvements		
	Existing Conditions (2019)	Opening Year (2022)	Buildout Conditions (2040)
7. State Street & 16th Street			Construct Traffic Signal
8. State Street/University Parkway & Baseline Street		Upgrade the existing traffic signal to serve the new north-leg of the intersection of State Street at Baseline Street.	Construct a northbound exclusive right turn lane and modify signal timing to add an overlap phase for this movement
9. Rancho Avenue & Foothill Boulevard	Construct Traffic Signal		Construct Traffic Signal
13. Rancho Avenue & Valley Boulevard			Construct an eastbound exclusive right turn lane

The following intersections warrant a traffic signal under at least one of the analysis scenarios.

- State Street and 16th Street
- Rancho Avenue and Foothill Boulevard

Traffic signal warrant worksheets for these intersections are provided in **Appendix G**.

EXISTING CONDITIONS (2019)

Table 6-2 displays the analysis results after the implementation of the mitigation measure shown in **Table 6-1** under Existing Year Conditions:

Table 6-2
Existing Conditions (2019) Intersection Operation Post-Mitigation Analysis

Intersection	Existing Conditions (2019)		Existing Conditions (2019) Post Mitigation	
	Delay(a)	LOS(b)	Delay(a)	LOS(b)
7. Rancho Avenue & Foothill Boulevard	24.9/102.5	C/**F**	12.6/13.2	B/B

As shown in the above table, the deficient location will be fully mitigated with the implementation of the proposed transportation improvements.

OPENING YEAR CONDITIONS (2022)

All study intersections would operate at acceptable LOS under Opening Year Phase 1 Conditions.

BUILDOUT CONDITIONS (2040)

Table 6-3 displays the analysis results after the implementation of the mitigation measures shown in **Table 6-1** under Buildout Conditions:

Table 6-3
Buildout Conditions (2040) Intersection Operation Post-Mitigation Analysis

Intersection	Buildout Conditions (2040)		Buildout Conditions (2040) Post Mitigation	
	Delay(a)	LOS(b)	Delay(a)	LOS(b)
5. State Street & 16th Street	114.5/>180	**F/F**	10.6/24.4	B/C
6. State Street/University Parkway & Baseline Street	86.3/45.1	**F**/D	51.7/43.5	D/D
7. Rancho Avenue & Foothill Boulevard	>180/>180	**F/F**	25.4/34.5	C/C
11. Rancho Avenue & Valley Boulevard	37.6/64.3	D/**E**	31.5/52.3	C/D

As shown in the above table, all deficient locations will be fully mitigated with the implementation of the proposed transportation improvements.

Post Mitigation peak hour analysis worksheets are provided in **Appendix H**.

QUEUING ANLAYSIS (2040)

Table 6-4 displays the queuing analysis results and recommended intersection storage length.

Table 6-4
Queueing Analysis and Recommended Intersection Storage Length

Intersection	Movement	Queue (ft)		Recommended Storage Length (ft)
		AM	PM	
5. State Street & 16th Street	SBL	166	245	250
6. State Street/University Parkway & Baseline Street	EBL	139	192	200
	EBR	156	175	200
	WBL	171	175	200
	WBR	93	128	150
	NBR	131	80	150
	SBL	161	99	200
7. Rancho Avenue & Foothill Boulevard	EBL	170	248	250
	EBR	38	137	150
	WBL	132	202	200
	WBR	53	215	200
	NBL	59	100	100
	NBR	85	93	-
	SBL	194	133	150
	SBR	50	112	-
11. Rancho Avenue & Valley Boulevard	EBR	113	135	150

Post Mitigation peak hour analysis worksheets are provided in **Appendix I**.

APPENDIX A -

TRAFFIC COUNT DATA

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	1
WEDNESDAY	EAST & WEST:	Short	CONTROL:	SIGNAL

PCE Adjusted	NOTES:									AM	▲ N
	Class	1	2	3	4	5	6			PM	
	Factor	1	1.5	2	3	2	2			MD	◄ W E ►
										OTHER	S
										OTHER	▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	1	2	2	0	1	1	0	1	1	1						
AM 7:00 AM	2	51	4	8	20	16	26	1	8	13	0	39	187					0
7:15 AM	10	75	5	14	45	21	37	0	13	14	1	50	282					0
7:30 AM	8	92	7	24	48	22	27	1	7	8	0	39	282					0
7:45 AM	4	86	9	22	49	24	20	2	7	14	0	44	279					0
8:00 AM	5	53	10	16	55	19	20	0	7	14	0	25	222					0
8:15 AM	5	69	6	19	46	33	22	1	12	14	1	39	266					0
8:30 AM	7	96	6	20	52	18	19	1	7	16	0	38	278					0
8:45 AM	6	85	9	19	60	27	23	0	11	12	0	38	288					0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
VOLUMES	47	606	54	140	374	179	192	6	71	104	2	309	2,081	0	0	0	0	0
APPROACH %	7%	86%	8%	20%	54%	26%	71%	2%	26%	25%	0%	75%						
APP/DEPART	707	/	1,107	692	/	548	268	/	200	415	/	227	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	27	306	30	75	196	86	103	3	33	50	1	157	1,063					
APPROACH %	7%	85%	8%	21%	55%	24%	74%	2%	24%	24%	0%	76%						
PEAK HR FACTOR		0.845			0.940			0.707			0.804		0.944					
APP/DEPART	362	/	565	356	/	278	139	/	107	208	/	113	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
4:00 PM	17	58	26	36	114	34	24	1	16	16	0	45	385					0
4:15 PM	8	60	19	38	92	37	12	1	11	10	2	37	324					0
4:30 PM	13	73	23	33	109	36	20	2	10	9	0	31	358					0
4:45 PM	9	71	12	29	97	34	22	2	8	8	2	31	322					0
5:00 PM	9	74	24	30	87	32	24	0	15	12	3	29	336					0
5:15 PM	10	69	27	24	84	30	33	1	13	11	0	44	342					0
5:30 PM	12	91	14	34	101	31	25	2	4	15	4	44	376					0
5:45 PM	12	66	17	28	73	36	27	1	12	13	1	40	324					0
VOLUMES	88	559	160	250	757	269	185	10	87	93	12	299	2,766	0	0	0	0	0
APPROACH %	11%	69%	20%	20%	59%	21%	66%	3%	31%	23%	3%	74%						
APP/DEPART	807	/	1,042	1,275	/	937	281	/	420	403	/	368	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	47	261	79	135	412	141	77	6	44	43	4	144	1,389					
APPROACH %	12%	68%	20%	20%	60%	20%	61%	4%	35%	23%	2%	76%						
PEAK HR FACTOR		0.888			0.936			0.788			0.779		0.902					
APP/DEPART	386	/	481	687	/	499	126	/	219	190	/	191	0					

State

NORTH SIDE

Short WEST SIDE EAST SIDE **Short**

SOUTH SIDE

State

AimTD LLC

TURNING MOVEMENT COUNTS

State / Short — San Bernardino — SC2069 — ALL HOURS

State (north leg)

1,967	447	1,130	390	TOTAL		2,149
1,275	269	757	250	PM		1,042
692	179	374	140	AM		1,107

Short (west leg)

TOTAL	PM	AM
595	368	227
376	185	192
16	10	6
158	87	71
549	281	268

Short (east leg)

AM	PM	TOTAL
415	403	818
309	299	608
2	12	14
104	93	197
200	420	619

State (south leg)

548		AM	47	606	54	707
937		PM	88	559	160	807
1,484		TOTAL	135	1,165	214	1,514

State

State / Short — PEAK HOUR

AM 7:15 AM

PM 5:00 PM

State (north leg)

1,043	226	608	209	TOTAL		1,046
687	141	412	135	PM		481
356	86	196	75	AM		565

Short (west leg)

TOTAL	PM	AM
304	191	113
179	77	103
9	6	3
77	44	33
253	126	127

Short (east leg)

AM	PM	TOTAL
208	190	398
157	144	301
1	4	5
50	43	93
107	219	326

State (south leg)

278		AM	27	306	30	362
499		PM	47	261	79	386
777		Total	73	566	108	747

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	State	LOCATION #:	1
	EAST & WEST:	Short	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
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E ►
S ▼

Add U-Turns to Left Turns

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	1	2	2	0	1	1	0	1	1	1		0	0	0	0	
AM	7:00 AM	2	47	4	7	19	15	24	1	8	11	0	33	171	0	0	0	0	0
	7:15 AM	10	70	4	13	39	19	32	0	12	14	1	46	260	0	0	0	0	0
	7:30 AM	8	89	7	22	45	21	27	1	5	7	0	31	263	0	0	0	0	0
	7:45 AM	3	84	8	21	42	22	18	2	7	14	0	41	262	0	0	0	0	0
	8:00 AM	5	51	8	15	50	19	17	0	6	11	0	24	206	0	0	0	0	0
	8:15 AM	5	66	6	14	40	31	19	1	11	12	1	32	238	0	0	0	0	0
	8:30 AM	6	90	6	18	48	17	18	1	7	10	0	35	256	0	0	0	0	0
	8:45 AM	6	80	8	16	54	25	20	0	9	11	0	33	262	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	45	577	51	126	337	169	175	6	65	90	2	275	1,918	0	0	0	0	0
	APPROACH %	7%	86%	8%	20%	53%	27%	71%	2%	26%	25%	1%	75%						
	APP/DEPART	673	/	1,027	632	/	492	246	/	183	367	/	216	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	26	294	27	71	176	81	94	3	30	46	1	142	991					
	APPROACH %	7%	85%	8%	22%	54%	25%	74%	2%	24%	24%	1%	75%						
	PEAK HR FACTOR		0.834			0.932			0.722			0.775		0.942					
	APP/DEPART	347	/	530	328	/	252	127	/	101	189	/	108	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	17	54	23	34	109	33	21	1	14	15	0	43	364	0	0	0	0	0
	4:15 PM	8	55	18	33	91	35	11	1	10	7	1	36	306	0	0	0	0	0
	4:30 PM	11	71	22	32	103	34	18	2	9	9	0	30	341	0	0	0	0	0
	4:45 PM	8	67	11	25	93	30	19	1	8	8	2	30	302	0	0	0	0	0
	5:00 PM	9	69	21	30	82	28	21	0	13	11	3	27	314	0	0	0	0	0
	5:15 PM	8	67	20	23	83	29	29	1	12	10	0	40	322	0	0	0	0	0
	5:30 PM	11	89	14	33	95	29	25	2	4	14	4	43	363	0	0	0	0	0
	5:45 PM	11	65	16	28	71	35	26	1	12	11	1	39	316	0	0	0	0	0
	VOLUMES	83	537	145	238	727	253	170	9	82	85	11	288	2,628	0	0	0	0	0
	APPROACH %	11%	70%	19%	20%	60%	21%	65%	3%	31%	22%	3%	75%						
	APP/DEPART	765	/	995	1,218	/	894	261	/	392	384	/	347	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	39	290	71	114	331	121	101	4	41	46	8	149	1,315					
	APPROACH %	10%	73%	18%	20%	58%	21%	69%	3%	28%	23%	4%	73%						
	PEAK HR FACTOR		0.877			0.901			0.869			0.832		0.906					
	APP/DEPART	400	/	540	566	/	418	146	/	189	203	/	168	0					

State

NORTH SIDE

Short WEST SIDE

EAST SIDE **Short**

SOUTH SIDE

State

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	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	0	0
	7:45 AM	0	0	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	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	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	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	1
WEDNESDAY	EAST & WEST:	Short	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	1	2	2	0	1	1	0	1	1	1						
AM																		
7:00 AM	2	42	4	5	17	14	22	1	8	9	0	29	153	0	0	0	0	0
7:15 AM	10	65	3	12	33	16	28	0	11	14	1	39	232	0	0	0	0	0
7:30 AM	8	85	7	20	41	20	27	1	4	6	0	22	241	0	0	0	0	0
7:45 AM	2	80	7	20	35	20	16	2	7	14	0	39	242	0	0	0	0	0
8:00 AM	5	48	6	14	45	19	14	0	5	8	0	22	186	0	0	0	0	0
8:15 AM	5	62	6	11	33	28	15	1	10	11	1	26	209	0	0	0	0	0
8:30 AM	5	85	6	16	42	16	17	1	7	5	0	33	233	0	0	0	0	0
8:45 AM	6	76	7	14	47	22	18	0	7	9	0	30	236	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	43	543	46	112	293	155	157	6	59	76	2	240	1,732	0	0	0	0	0
APPROACH %	7%	86%	7%	20%	52%	28%	71%	3%	27%	24%	1%	75%						
APP/DEPART	632	/	940	560	/	428	222	/	164	318	/	200	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	25	278	23	66	154	75	85	3	27	42	1	122	901					
APPROACH %	8%	85%	7%	22%	52%	25%	74%	3%	23%	25%	1%	74%						
PEAK HR FACTOR		0.815			0.910			0.737			0.764		0.931					
APP/DEPART	326	/	485	295	/	223	115	/	92	165	/	101	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	17	50	19	31	104	32	18	1	12	13	0	39	336	0	0	0	0	0
4:15 PM	8	49	17	27	89	32	10	1	9	5	0	35	282	0	0	0	0	0
4:30 PM	10	68	21	30	97	31	16	2	8	9	0	28	320	0	0	0	0	0
4:45 PM	7	63	10	21	87	28	15	0	8	8	2	29	278	0	0	0	0	0
5:00 PM	9	66	18	30	76	25	17	0	11	10	3	24	289	0	0	0	0	0
5:15 PM	5	64	16	22	81	28	25	1	11	9	0	36	298	0	0	0	0	0
5:30 PM	10	86	14	31	90	26	25	2	4	12	4	42	346	0	0	0	0	0
5:45 PM	10	64	14	28	70	33	25	1	12	7	1	38	303	0	0	0	0	0
VOLUMES	76	510	129	220	694	235	151	8	75	73	10	271	2,452	0	0	0	0	0
APPROACH %	11%	71%	18%	19%	60%	20%	65%	3%	32%	21%	3%	77%						
APP/DEPART	715	/	932	1,149	/	842	234	/	357	354	/	321	0					
BEGIN PEAK HR		5:00 PM																
VOLUMES	34	280	62	111	317	112	92	4	38	38	8	140	1,236					
APPROACH %	9%	74%	16%	21%	59%	21%	69%	3%	28%	20%	4%	75%						
PEAK HR FACTOR		0.855			0.918			0.882			0.802		0.893					
APP/DEPART	376	/	512	540	/	393	134	/	177	186	/	154	0					

State

NORTH SIDE

Short WEST SIDE

EAST SIDE **Short**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	1
	EAST & WEST:	Short	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	2	2	0	1	1	0	1	1	1	
AM													
7:00 AM	0	3	0	2	2	0	0	0	0	1	0	1	9
7:15 AM	0	3	1	1	3	2	1	0	1	0	0	7	19
7:30 AM	0	2	0	0	3	1	0	0	0	1	0	6	13
7:45 AM	1	4	1	1	2	0	1	0	0	0	0	1	11
8:00 AM	0	2	1	1	3	0	1	0	1	2	0	2	13
8:15 AM	0	2	0	0	4	2	3	0	0	0	0	3	14
8:30 AM	0	2	0	1	4	1	1	0	0	1	0	1	11
8:45 AM	0	2	1	1	4	3	0	0	1	2	0	1	15
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	20	4	7	25	9	7	0	3	7	0	22	105
APPROACH %	4%	80%	16%	17%	61%	22%	70%	0%	30%	24%	0%	76%	
APP/DEPART	25	/	49	41	/	35	10	/	11	29	/	10	0
BEGIN PEAK HR		7:15 AM											
VOLUMES	1	11	3	3	11	3	3	0	2	3	0	16	56
APPROACH %	7%	73%	20%	18%	65%	18%	60%	0%	40%	16%	0%	84%	
PEAK HR FACTOR		0.625			0.708			0.625			0.679		0.737
APP/DEPART	15	/	30	17	/	16	5	/	6	19	/	4	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	3	2	3	2	0	1	0	1	2	0	4	18
4:15 PM	0	3	1	5	2	3	0	0	1	0	1	1	17
4:30 PM	0	2	1	2	4	2	1	0	0	0	0	2	14
4:45 PM	1	3	1	3	4	0	3	1	0	0	0	0	16
5:00 PM	0	1	2	0	4	1	3	0	1	1	0	3	16
5:15 PM	3	3	1	1	2	1	2	0	1	1	0	3	18
5:30 PM	1	2	0	2	3	2	0	0	0	2	0	1	13
5:45 PM	1	1	2	0	0	2	1	0	0	4	0	1	12
VOLUMES	6	18	10	16	21	11	11	1	4	10	1	15	124
APPROACH %	18%	53%	29%	33%	44%	23%	69%	6%	25%	38%	4%	58%	
APP/DEPART	34	/	44	48	/	35	16	/	27	26	/	18	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	1	11	5	13	12	5	5	1	2	2	1	7	65
APPROACH %	6%	65%	29%	43%	40%	17%	63%	13%	25%	20%	10%	70%	
PEAK HR FACTOR		0.850			0.750			0.500			0.417		0.903
APP/DEPART	17	/	23	30	/	16	8	/	19	10	/	7	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

Short WEST SIDE

EAST SIDE **Short**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	1
WEDNESDAY	EAST & WEST:	Short	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short			TOTAL	U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	1	2	2	0	1	1	0	1	1	1						
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	1	0	1	0	0	0	0	0	2	0	0	0	0	0
7:30 AM	0	1	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0
7:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8:15 AM	0	0	0	1	1	0	0	0	0	0	0	1	3	0	0	0	0	0
8:30 AM	0	1	0	1	1	0	0	0	0	2	0	0	5	0	0	0	0	0
8:45 AM	0	0	0	0	2	0	1	0	0	0	0	0	3	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	3	0	3	8	0	2	0	0	2	0	1	19	0	0	0	0	0
APPROACH %	0%	100%	0%	27%	73%	0%	100%	0%	0%	67%	0%	33%						
APP/DEPART	3	/	6	11	/	10	2	/	3	3	/	0	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	0	2	0	2	4	0	1	0	0	2	0	1	12					
APPROACH %	0%	100%	0%	33%	67%	0%	100%	0%	0%	67%	0%	33%						
PEAK HR FACTOR		0.500			0.750			0.250			0.375		0.600					
APP/DEPART	2	/	4	6	/	6	1	/	2	3	/	0	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	2	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	1	0	1	0	0	0	3	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	3	2	0	0	0	2	0	3	1	0	1	12	0	0	0	0	0
APPROACH %	0%	60%	40%	0%	0%	0%	40%	0%	60%	50%	0%	50%						
APP/DEPART	5	/	6	0	/	4	5	/	2	2	/	0	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	0	2	2	0	0	0	1	0	2	1	0	1	9					
APPROACH %	0%	50%	50%	0%	0%	0%	33%	0%	67%	50%	0%	50%						
PEAK HR FACTOR		0.500			0.000			0.375			0.500		0.750					
APP/DEPART	4	/	4	0	/	3	3	/	2	2	/	0	0					

State

NORTH SIDE

Short WEST SIDE

EAST SIDE **Short**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	1
	EAST & WEST:	Short	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	1	2	2	0	1	1	0	1	1	1						
AM																		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0
7:15 AM	0	1	0	0	1	0	1	0	0	0	0	0	3	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	1	0	0	2	3	0	0	0	0	0
7:45 AM	0	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0
8:00 AM	0	0	0	0	1	0	0	0	0	1	0	0	2	0	0	0	0	0
8:15 AM	0	0	0	2	1	0	0	0	0	1	0	2	6	0	0	0	0	0
8:30 AM	0	2	0	0	0	0	0	0	0	1	0	1	4	0	0	0	0	0
8:45 AM	0	2	0	1	1	0	1	0	0	0	0	2	7	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	5	0	3	5	0	2	0	1	3	0	10	29	0	0	0	0	0
APPROACH %	0%	100%	0%	38%	63%	0%	67%	0%	33%	23%	0%	77%						
APP/DEPART	5	/	17	8	/	9	3	/	3	13	/	0	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	0	4	0	3	3	0	1	0	0	3	0	5	19					
APPROACH %	0%	100%	0%	50%	50%	0%	100%	0%	0%	38%	0%	63%						
PEAK HR FACTOR		0.500			0.500			0.250			0.667		0.679					
APP/DEPART	4	/	10	6	/	6	1	/	3	8	/	0	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
4:15 PM	0	0	0	1	0	0	0	0	0	1	0	0	2	0	0	0	0	0
4:30 PM	1	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0
4:45 PM	0	1	0	1	0	2	0	0	0	0	0	0	4	0	0	0	0	0
5:00 PM	0	2	1	0	1	1	0	0	0	0	0	0	5	0	0	0	0	0
5:15 PM	0	0	3	0	0	0	1	0	0	0	0	1	5	0	0	0	0	0
5:30 PM	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
VOLUMES	1	4	4	2	7	3	1	0	0	1	0	1	24	0	0	0	0	0
APPROACH %	11%	44%	44%	17%	58%	25%	100%	0%	0%	50%	0%	50%						
APP/DEPART	9	/	6	12	/	8	1	/	6	2	/	4	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	1	3	4	1	3	3	1	0	0	0	0	1	17					
APPROACH %	13%	38%	50%	14%	43%	43%	100%	0%	0%	0%	0%	100%						
PEAK HR FACTOR		0.667			0.583			0.250			0.250		0.850					
APP/DEPART	8	/	5	7	/	3	1	/	5	1	/	4	0					

State

NORTH SIDE

Short WEST SIDE

EAST SIDE **Short**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	1
	EAST & WEST:	Short	CONTROL:	SIGNAL

CLASS 5: RV

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	2	2	0	1	1	0	1	1	1	
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	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	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	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	0	0	0	0	0	0
5:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	1	0	1	0	0	0	0	0	2
APPROACH %	0%	0%	0%	0%	100%	0%	100%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	1	1	/	1	1	/	0	0	/	0	0
BEGIN PEAK HR		3:15 PM											
VOLUMES	0	0	0	0	1	0	0	0	0	0	0	0	1
APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.250			0.000			0.000		0.250
APP/DEPART	0	/	0	1	/	1	0	/	0	0	/	0	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

Short WEST SIDE

EAST SIDE **Short**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	1
WEDNESDAY	EAST & WEST:	Short	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Short			WESTBOUND Short			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	2	2	0	1	1	0	1	1	1	
AM													
7:00 AM	0	2	0	0	0	1	2	0	0	1	0	1	7
7:15 AM	0	1	0	0	1	1	1	0	0	0	0	0	4
7:30 AM	0	1	0	1	0	0	0	0	0	0	0	1	3
7:45 AM	0	0	0	0	2	2	1	0	0	0	0	0	5
8:00 AM	0	0	1	0	1	0	2	0	0	0	0	0	4
8:15 AM	0	2	0	0	1	1	1	0	1	0	0	0	6
8:30 AM	1	0	0	0	1	0	0	0	0	1	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	1	0	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	6	1	1	6	5	7	0	2	2	0	2	33
APPROACH %	13%	75%	13%	8%	50%	42%	78%	0%	22%	50%	0%	50%	
APP/DEPART	8	/	15	12	/	10	9	/	2	4	/	6	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	4	0	1	3	4	4	0	0	1	0	2	19
APPROACH %	0%	100%	0%	13%	38%	50%	100%	0%	0%	33%	0%	67%	
PEAK HR FACTOR		0.500			0.500			0.500			0.375		0.679
APP/DEPART	4	/	10	8	/	4	4	/	1	3	/	4	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	2	1	1	0	0	0	0	0	4
4:15 PM	0	2	0	0	0	0	1	0	0	0	0	0	3
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	2	0	1	0	0	0	0	0	3
5:00 PM	0	0	0	0	0	1	1	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	2	0	0	4	4	4	0	0	0	0	0	14
APPROACH %	0%	100%	0%	0%	50%	50%	100%	0%	0%	0%	0%	0%	
APP/DEPART	2	/	6	8	/	4	4	/	0	0	/	4	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	0	2	0	0	4	2	3	0	0	0	0	0	11
APPROACH %	0%	100%	0%	0%	67%	33%	100%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.250			0.500			0.750			0.000		0.688
APP/DEPART	2	/	5	6	/	4	3	/	0	0	/	2	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

Short WEST SIDE

EAST SIDE **Short**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY				
	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	2
	EAST & WEST:	Highland	CONTROL:	SIGNAL

PCE Adjusted	NOTES:								AM PM MD OTHER OTHER	N W E S
	Class	1	2	3	4	5	6			
	Factor	1	1.5	2	3	2	2			

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND Highland			WESTBOUND Highland				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	3	1	1	2	1	1	2	1	2	2	0						
AM	7:00 AM	24	53	21	13	65	10	15	20	43	52	23	4	341					0
	7:15 AM	28	57	29	10	62	23	19	25	41	51	37	6	386					0
	7:30 AM	22	63	22	9	47	22	28	29	57	65	42	7	413					0
	7:45 AM	18	93	37	11	49	18	20	36	23	43	42	8	395					0
	8:00 AM	19	51	37	12	51	12	19	32	39	35	26	8	338					0
	8:15 AM	18	56	43	11	45	12	13	36	38	46	29	10	354					0
	8:30 AM	17	65	36	10	60	13	18	34	21	49	28	11	360					0
	8:45 AM	23	57	34	10	44	19	17	32	31	53	35	14	366					0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	VOLUMES	168	494	256	85	423	128	148	242	292	392	261	66	2,952	0	0	0	0	0
	APPROACH %	18%	54%	28%	13%	67%	20%	22%	36%	43%	55%	36%	9%						
	APP/DEPART	918	/	708	635	/	1,106	682	/	582	718	/	557	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	92	265	108	43	223	73	82	110	164	210	144	24	1,535					
	APPROACH %	20%	57%	23%	13%	66%	22%	23%	31%	46%	56%	38%	6%						
	PEAK HR FACTOR		0.790			0.891			0.777			0.828		0.929					
	APP/DEPART	465	/	371	339	/	597	355	/	260	378	/	309	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	4:00 PM	32	80	29	17	82	33	10	53	43	59	50	12	498					0
	4:15 PM	39	78	25	12	79	24	18	49	34	43	61	13	474					0
	4:30 PM	30	82	48	13	90	21	16	57	48	64	74	10	549					0
	4:45 PM	31	81	51	19	60	32	21	50	29	53	49	20	493					0
	5:00 PM	40	65	44	10	67	17	16	66	37	65	56	9	490					0
	5:15 PM	57	77	34	21	70	29	27	58	34	61	77	24	565					0
	5:30 PM	36	67	37	8	81	25	16	52	35	56	72	15	498					0
	5:45 PM	31	71	40	13	70	22	23	42	21	89	89	23	532					0
	VOLUMES	294	601	306	112	597	202	146	424	280	487	527	124	4,098	0	0	0	0	0
	APPROACH %	24%	50%	25%	12%	66%	22%	17%	50%	33%	43%	46%	11%						
	APP/DEPART	1,201	/	871	910	/	1,363	850	/	842	1,138	/	1,023	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	157	305	176	62	286	98	79	229	148	241	255	62	2,097					
	APPROACH %	25%	48%	28%	14%	64%	22%	17%	50%	32%	43%	46%	11%						
	PEAK HR FACTOR		0.955			0.909			0.945			0.866		0.928					
	APP/DEPART	638	/	446	446	/	674	456	/	467	558	/	510	0					

State

NORTH SIDE

Highland WEST SIDE

EAST SIDE **Highland**

SOUTH SIDE

State

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino — SC2069 — ALL HOURS

State (North leg)

TOTAL	**1,545**	**330**	**1,019**	**196**
PM	**910**	202	597	112
AM	**635**	128	423	85

TOTAL	**1,579**
PM	871
AM	708

Highland (West leg)

TOTAL	**1,579**
PM	1,023
AM	557

TOTAL	**294**	**666**	**571**	**1,531**
PM	146	424	280	**850**
AM	148	242	292	**682**

Highland (East leg)

AM	**718**	66	261	392
PM	**1,138**	124	527	487
TOTAL	**1,856**	**190**	**787**	**879**

AM	582
PM	842
TOTAL	**1,424**

State (South leg)

AM	1,106
PM	1,363
TOTAL	**2,469**

AM	168	494	256	**918**
PM	294	601	306	**1,201**
TOTAL	**462**	**1,095**	**562**	**2,119**

PEAK HOUR

AM 7:00 AM

PM 5:00 PM

State (North leg)

TOTAL	**784**	**171**	**509**	**105**
PM	**446**	98	286	62
AM	**339**	73	223	43

TOTAL	**817**
PM	446
AM	371

Highland (West leg)

TOTAL	**720**
PM	510
AM	210

TOTAL	**79**	**339**	**311**	**810**
PM	79	229	148	**456**
AM	0	110	164	**355**

Highland (East leg)

AM	**378**	24	144	210
PM	**558**	62	255	241
TOTAL	**936**	**86**	**399**	**451**

AM	260
PM	467
TOTAL	**727**

State (South leg)

AM	597
PM	674
Total	**1,271**

AM	92	265	108	**465**
PM	157	305	176	**638**
Total	**249**	**570**	**284**	**1,103**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	State	LOCATION #:	2
	EAST & WEST:	Highland	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

Add U-Turns to Left Turns

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND Highland			WESTBOUND Highland				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	3	1	1	2	1	1	2	1	2	2	0		0	0	0	0	
AM	7:00 AM	22	49	19	9	64	10	15	19	40	50	23	3	323	0	0	0	0	0
	7:15 AM	27	56	26	8	58	21	19	24	39	47	37	6	368	0	0	0	0	0
	7:30 AM	21	61	21	7	42	20	27	29	50	62	42	6	388	0	0	0	0	0
	7:45 AM	17	90	34	7	46	16	19	34	22	40	39	6	370	0	0	0	0	0
	8:00 AM	17	49	34	9	46	11	19	29	38	34	25	6	317	0	0	0	0	0
	8:15 AM	17	51	37	11	42	11	12	35	34	39	28	8	325	0	0	0	0	0
	8:30 AM	16	56	35	9	52	11	18	32	21	44	27	11	332	0	0	0	0	0
	8:45 AM	20	53	32	9	39	18	16	31	29	49	33	12	341	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	157	465	238	69	389	118	145	233	273	365	254	58	2,764	0	0	0	0	0
	APPROACH %	18%	54%	28%	12%	68%	20%	22%	36%	42%	54%	38%	9%						
	APP/DEPART	860	/	668	576	/	1,027	651	/	540	677	/	529	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	87	256	100	31	210	67	80	106	151	199	141	21	1,449					
	APPROACH %	20%	58%	23%	10%	68%	22%	24%	31%	45%	55%	39%	6%						
	PEAK HR FACTOR		0.785			0.885			0.795			0.820		0.934					
	APP/DEPART	443	/	357	308	/	560	337	/	237	361	/	295	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	29	72	28	16	77	31	10	50	40	55	48	11	467	0	0	0	0	0
	4:15 PM	38	73	24	11	70	24	18	47	34	41	59	13	452	0	0	0	0	0
	4:30 PM	26	77	44	11	79	20	16	55	45	63	71	8	515	0	0	0	0	0
	4:45 PM	30	77	48	18	59	32	19	49	27	52	48	17	476	0	0	0	0	0
	5:00 PM	40	60	40	10	64	17	16	64	36	62	53	9	471	0	0	0	0	0
	5:15 PM	54	68	33	20	69	28	26	57	33	56	76	23	543	0	0	0	0	0
	5:30 PM	35	67	36	7	74	25	16	52	34	53	71	14	484	0	0	0	0	0
	5:45 PM	28	66	37	13	65	22	23	40	21	87	87	21	510	0	0	1	0	1
	VOLUMES	280	560	290	106	557	199	144	414	270	469	513	116	3,918	0	0	1	0	1
	APPROACH %	25%	50%	26%	12%	65%	23%	17%	50%	33%	43%	47%	11%						
	APP/DEPART	1,130	/	819	862	/	1,296	828	/	810	1,098	/	993	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	157	261	146	50	272	92	81	213	124	258	287	67	2,008					
	APPROACH %	28%	46%	26%	12%	66%	22%	19%	51%	30%	42%	47%	11%						
	PEAK HR FACTOR		0.910			0.885			0.901			0.785		0.924					
	APP/DEPART	564	/	408	414	/	654	418	/	409	612	/	537	0					

State

NORTH SIDE

Highland WEST SIDE EAST SIDE **Highland**

SOUTH SIDE

State

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	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	0	0
	7:45 AM	0	0	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	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	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	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	2
	EAST & WEST:	Highland	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Highland			WESTBOUND Highland				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	3	1	1	2	1	1	2	1	2	2	0						
AM 7:00 AM	21	44	17	6	62	10	15	17	36	48	23	2	301	0	0	0	0	0
7:15 AM	26	55	24	5	52	18	19	22	37	43	37	6	344	0	0	0	0	0
7:30 AM	20	57	19	5	37	17	26	29	43	56	42	5	356	0	0	0	0	0
7:45 AM	16	86	30	4	42	15	18	32	20	37	35	4	339	0	0	0	0	0
8:00 AM	15	46	31	5	42	10	19	26	37	32	23	4	290	0	0	0	0	0
8:15 AM	16	46	32	11	39	10	11	34	31	35	27	6	298	0	0	0	0	0
8:30 AM	14	50	34	8	43	10	18	29	21	39	26	11	303	0	0	0	0	0
8:45 AM	17	48	29	8	33	16	15	30	25	44	30	10	305	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	145	432	216	52	350	106	141	219	250	334	243	48	2,536	0	0	0	0	0
APPROACH %	18%	54%	27%	10%	69%	21%	23%	36%	41%	53%	39%	8%						
APP/DEPART	793	/	621	508	/	934	610	/	487	625	/	494	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	83	242	90	20	193	60	78	100	136	184	137	17	1,340					
APPROACH %	20%	58%	22%	7%	71%	22%	25%	32%	43%	54%	41%	5%						
PEAK HR FACTOR		0.786			0.875			0.801			0.820		0.941					
APP/DEPART	415	/	337	273	/	513	314	/	210	338	/	280	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	26	62	27	15	70	30	10	46	36	53	45	10	430	0	0	0	0	0
4:15 PM	36	67	22	9	62	24	18	44	34	38	57	13	424	0	0	0	0	0
4:30 PM	23	70	40	9	69	19	16	53	42	62	67	6	476	0	0	0	0	0
4:45 PM	28	73	42	17	57	32	17	48	25	51	47	15	452	0	0	0	0	0
5:00 PM	40	57	34	10	60	17	16	61	35	57	48	9	444	0	0	0	0	0
5:15 PM	50	59	32	19	68	27	25	56	31	50	74	22	513	0	0	0	0	0
5:30 PM	34	67	34	6	66	25	16	52	33	51	69	13	466	0	0	0	0	0
5:45 PM	26	60	35	13	58	22	23	38	21	83	84	19	482	0	0	1	0	1
VOLUMES	263	515	266	98	510	196	141	398	257	445	491	107	3,687	0	0	1	0	1
APPROACH %	25%	49%	25%	12%	63%	24%	18%	50%	32%	43%	47%	10%						
APP/DEPART	1,044	/	762	804	/	1,212	796	/	762	1,043	/	951	0					
BEGIN PEAK HR		5:00 PM																
VOLUMES	150	243	135	48	252	91	79	207	120	241	275	63	1,905					
APPROACH %	28%	46%	26%	12%	64%	23%	19%	51%	29%	42%	47%	11%						
PEAK HR FACTOR		0.936			0.857			0.908			0.778		0.928					
APP/DEPART	528	/	385	391	/	613	407	/	390	579	/	517	0					

State

NORTH SIDE

Highland WEST SIDE

EAST SIDE **Highland**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:				
2/6/19	LOCATION:	San Bernardino	PROJECT #:	SC2069
WEDNESDAY	NORTH & SOUTH:	State	LOCATION #:	2
	EAST & WEST:	Highland	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Highland			WESTBOUND Highland			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	3	1	1	2	1	1	2	1	2	2	0	
AM													
7:00 AM	0	4	1	1	2	0	0	2	2	1	0	1	14
7:15 AM	0	1	1	2	4	2	0	2	1	3	0	0	16
7:30 AM	0	4	2	0	2	2	0	0	4	6	0	0	20
7:45 AM	0	3	3	0	2	0	1	1	2	2	3	1	18
8:00 AM	1	2	1	3	2	1	0	1	1	2	2	0	16
8:15 AM	1	2	1	0	2	1	0	0	1	1	1	1	11
8:30 AM	2	2	1	0	4	0	0	3	0	3	1	0	16
8:45 AM	2	4	3	1	3	2	1	1	4	3	2	1	27
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	6	22	13	7	21	8	2	10	15	21	9	4	138
APPROACH %	15%	54%	32%	19%	58%	22%	7%	37%	56%	62%	26%	12%	
APP/DEPART	41	/	28	36	/	57	27	/	30	34	/	23	0
BEGIN PEAK HR		7:15 AM											
VOLUMES	6	10	6	4	11	4	1	5	6	9	6	2	70
APPROACH %	27%	45%	27%	21%	58%	21%	8%	42%	50%	53%	35%	12%	
PEAK HR FACTOR		0.611			0.594			0.500			0.708		0.648
APP/DEPART	22	/	13	19	/	26	12	/	15	17	/	16	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	2	6	1	1	5	0	0	3	3	0	2	0	23
4:15 PM	2	4	2	2	2	0	0	2	0	3	1	0	18
4:30 PM	1	6	3	1	5	1	0	1	0	1	2	1	22
4:45 PM	2	2	6	1	2	0	1	1	1	1	1	0	18
5:00 PM	0	0	4	0	3	0	0	3	0	5	5	0	20
5:15 PM	3	6	1	0	1	1	1	1	2	5	2	1	24
5:30 PM	1	0	2	0	5	0	0	0	1	1	2	1	13
5:45 PM	1	4	1	0	6	0	0	1	0	4	2	1	20
VOLUMES	12	28	20	5	29	2	2	12	7	20	17	4	158
APPROACH %	20%	47%	33%	14%	81%	6%	10%	57%	33%	49%	41%	10%	
APP/DEPART	60	/	34	36	/	56	21	/	37	41	/	31	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	6	14	14	2	11	2	2	6	3	12	10	2	84
APPROACH %	18%	41%	41%	13%	73%	13%	18%	55%	27%	50%	42%	8%	
PEAK HR FACTOR		0.850			0.536			0.688			0.600		0.875
APP/DEPART	34	/	18	15	/	26	11	/	22	24	/	18	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

Highland WEST SIDE

EAST SIDE **Highland**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	2
WEDNESDAY	EAST & WEST:	Highland	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER

▲ N / ◀ W / E ▶ / S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Highland			WESTBOUND Highland				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	3	1	1	2	1	1	2	1	2	2	0						
AM																		
7:00 AM	0	0	0	0	0	0	0	0	2	1	0	0	3	0	0	0	0	0
7:15 AM	0	0	0	0	2	1	0	0	1	0	0	0	4	0	0	0	0	0
7:30 AM	0	0	0	0	1	1	1	0	1	0	0	0	4	0	0	0	0	0
7:45 AM	1	0	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0
8:00 AM	1	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
8:15 AM	0	1	1	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0
8:30 AM	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
8:45 AM	0	0	0	0	1	0	0	0	0	2	0	0	3	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	2	2	1	1	7	2	2	0	4	3	0	0	24	0	0	0	0	0
APPROACH %	40%	40%	20%	10%	70%	20%	33%	0%	67%	100%	0%	0%						
APP/DEPART	5	/	4	10	/	14	6	/	2	3	/	4	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	1	0	0	1	4	2	1	0	4	1	0	0	14					
APPROACH %	100%	0%	0%	14%	57%	29%	20%	0%	80%	100%	0%	0%						
PEAK HR FACTOR		0.250			0.583			0.625			0.250		0.875					
APP/DEPART	1	/	1	7	/	9	5	/	1	1	/	3	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	3	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0
4:15 PM	0	0	0	0	2	0	0	1	0	0	0	0	3	0	0	0	0	0
4:30 PM	1	0	0	0	0	0	0	1	0	0	2	0	4	0	0	0	0	0
4:45 PM	0	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
5:00 PM	0	1	2	0	1	0	0	0	1	0	0	0	5	0	0	0	0	0
5:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	0	1	0	0	1	0	3	0	0	0	0	0
VOLUMES	2	6	2	0	4	0	1	3	1	0	3	0	22	0	0	0	0	0
APPROACH %	20%	60%	20%	0%	100%	0%	20%	60%	20%	0%	100%	0%						
APP/DEPART	10	/	7	4	/	5	5	/	5	3	/	5	0					
BEGIN PEAK HR		4:15 PM																
VOLUMES	1	2	2	0	3	0	1	2	1	0	2	0	14					
APPROACH %	20%	40%	40%	0%	100%	0%	25%	50%	25%	0%	100%	0%						
PEAK HR FACTOR		0.417			0.375			1.000			0.250		0.700					
APP/DEPART	5	/	3	3	/	4	4	/	4	2	/	3	0					

State

NORTH SIDE

Highland WEST SIDE

EAST SIDE **Highland**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	2
	EAST & WEST:	Highland	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Highland			WESTBOUND Highland			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	3	1	1	2	1	1	2	1	2	2	0	
AM													
7:00 AM	1	1	0	1	0	0	0	0	0	0	0	0	3
7:15 AM	0	0	1	0	0	0	0	0	0	1	0	0	2
7:30 AM	0	0	0	0	1	0	0	0	2	0	0	0	3
7:45 AM	0	0	0	1	0	1	0	0	0	1	0	0	3
8:00 AM	0	0	0	0	2	0	0	0	0	0	0	0	2
8:15 AM	0	1	1	0	1	0	0	0	1	3	0	0	7
8:30 AM	0	4	0	0	1	1	0	0	0	1	0	0	7
8:45 AM	1	1	0	0	0	0	0	0	0	0	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	2	7	2	2	5	2	0	0	3	6	0	0	29
APPROACH %	18%	64%	18%	22%	56%	22%	0%	0%	100%	100%	0%	0%	
APP/DEPART	11	/	7	9	/	14	3	/	4	6	/	4	0
BEGIN PEAK HR		7:45 AM											
VOLUMES	0	5	1	1	4	2	0	0	1	5	0	0	19
APPROACH %	0%	83%	17%	14%	57%	29%	0%	0%	100%	100%	0%	0%	
PEAK HR FACTOR		0.375			0.875			0.250			0.417		0.679
APP/DEPART	6	/	5	7	/	10	1	/	2	5	/	2	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	1	0	0	0	1	0	0	0	2	0	0	5
4:15 PM	0	1	0	0	2	0	0	0	0	0	0	0	3
4:30 PM	1	1	1	0	3	0	0	0	0	0	0	0	6
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	1	2
5:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	3	0	0	0	0	0	0	0	1	0	0	4
5:30 PM	0	0	0	0	1	0	0	0	0	1	0	0	2
5:45 PM	1	1	1	0	1	0	0	0	0	0	0	0	4
VOLUMES	3	10	2	0	7	1	0	0	0	4	0	1	28
APPROACH %	20%	67%	13%	0%	88%	13%	0%	0%	0%	80%	0%	20%	
APP/DEPART	15	/	11	8	/	11	0	/	2	5	/	4	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	2	4	1	0	5	1	0	0	0	2	0	1	16
APPROACH %	29%	57%	14%	0%	83%	17%	0%	0%	0%	67%	0%	33%	
PEAK HR FACTOR		0.583			0.500			0.000			0.375		0.667
APP/DEPART	7	/	5	6	/	7	0	/	1	3	/	3	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

Highland WEST SIDE

EAST SIDE **Highland**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	2
	EAST & WEST:	Highland	CONTROL:	SIGNAL

CLASS 5: RV

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND Highland			WESTBOUND Highland				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	3	1	1	2	1	1	2	1	2	2	0						
AM																		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	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	0	0	0	0	0
7:45 AM	0	0	0	0	0	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	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	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	0	0	0	0	0
4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	1	/	1	0	/	0	0	/	0	0					
BEGIN PEAK HR		3:45 PM																
VOLUMES	0	0	0	0	1	0	0	0	0	0	0	0	1					
APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.250			0.000			0.000		0.250					
APP/DEPART	0	/	0	1	/	1	0	/	0	0	/	0	0					

State

NORTH SIDE

Highland WEST SIDE

EAST SIDE **Highland**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:				
2/6/19	LOCATION: San Bernardino		PROJECT #:	SC2069
WEDNESDAY	NORTH & SOUTH: State		LOCATION #:	2
	EAST & WEST: Highland		CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

▲ N S ▼ ◄ W E ►

		NORTHBOUND (State)			SOUTHBOUND (State)			EASTBOUND (Highland)			WESTBOUND (Highland)				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	3	1	1	2	1	1	2	1	2	2	0						
AM	7:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	7:15 AM	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	7:30 AM	1	0	0	2	1	0	0	0	0	0	0	1	5	0	0	0	0	0
	7:45 AM	0	1	1	1	1	0	0	1	0	0	1	1	7	0	0	0	0	0
	8:00 AM	0	0	2	1	0	0	0	2	0	0	0	2	7	0	0	0	0	0
	8:15 AM	0	1	2	0	0	0	0	1	1	0	0	1	6	0	0	0	0	0
	8:30 AM	0	0	0	1	2	0	0	0	0	1	0	0	4	0	0	0	0	0
	8:45 AM	0	0	0	0	2	0	0	0	0	0	1	1	4	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	2	2	6	7	6	0	0	4	1	1	2	6	37	0	0	0	0	0
	APPROACH %	20%	20%	60%	54%	46%	0%	0%	80%	20%	11%	22%	67%						
	APP/DEPART	10	/	8	13	/	8	5	/	17	9	/	4	0					
	BEGIN PEAK HR		7:30 AM																
	VOLUMES	1	2	5	4	2	0	0	4	1	0	1	5	25					
	APPROACH %	13%	25%	63%	67%	33%	0%	0%	80%	20%	0%	17%	83%						
	PEAK HR FACTOR		0.667			0.500			0.625			0.750		0.893					
	APP/DEPART	8	/	7	6	/	3	5	/	13	6	/	2	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	1	0	0	1	1	0	1	1	5	0	0	0	0	0
	4:15 PM	0	1	0	0	2	0	0	0	0	0	1	0	4	0	0	0	0	0
	4:30 PM	0	0	0	1	1	0	0	0	3	0	0	1	6	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	2	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	5:30 PM	0	0	0	1	2	0	0	0	0	0	0	0	3	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
	VOLUMES	0	1	0	3	6	0	0	1	5	0	2	4	22	0	0	0	0	0
	APPROACH %	0%	100%	0%	33%	67%	0%	0%	17%	83%	0%	33%	67%						
	APP/DEPART	1	/	5	9	/	11	6	/	4	6	/	2	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	0	1	0	1	4	0	0	1	5	0	2	3	17					
	APPROACH %	0%	100%	0%	20%	80%	0%	0%	17%	83%	0%	40%	60%						
	PEAK HR FACTOR		0.250			0.625			0.500			0.625		0.708					
	APP/DEPART	1	/	4	5	/	9	6	/	2	5	/	2	0					

State

NORTH SIDE

Highland WEST SIDE

EAST SIDE **Highland**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	3
WEDNESDAY	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

PCE Adjusted	NOTES:								AM
	Class	1	2	3	4	5	6		PM
	Factor	1	1.5	2	3	2	2		MD
									OTHER
									OTHER

N ▲ / S ▼ / ◄ W / E ►

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3						
AM 7:00 AM	65	57	0	0	86	74	0	0	0	25	1	41	347					0
7:15 AM	53	75	0	0	83	71	0	0	0	23	2	39	344					0
7:30 AM	42	60	0	0	97	73	0	0	0	26	0	47	343					0
7:45 AM	58	94	0	0	52	63	0	0	0	22	0	52	341					0
8:00 AM	34	54	0	0	64	61	0	0	0	32	0	52	297					0
8:15 AM	36	58	0	0	70	58	0	0	0	24	0	59	303					0
8:30 AM	42	72	0	0	57	72	0	0	0	30	0	46	318					0
8:45 AM	24	54	0	0	60	68	0	0	0	32	0	60	297					0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
VOLUMES	352	522	0	0	567	538	0	0	0	213	3	395	2,588	0	0	0	0	0
APPROACH %	40%	60%	0%	0%	51%	49%	0%	0%	0%	35%	0%	65%						
APP/DEPART	874	/	917	1,105	/	780	0	/	0	610	/	892	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	217	285	0	0	317	280	0	0	0	95	3	179	1,374					
APPROACH %	43%	57%	0%	0%	53%	47%	0%	0%	0%	34%	1%	65%						
PEAK HR FACTOR		0.828			0.882			0.000			0.932		0.990					
APP/DEPART	502	/	464	597	/	412	0	/	0	276	/	499	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
4:00 PM	41	77	0	0	79	105	0	0	0	28	0	64	392					0
4:15 PM	36	76	0	0	72	84	0	0	0	17	3	66	353					0
4:30 PM	33	97	0	0	103	96	0	0	0	27	4	63	421					0
4:45 PM	38	91	0	0	58	86	0	0	0	30	1	73	375					0
5:00 PM	51	75	0	0	75	93	0	0	0	35	4	74	407					0
5:15 PM	44	100	0	0	63	101	0	0	0	16	8	67	399					0
5:30 PM	40	78	0	0	75	92	0	0	0	26	6	62	377					0
5:45 PM	40	98	0	0	65	117	0	0	0	31	2	44	396					0
VOLUMES	322	691	0	0	589	772	0	0	0	208	27	511	3,118	0	0	0	0	0
APPROACH %	32%	68%	0%	0%	43%	57%	0%	0%	0%	28%	4%	69%						
APP/DEPART	1,012	/	1,201	1,361	/	797	0	/	0	745	/	1,121	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	166	362	0	0	299	376	0	0	0	107	17	276	1,601					
APPROACH %	31%	69%	0%	0%	44%	56%	0%	0%	0%	27%	4%	69%						
PEAK HR FACTOR		0.916			0.847			0.000			0.884		0.951					
APP/DEPART	528	/	638	674	/	406	0	/	0	400	/	558	0					

State

NORTH SIDE

SR-210 WB Ramps WEST SIDE

EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC2069

ALL HOURS

State (north approach)

2,320	**1,310**	**1,156**	**0**	**TOTAL**
1,294	772	589	0	**PM**
1,026	538	567	0	**AM**

1,989	
1,130	
859	

SR-210 WB Ramps (west)

TOTAL	**PM**	**AM**
1,927	1,081	846
0	0	0
0	0	0
0	0	0
0	**0**	**0**

SR-210 WB Ramps (east)

AM	**PM**	**TOTAL**
573	**710**	**1,283**
395	511	**906**
3	27	**30**
213	208	**420**
0	0	**0**

State (south approach)

726	**AM**	352	522	0	**832**
755	**PM**	322	691	0	**962**
1,481	**TOTAL**	**674**	**1,212**	**0**	**1,794**

State

State (north approach)

1,271	**655**	**616**	**0**	**TOTAL**
674	376	299	0	**PM**
597	280	317	0	**AM**

1,102	
638	
464	

PEAK HOUR

AM 7:00 AM

PM 4:30 PM

SR-210 WB Ramps (west)

TOTAL	**PM**	**AM**
1,056	558	499
0	0	0
0	0	0
0	0	0
0	**0**	**0**

SR-210 WB Ramps (east)

AM	**PM**	**TOTAL**
276	**400**	**676**
179	276	**455**
3	17	**19**
95	107	**202**
0	0	**0**

State (south approach)

412	**AM**	217	285	0	**502**
406	**PM**	166	362	0	**528**
818	**Total**	**382**	**647**	**0**	**1,029**

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	State	LOCATION #:	3
	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N ◄ W E ► S ▼

Add U-Turns to Left Turns

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3		0	0	0	0	
AM 7:00 AM	63	54	0	0	81	73	0	0	0	24	1	36	332	0	0	0	0	0
7:15 AM	53	71	0	0	77	67	0	0	0	23	1	38	330	0	0	0	0	0
7:30 AM	41	58	0	0	86	68	0	0	0	23	0	45	321	0	0	0	0	0
7:45 AM	56	92	0	0	49	59	0	0	0	21	0	48	325	0	0	0	0	0
8:00 AM	31	50	0	0	64	54	0	0	0	30	0	50	279	0	0	0	0	0
8:15 AM	35	51	0	0	61	54	0	0	0	22	0	54	277	0	0	0	0	0
8:30 AM	40	65	0	0	53	63	0	0	0	27	0	42	290	0	0	0	0	0
8:45 AM	24	48	0	0	54	63	0	0	0	31	0	57	277	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	343	489	0	0	525	501	0	0	0	201	2	370	2,431	0	0	0	0	0
APPROACH %	41%	59%	0%	0%	51%	49%	0%	0%	0%	35%	0%	65%						
APP/DEPART	832	/	859	1,026	/	726	0	/	0	573	/	846	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	213	275	0	0	293	267	0	0	0	91	2	167	1,308					
APPROACH %	44%	56%	0%	0%	52%	48%	0%	0%	0%	35%	1%	64%						
PEAK HR FACTOR		0.824			0.909			0.000			0.942		0.985					
APP/DEPART	488	/	442	560	/	384	0	/	0	260	/	482	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	40	70	0	0	75	97	0	0	0	27	0	59	368	0	0	0	0	0
4:15 PM	35	73	0	0	67	78	0	0	0	16	2	62	333	0	0	0	0	0
4:30 PM	33	88	0	0	95	92	0	0	0	26	3	59	396	0	0	0	0	0
4:45 PM	36	87	0	0	56	82	0	0	0	30	1	68	360	0	0	0	0	0
5:00 PM	51	70	0	0	72	90	0	0	0	32	4	70	389	0	0	0	0	0
5:15 PM	43	89	0	0	60	98	0	0	0	14	8	66	378	0	0	0	0	0
5:30 PM	40	77	0	0	69	90	0	0	0	25	5	61	367	0	0	0	0	0
5:45 PM	40	90	0	0	62	111	0	0	0	29	2	41	375	0	0	0	0	0
VOLUMES	318	644	0	0	556	738	0	0	0	199	25	486	2,966	0	0	0	0	0
APPROACH %	33%	67%	0%	0%	43%	57%	0%	0%	0%	28%	4%	68%						
APP/DEPART	962	/	1,130	1,294	/	755	0	/	0	710	/	1,081	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	163	334	0	0	283	362	0	0	0	102	16	263	1,523					
APPROACH %	33%	67%	0%	0%	44%	56%	0%	0%	0%	27%	4%	69%						
PEAK HR FACTOR		0.941			0.862			0.000			0.899		0.961					
APP/DEPART	497	/	597	645	/	385	0	/	0	381	/	541	0					

State

NORTH SIDE

SR-210 WB Ramps WEST SIDE EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	3
	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3	
AM 7:00 AM	60	52	0	0	74	72	0	0	0	23	1	30	312
7:15 AM	53	68	0	0	69	63	0	0	0	23	0	37	313
7:30 AM	40	54	0	0	76	60	0	0	0	20	0	42	292
7:45 AM	53	89	0	0	44	55	0	0	0	20	0	42	303
8:00 AM	28	45	0	0	64	47	0	0	0	27	0	47	258
8:15 AM	34	46	0	0	53	52	0	0	0	20	0	48	253
8:30 AM	36	61	0	0	48	54	0	0	0	24	0	37	260
8:45 AM	24	43	0	0	47	55	0	0	0	29	0	51	249
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	328	458	0	0	475	458	0	0	0	186	1	334	2,240
APPROACH %	42%	58%	0%	0%	51%	49%	0%	0%	0%	36%	0%	64%	
APP/DEPART	786	/	792	933	/	661	0	/	0	521	/	787	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	206	263	0	0	263	250	0	0	0	86	1	151	1,220
APPROACH %	44%	56%	0%	0%	51%	49%	0%	0%	0%	36%	0%	63%	
PEAK HR FACTOR		0.826			0.878			0.000			0.960		0.974
APP/DEPART	469	/	414	513	/	349	0	/	0	238	/	457	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	39	61	0	0	71	88	0	0	0	25	0	54	338
4:15 PM	34	68	0	0	62	72	0	0	0	15	1	57	309
4:30 PM	33	77	0	0	87	87	0	0	0	25	2	56	367
4:45 PM	34	81	0	0	54	78	0	0	0	30	1	62	340
5:00 PM	51	65	0	0	68	84	0	0	0	29	4	66	367
5:15 PM	41	77	0	0	54	95	0	0	0	11	8	64	350
5:30 PM	40	75	0	0	62	87	0	0	0	24	4	60	352
5:45 PM	40	82	0	0	56	105	0	0	0	26	2	39	350
VOLUMES	312	586	0	0	514	696	0	0	0	185	22	458	2,773
APPROACH %	35%	65%	0%	0%	42%	58%	0%	0%	0%	28%	3%	69%	
APP/DEPART	898	/	1,044	1,210	/	699	0	/	0	665	/	1,030	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	159	300	0	0	263	344	0	0	0	95	15	248	1,424
APPROACH %	35%	65%	0%	0%	43%	57%	0%	0%	0%	27%	4%	69%	
PEAK HR FACTOR		0.972			0.872			0.000			0.904		0.970
APP/DEPART	459	/	548	607	/	358	0	/	0	358	/	518	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

SR-210 WB Ramps WEST SIDE

EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:				
2/6/19	LOCATION:	San Bernardino	PROJECT #:	SC2069
WEDNESDAY	NORTH & SOUTH:	State	LOCATION #:	3
	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

CLASS 2:	NOTES:	
2-AXLE WORK VEHICLES/ TRUCKS		AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3						
AM																		
7:00 AM	3	1	0	0	4	1	0	0	0	1	0	4	14	0	0	0	0	0
7:15 AM	0	1	0	0	5	3	0	0	0	0	1	1	11	0	0	0	0	0
7:30 AM	1	4	0	0	5	7	0	0	0	1	0	2	20	0	0	0	0	0
7:45 AM	3	2	0	0	4	2	0	0	0	0	0	4	15	0	0	0	0	0
8:00 AM	2	2	0	0	0	5	0	0	0	2	0	2	13	0	0	0	0	0
8:15 AM	1	1	0	0	4	0	0	0	0	1	0	3	10	0	0	0	0	0
8:30 AM	4	1	0	0	3	4	0	0	0	2	0	4	18	0	0	0	0	0
8:45 AM	0	3	0	0	3	7	0	0	0	2	0	6	21	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	14	15	0	0	28	29	0	0	0	9	1	26	122	0	0	0	0	0
APPROACH %	48%	52%	0%	0%	49%	51%	0%	0%	0%	25%	3%	72%						
APP/DEPART	29	/	41	57	/	37	0	/	0	36	/	44	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	7	7	0	0	10	16	0	0	0	7	0	15	62					
APPROACH %	50%	50%	0%	0%	38%	62%	0%	0%	0%	32%	0%	68%						
PEAK HR FACTOR		0.700			0.650			0.000			0.688		0.738					
APP/DEPART	14	/	22	26	/	17	0	/	0	22	/	23	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	6	0	0	1	7	0	0	0	2	0	3	20	0	0	0	0	0
4:15 PM	1	4	0	0	2	3	0	0	0	1	0	4	15	0	0	0	0	0
4:30 PM	0	9	0	0	2	4	0	0	0	1	1	1	18	0	0	0	0	0
4:45 PM	1	5	0	0	1	3	0	0	0	0	0	5	15	0	0	0	0	0
5:00 PM	0	2	0	0	2	6	0	0	0	2	0	2	14	0	0	0	0	0
5:15 PM	2	8	0	0	6	2	0	0	0	3	0	2	23	0	0	0	0	0
5:30 PM	0	2	0	0	4	3	0	0	0	1	1	1	12	0	0	0	0	0
5:45 PM	0	5	0	0	6	4	0	0	0	3	0	1	19	0	0	0	0	0
VOLUMES	5	41	0	0	24	32	0	0	0	13	2	19	136	0	0	0	0	0
APPROACH %	11%	89%	0%	0%	43%	57%	0%	0%	0%	38%	6%	56%						
APP/DEPART	46	/	60	56	/	37	0	/	0	34	/	39	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	3	24	0	0	11	15	0	0	0	6	1	10	70					
APPROACH %	11%	89%	0%	0%	42%	58%	0%	0%	0%	35%	6%	59%						
PEAK HR FACTOR		0.675			0.813			0.000			0.850		0.761					
APP/DEPART	27	/	34	26	/	17	0	/	0	17	/	19	0					

State

NORTH SIDE

SR-210 WB Ramps WEST SIDE

EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	3
WEDNESDAY	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

N ▲ ◀ W E ▶ S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3						
AM 7:00 AM	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0
7:15 AM	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0
7:30 AM	0	0	0	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0
7:45 AM	0	0	0	0	0	1	0	0	0	0	0	1	2	0	0	0	0	0
8:00 AM	0	1	0	0	0	0	0	0	0	1	0	1	3	0	0	0	0	0
8:15 AM	0	2	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0
8:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0
8:45 AM	0	0	0	0	2	1	0	0	0	0	0	0	3	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	3	0	0	9	5	0	0	0	2	0	2	21	0	0	0	0	0
APPROACH %	0%	100%	0%	0%	64%	36%	0%	0%	0%	50%	0%	50%						
APP/DEPART	3	/	5	14	/	11	0	/	0	4	/	5	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	0	3	0	0	2	3	0	0	0	2	0	1	11					
APPROACH %	0%	100%	0%	0%	40%	60%	0%	0%	0%	67%	0%	33%						
PEAK HR FACTOR		0.375			0.417			0.000			0.375		0.917					
APP/DEPART	3	/	4	5	/	4	0	/	0	3	/	3	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	2	0	0	1	0	0	0	0	0	0	1	4	0	0	0	0	0
4:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
5:00 PM	0	2	0	0	2	0	0	0	0	0	0	1	5	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
VOLUMES	0	7	0	0	3	2	0	0	0	0	0	3	15	0	0	0	0	0
APPROACH %	0%	100%	0%	0%	60%	40%	0%	0%	0%	0%	0%	100%						
APP/DEPART	7	/	10	5	/	3	0	/	0	3	/	2	0					
BEGIN PEAK HR		4:15 PM																
VOLUMES	0	3	0	0	2	2	0	0	0	0	0	2	9					
APPROACH %	0%	100%	0%	0%	50%	50%	0%	0%	0%	0%	0%	100%						
PEAK HR FACTOR		0.375			0.500			0.000			0.500		0.450					
APP/DEPART	3	/	5	4	/	2	0	/	0	2	/	2	0					

State

NORTH SIDE

SR-210 WB Ramps WEST SIDE

EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	3
WEDNESDAY	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER

▲ N / ◄ W / E ► / S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3						
AM 7:00 AM	0	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0
7:15 AM	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0
7:30 AM	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0
7:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
8:00 AM	1	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0
8:15 AM	0	2	0	0	3	2	0	0	0	0	0	0	7	0	0	0	0	0
8:30 AM	0	3	0	0	0	2	0	0	0	1	0	1	7	0	0	0	0	0
8:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	9	0	0	6	8	0	0	0	1	0	2	27	0	0	0	0	0
APPROACH %	10%	90%	0%	0%	43%	57%	0%	0%	0%	33%	0%	67%						
APP/DEPART	10	/	11	14	/	7	0	/	0	3	/	9	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	1	7	0	0	3	6	0	0	0	1	0	1	19					
APPROACH %	13%	88%	0%	0%	33%	67%	0%	0%	0%	50%	0%	50%						
PEAK HR FACTOR		0.667			0.450			0.000			0.250		0.679					
APP/DEPART	8	/	8	9	/	4	0	/	0	2	/	7	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	1	0	0	0	2	0	0	0	0	0	1	4	0	0	0	0	0
4:15 PM	0	0	0	0	1	1	0	0	0	0	0	1	3	0	0	0	0	0
4:30 PM	0	2	0	0	1	1	0	0	0	0	0	1	5	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	1	2	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	1	0	1	3	0	0	0	0	0
5:15 PM	0	3	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	0
5:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
5:45 PM	0	2	0	0	0	2	0	0	0	0	0	1	5	0	0	0	0	0
VOLUMES	0	9	0	0	3	8	0	0	0	1	0	6	27	0	0	0	0	0
APPROACH %	0%	100%	0%	0%	27%	73%	0%	0%	0%	14%	0%	86%						
APP/DEPART	9	/	15	11	/	4	0	/	0	7	/	8	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	0	6	0	0	1	3	0	0	0	1	0	3	14					
APPROACH %	0%	100%	0%	0%	25%	75%	0%	0%	0%	25%	0%	75%						
PEAK HR FACTOR		0.500			0.500			0.000			0.500		0.700					
APP/DEPART	6	/	9	4	/	2	0	/	0	4	/	3	0					

State

NORTH SIDE

SR-210 WB Ramps WEST SIDE

EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	3
WEDNESDAY	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

CLASS 5: RV

NOTES:

AM
PM
MD
OTHER
OTHER

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	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3						
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	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	0	0	0	0	0
7:45 AM	0	0	0	0	0	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	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	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	0	0	0	0	0
4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	1	/	1	0	/	0	0	/	0	0					
BEGIN PEAK HR		3:45 PM																
VOLUMES	0	0	0	0	1	0	0	0	0	0	0	0	1					
APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.250			0.000			0.000		0.250					
APP/DEPART	0	/	0	1	/	1	0	/	0	0	/	0	0					

State

NORTH SIDE

SR-210 WB Ramps WEST SIDE

EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	3
	EAST & WEST:	SR-210 WB Ramps	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND SR-210 WB Ramps			WESTBOUND SR-210 WB Ramps			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
LANES:	2	2	X	X	1.5	1.5	X	X	X	1.3	0.3	1.3	
AM													
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	1	0	0	0	0	2	0	1	4
7:45 AM	0	1	0	0	1	0	0	0	0	1	0	1	4
8:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	0	0	0	1	0	0	0	0	0	0	3	4
8:30 AM	0	0	0	0	2	1	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	4	0	0	7	1	0	0	0	3	0	6	21
APPROACH %	0%	100%	0%	0%	88%	13%	0%	0%	0%	33%	0%	67%	
APP/DEPART	4	/	10	8	/	10	0	/	0	9	/	1	0
BEGIN PEAK HR		7:30 AM											
VOLUMES	0	3	0	0	3	0	0	0	0	3	0	5	14
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	38%	0%	63%	
PEAK HR FACTOR		0.375			0.750			0.000			0.667		0.875
APP/DEPART	3	/	8	3	/	6	0	/	0	8	/	0	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
4:15 PM	0	1	0	0	2	0	0	0	0	0	1	0	4
4:30 PM	0	0	0	0	4	0	0	0	0	0	0	0	4
4:45 PM	1	0	0	0	1	0	0	0	0	0	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	1	0	0	11	0	0	0	0	0	1	0	14
APPROACH %	50%	50%	0%	0%	100%	0%	0%	0%	0%	0%	100%	0%	
APP/DEPART	2	/	1	11	/	11	0	/	0	1	/	2	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	1	1	0	0	9	0	0	0	0	0	1	0	12
APPROACH %	50%	50%	0%	0%	100%	0%	0%	0%	0%	0%	100%	0%	
PEAK HR FACTOR		0.500			0.563			0.000			0.250		0.750
APP/DEPART	2	/	1	9	/	9	0	/	0	1	/	2	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

SR-210 WB Ra WEST SIDE

EAST SIDE **SR-210 WB Ramps**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	4
WEDNESDAY	EAST & WEST:	20th	CONTROL:	SIGNAL

PCE Adjusted	NOTES:									AM / PM / MD / OTHER / OTHER	▲ N / ◄ W / E ► / S ▼
	Class	1	2	3	4	5	6				
	Factor	1	1.5	2	3	2	2				

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND 20th			WESTBOUND 20th				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5						
AM	7:00 AM	20	71	2	8	60	43	34	24	23	2	11	17	312					0
AM	7:15 AM	28	60	0	5	55	46	47	14	30	1	20	21	327					0
AM	7:30 AM	13	45	0	6	34	83	46	21	32	1	15	11	306					0
AM	7:45 AM	19	52	2	4	25	45	77	46	30	3	17	24	342					0
AM	8:00 AM	12	32	0	8	42	45	45	25	37	0	18	12	276					0
AM	8:15 AM	16	33	4	5	32	57	43	18	34	0	20	20	281					0
AM	8:30 AM	19	39	1	10	23	53	59	23	21	5	17	16	285					0
AM	8:45 AM	15	34	3	6	27	60	34	24	18	2	17	10	248					0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	VOLUMES	140	365	12	52	298	431	383	193	224	14	134	131	2,374	0	0	0	0	0
AM	APPROACH %	27%	71%	2%	7%	38%	55%	48%	24%	28%	5%	48%	47%						
AM	APP/DEPART	517	/	878	780	/	535	799	/	257	279	/	705	0					
AM	BEGIN PEAK HR		7:00 AM																
AM	VOLUMES	79	227	4	23	174	217	203	104	114	7	63	73	1,286					
AM	APPROACH %	26%	73%	1%	5%	42%	52%	48%	25%	27%	5%	44%	51%						
AM	PEAK HR FACTOR		0.841			0.843			0.692			0.810		0.940					
AM	APP/DEPART	310	/	503	413	/	295	421	/	130	143	/	358	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	4:00 PM	17	43	3	6	40	61	56	31	65	1	23	17	361					0
PM	4:15 PM	15	43	2	7	29	53	52	42	37	3	14	16	312					0
PM	4:30 PM	24	34	2	9	47	75	85	27	48	4	16	12	380					0
PM	4:45 PM	17	37	6	3	36	49	76	39	44	1	16	18	340					0
PM	5:00 PM	13	45	5	9	43	37	50	50	45	3	16	32	346					0
PM	5:15 PM	14	36	2	8	38	54	92	39	65	1	19	17	382					0
PM	5:30 PM	17	35	2	1	49	53	67	34	40	6	12	17	332					0
PM	5:45 PM	17	50	1	8	37	51	71	27	54	2	13	14	343					0
PM	VOLUMES	133	321	22	50	318	431	547	288	397	21	127	143	2,794	0	0	0	0	0
PM	APPROACH %	28%	67%	5%	6%	40%	54%	44%	23%	32%	7%	44%	49%						
PM	APP/DEPART	476	/	1,010	798	/	735	1,231	/	359	290	/	691	0					
PM	BEGIN PEAK HR		4:30 PM																
PM	VOLUMES	68	151	14	28	163	214	302	154	202	9	66	79	1,447					
PM	APPROACH %	29%	65%	6%	7%	40%	53%	46%	23%	31%	6%	43%	51%						
PM	PEAK HR FACTOR		0.938			0.781			0.841			0.755		0.947					
PM	APP/DEPART	233	/	531	405	/	374	658	/	196	153	/	347	0					

State

NORTH SIDE

20th WEST SIDE

EAST SIDE **20th**

SOUTH SIDE

State

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino — SC2069 — ALL HOURS

State (north leg)

1,482	**861**	**615**	**101**	**TOTAL**
756	431	318	50	**PM**
726	431	298	52	**AM**

1,795	TOTAL
960	PM
835	AM

20th (west leg)

TOTAL	**PM**	**AM**
1,309	655	654

TOTAL	**PM**	**AM**
929	547	383
481	288	193
620	397	224
1,925	**1,164**	**761**

20th (east leg)

AM	**PM**	**TOTAL**
267	**281**	**548**
131	143	**273**
134	127	**261**
14	21	**35**

AM	**PM**	**TOTAL**
251	340	**591**

State (south leg)

AM	512
PM	702
TOTAL	**1,214**

AM	140	365	12	**498**
PM	133	321	22	**456**
TOTAL	**273**	**686**	**34**	**954**

PEAK HOUR

AM 7:00 AM

PM 4:30 PM

State (north leg)

818	**430**	**337**	**51**	**TOTAL**
405	214	163	28	**PM**
413	217	174	23	**AM**

1,033	TOTAL
530	PM
503	AM

20th (west leg)

TOTAL	**PM**	**AM**
705	347	358

TOTAL	**PM**	**AM**
505	302	203
258	154	104
316	202	114
1,078	**658**	**421**

20th (east leg)

AM	**PM**	**TOTAL**
143	**153**	**295**
73	79	**152**
63	66	**128**
7	9	**16**

AM	**PM**	**TOTAL**
130	196	**326**

State (south leg)

AM	295
PM	375
Total	**670**

AM	79	227	4	**310**
PM	68	151	14	**233**
Total	**147**	**378**	**18**	**542**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	State	LOCATION #:	4
	EAST & WEST:	20th	CONTROL:	SIGNAL

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

Add U-Turns to Left Turns

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 20th			WESTBOUND 20th				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5		0	0	0	0	
AM 7:00 AM	19	69	2	7	58	40	31	23	22	2	10	17	300	0	0	0	0	0
7:15 AM	27	59	0	5	53	42	45	14	29	1	19	20	314	0	0	0	0	0
7:30 AM	12	44	0	6	32	71	44	20	32	1	15	11	288	0	0	0	0	0
7:45 AM	18	50	2	4	23	43	75	45	29	3	14	24	330	0	0	0	0	0
8:00 AM	11	30	0	8	41	44	41	25	35	0	17	12	264	0	0	0	0	0
8:15 AM	16	32	4	5	29	49	37	17	33	0	18	18	258	0	0	1	0	1
8:30 AM	17	37	1	10	21	50	52	22	20	5	17	16	268	0	0	0	0	0
8:45 AM	14	31	3	6	24	55	31	22	17	2	15	10	230	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	134	352	12	51	281	394	356	188	217	14	125	128	2,252	0	0	1	0	1
APPROACH %	27%	71%	2%	7%	39%	54%	47%	25%	29%	5%	47%	48%						
APP/DEPART	498	/	835	726	/	512	761	/	251	267	/	654	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	76	222	4	22	166	196	195	102	112	7	58	72	1,232					
APPROACH %	25%	74%	1%	6%	43%	51%	48%	25%	27%	5%	42%	53%						
PEAK HR FACTOR		0.839			0.881			0.686			0.835		0.933					
APP/DEPART	302	/	489	384	/	285	409	/	128	137	/	330	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	41	3	6	38	58	52	30	61	1	21	17	344	0	0	0	0	0
4:15 PM	13	42	2	7	28	48	50	40	35	3	13	15	296	0	1	0	0	1
4:30 PM	23	31	2	8	45	68	79	26	46	3	15	12	358	0	0	0	0	0
4:45 PM	16	35	5	3	36	47	71	38	43	1	16	17	328	0	0	0	0	0
5:00 PM	13	43	4	9	37	37	47	42	44	3	15	32	326	0	0	1	0	1
5:15 PM	14	34	1	7	35	52	81	39	62	1	17	17	360	1	0	0	0	1
5:30 PM	15	35	2	1	46	49	65	31	38	6	11	17	316	0	0	0	0	0
5:45 PM	17	48	1	7	35	49	65	27	52	2	12	14	329	0	0	0	0	0
VOLUMES	127	309	20	48	300	408	510	273	381	20	120	141	2,657	1	1	1	0	3
APPROACH %	28%	68%	4%	6%	40%	54%	44%	23%	33%	7%	43%	50%						
APP/DEPART	456	/	960	756	/	702	1,164	/	340	281	/	655	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	66	143	12	27	153	204	278	145	195	8	63	78	1,372					
APPROACH %	30%	65%	5%	7%	40%	53%	45%	23%	32%	5%	42%	52%						
PEAK HR FACTOR		0.921			0.793			0.849			0.745		0.953					
APP/DEPART	221	/	498	384	/	357	618	/	184	149	/	333	0					

State

NORTH SIDE

20th WEST SIDE

EAST SIDE **20th**

SOUTH SIDE

State

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:			
2/6/19	LOCATION: San Bernardino	PROJECT #:	SC2069
WEDNESDAY	NORTH & SOUTH: State	LOCATION #:	4
	EAST & WEST: 20th	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 20th			WESTBOUND 20th				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5						
AM 7:00 AM	18	66	2	6	55	36	29	22	21	2	9	17	283	0	0	0	0	0
7:15 AM	26	58	0	5	49	39	44	14	27	1	18	19	300	0	0	0	0	0
7:30 AM	11	42	0	6	30	59	41	19	32	1	15	11	267	0	0	0	0	0
7:45 AM	17	48	2	4	20	40	71	44	28	3	12	24	313	0	0	0	0	0
8:00 AM	10	27	0	8	39	43	37	25	34	0	15	12	250	0	0	0	0	0
8:15 AM	16	31	4	5	24	44	33	15	31	0	16	16	235	0	0	1	0	1
8:30 AM	16	33	1	10	18	46	48	20	19	5	17	16	249	0	0	0	0	0
8:45 AM	13	28	3	6	20	49	29	19	15	2	13	10	207	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	127	333	12	50	255	356	332	178	207	14	115	125	2,104	0	0	1	0	1
APPROACH %	27%	71%	3%	8%	39%	54%	46%	25%	29%	6%	45%	49%						
APP/DEPART	472	/	789	661	/	476	717	/	240	254	/	599	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	72	214	4	21	154	174	185	99	108	7	54	71	1,163					
APPROACH %	25%	74%	1%	6%	44%	50%	47%	25%	28%	5%	41%	54%						
PEAK HR FACTOR		0.843			0.899			0.685			0.846		0.929					
APP/DEPART	290	/	470	349	/	269	392	/	124	132	/	300	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	15	38	3	6	36	54	46	29	53	1	18	17	316	0	0	0	0	0
4:15 PM	12	41	2	7	26	44	46	37	32	3	12	14	276	0	1	0	0	1
4:30 PM	22	26	2	7	43	62	73	24	42	2	14	12	329	0	0	0	0	0
4:45 PM	15	33	3	3	36	45	65	37	41	1	16	16	311	0	0	0	0	0
5:00 PM	13	41	3	9	30	37	45	37	42	3	14	32	306	0	0	1	0	1
5:15 PM	14	30	0	6	30	49	71	39	56	1	15	17	328	1	0	0	0	1
5:30 PM	14	35	2	1	42	45	62	29	36	6	10	17	299	0	0	0	0	0
5:45 PM	17	44	1	6	31	45	61	27	49	2	11	14	308	0	0	0	0	0
VOLUMES	122	288	16	45	274	381	469	259	351	19	110	139	2,473	1	1	1	0	3
APPROACH %	29%	68%	4%	6%	39%	54%	43%	24%	33%	7%	41%	52%						
APP/DEPART	426	/	896	700	/	645	1,079	/	319	268	/	613	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	63	130	8	25	139	193	253	137	181	7	59	77	1,274					
APPROACH %	31%	64%	4%	7%	39%	54%	44%	24%	32%	5%	41%	54%						
PEAK HR FACTOR		0.886			0.797			0.861			0.730		0.968					
APP/DEPART	202	/	460	357	/	328	572	/	170	143	/	316	0					

State

NORTH SIDE

20th WEST SIDE

EAST SIDE **20th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	4
	EAST & WEST:	20th	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 20th			WESTBOUND 20th				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5						
AM																		
7:00 AM	1	3	0	1	2	2	1	1	1	0	1	0	13	0	0	0	0	0
7:15 AM	0	1	0	0	4	0	0	0	2	0	0	0	7	0	0	0	0	0
7:30 AM	0	2	0	0	0	7	3	1	0	0	0	0	13	0	0	0	0	0
7:45 AM	1	1	0	0	2	2	4	1	1	0	0	0	12	0	0	0	0	0
8:00 AM	1	2	0	0	2	0	2	0	0	0	2	0	9	0	0	0	0	0
8:15 AM	0	0	0	0	4	1	1	2	2	0	0	1	11	0	0	0	0	0
8:30 AM	0	4	0	0	2	3	1	2	1	0	0	0	13	0	0	0	0	0
8:45 AM	1	2	0	0	3	2	1	3	2	0	1	0	15	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	4	15	0	1	19	17	13	10	9	0	4	1	93	0	0	0	0	0
APPROACH %	21%	79%	0%	3%	51%	46%	41%	31%	28%	0%	80%	20%						
APP/DEPART	19	/	29	37	/	28	32	/	11	5	/	25	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	2	8	0	0	11	6	5	7	5	0	3	1	48					
APPROACH %	20%	80%	0%	0%	65%	35%	29%	41%	29%	0%	75%	25%						
PEAK HR FACTOR		0.625			0.850			0.708			0.500		0.800					
APP/DEPART	10	/	14	17	/	16	17	/	7	4	/	11	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	3	0	0	0	3	4	1	8	0	2	0	22	0	0	0	0	0
4:15 PM	0	1	0	0	2	1	4	2	3	0	0	0	13	0	0	0	0	0
4:30 PM	1	5	0	1	1	1	4	2	4	1	1	0	21	0	0	0	0	0
4:45 PM	0	0	2	0	0	1	5	1	2	0	0	1	12	0	0	0	0	0
5:00 PM	0	1	1	0	4	0	1	1	2	0	1	0	11	0	0	0	0	0
5:15 PM	0	4	1	1	5	3	5	0	6	0	1	0	26	0	0	0	0	0
5:30 PM	0	0	0	0	3	2	3	0	1	0	0	0	9	0	0	0	0	0
5:45 PM	0	4	0	1	4	4	1	0	3	0	1	0	18	0	0	0	0	0
VOLUMES	2	18	4	3	19	15	27	7	29	1	6	1	132	0	0	0	0	0
APPROACH %	8%	75%	17%	8%	51%	41%	43%	11%	46%	13%	75%	13%						
APP/DEPART	24	/	46	37	/	49	63	/	14	8	/	23	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	1	10	4	2	10	5	15	4	14	1	3	1	70					
APPROACH %	7%	67%	27%	12%	59%	29%	45%	12%	42%	20%	60%	20%						
PEAK HR FACTOR		0.625			0.472			0.750			0.625		0.673					
APP/DEPART	15	/	26	17	/	25	33	/	10	5	/	9	0					

State

NORTH SIDE

20th WEST SIDE

EAST SIDE **20th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	4
WEDNESDAY	EAST & WEST:	20th	CONTROL:	SIGNAL

CLASS 3:	NOTES:	AM
3-AXLE TRUCKS		PM
		MD
		OTHER
		OTHER

N ▲ ◄ W E ► S ▼

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND 20th			WESTBOUND 20th				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5						
AM	7:00 AM	0	0	0	0	1	2	0	0	0	0	0	0	3	0	0	0	0	0
	7:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0
	7:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
	7:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
	8:00 AM	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0
	8:15 AM	0	1	0	0	0	1	1	0	0	0	1	0	4	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	1	1	0	0	0	0	1	0	3	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	1	0	0	2	9	2	0	0	0	2	0	16	0	0	0	0	0
	APPROACH %	0%	100%	0%	0%	18%	82%	100%	0%	0%	0%	100%	0%						
	APP/DEPART	1	/	3	11	/	2	2	/	0	2	/	11	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	0	1	0	0	1	3	2	0	0	0	2	0	9					
	APPROACH %	0%	100%	0%	0%	25%	75%	100%	0%	0%	0%	100%	0%						
	PEAK HR FACTOR		0.250			0.500			0.500			0.500		0.563					
	APP/DEPART	1	/	3	4	/	1	2	/	0	2	/	5	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	1	0	2	0	0	0	0	0	3	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	5:00 PM	0	1	0	0	2	0	0	1	0	0	0	0	4	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	2	0	0	0	1	0	3	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
	VOLUMES	0	2	0	0	3	0	5	2	0	0	1	0	13	0	0	0	0	0
	APPROACH %	0%	100%	0%	0%	100%	0%	71%	29%	0%	0%	100%	0%						
	APP/DEPART	2	/	7	3	/	3	7	/	2	1	/	1	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	0	1	0	0	2	0	3	1	0	0	1	0	8					
	APPROACH %	0%	100%	0%	0%	100%	0%	75%	25%	0%	0%	100%	0%						
	PEAK HR FACTOR		0.250			0.250			0.500			0.250		0.500					
	APP/DEPART	1	/	4	2	/	2	4	/	1	1	/	1	0					

State

NORTH SIDE

20th WEST SIDE

EAST SIDE **20th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	4
WEDNESDAY	EAST & WEST:	20th	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 20th			WESTBOUND 20th				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5						
AM																		
7:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
7:15 AM	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0
7:30 AM	0	0	0	0	0	3	0	0	0	0	0	0	3	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	1	0	1	0	0	0	2	0	0	0	0	0
8:15 AM	0	0	0	0	0	3	2	0	0	0	0	0	5	0	0	0	0	0
8:30 AM	1	0	0	0	0	0	3	0	0	0	0	0	4	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	1	0	0	0	7	9	0	1	0	1	0	20	0	0	0	0	0
APPROACH %	50%	50%	0%	0%	0%	100%	90%	0%	10%	0%	100%	0%						
APP/DEPART	2	/	10	7	/	1	10	/	0	1	/	9	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	1	1	0	0	0	3	7	0	1	0	0	0	13					
APPROACH %	50%	50%	0%	0%	0%	100%	88%	0%	13%	0%	0%	0%						
PEAK HR FACTOR		0.500			0.250			0.667			0.000		0.650					
APP/DEPART	2	/	8	3	/	1	8	/	0	0	/	4	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	1	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0
4:30 PM	0	0	0	0	0	1	2	0	0	0	0	0	3	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
5:00 PM	0	0	0	0	1	0	1	3	0	0	0	0	5	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0
5:30 PM	1	0	0	0	0	1	0	1	0	0	0	0	3	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0
VOLUMES	2	0	0	0	1	3	9	4	0	0	0	0	19	0	0	0	0	0
APPROACH %	100%	0%	0%	0%	25%	75%	69%	31%	0%	0%	0%	0%						
APP/DEPART	2	/	9	4	/	1	13	/	4	0	/	5	0					
BEGIN PEAK HR		5:00 PM																
VOLUMES	1	0	0	0	1	1	6	4	0	0	0	0	13					
APPROACH %	100%	0%	0%	0%	50%	50%	60%	40%	0%	0%	0%	0%						
PEAK HR FACTOR		0.250			0.500			0.625			0.000		0.650					
APP/DEPART	1	/	6	2	/	1	10	/	4	0	/	2	0					

State

NORTH SIDE

20th WEST SIDE

EAST SIDE **20th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	4
	EAST & WEST:	20th	CONTROL:	SIGNAL

CLASS 5:	NOTES:
RV	

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	State			State			20th			20th			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5	
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	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	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	1	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	1	0	0	0	0	0	0	0	1
APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	0	1	/	1	0	/	0	0	/	0	0
BEGIN PEAK HR		3:45 PM											
VOLUMES	0	0	0	0	1	0	0	0	0	0	0	0	1
APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.250			0.000			0.000		0.250
APP/DEPART	0	/	0	1	/	1	0	/	0	0	/	0	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

20th WEST SIDE

EAST SIDE **20th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	4
WEDNESDAY	EAST & WEST:	20th	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND 20th			WESTBOUND 20th			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	2	2	0	1	1.5	1.5	1.3	0.3	1.3	1	0.5	0.5	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	1	0	0	0	0	0	0	0	0	0	1	1	3
	7:30 AM	1	0	0	0	2	1	0	0	0	0	0	0	4
	7:45 AM	0	1	0	0	1	0	0	0	0	0	1	0	3
	8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
	8:15 AM	0	0	0	0	1	0	0	0	0	0	1	1	3
	8:30 AM	0	0	0	0	1	1	0	0	0	0	0	0	2
	8:45 AM	0	0	0	0	0	3	0	0	0	0	0	0	3
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	2	2	0	0	5	5	0	0	0	0	3	2	19
	APPROACH %	50%	50%	0%	0%	50%	50%	0%	0%	0%	0%	60%	40%	
	APP/DEPART	4	/	4	10	/	5	0	/	0	5	/	10	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	1	2	0	0	4	1	0	0	0	0	2	1	11
	APPROACH %	33%	67%	0%	0%	80%	20%	0%	0%	0%	0%	67%	33%	
	PEAK HR FACTOR		0.750			0.417			0.000			0.375		0.688
	APP/DEPART	3	/	3	5	/	4	0	/	0	3	/	4	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	1	1	0	0	0	0	1	0	3
	4:15 PM	0	0	0	0	0	2	0	0	0	0	1	1	4
	4:30 PM	0	0	0	0	0	4	0	0	0	0	0	0	4
	4:45 PM	1	1	0	0	0	1	0	0	0	0	0	0	3
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	1	1	0	1	1	0	1	0	5
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	1	1	0	0	2	9	0	1	1	0	3	1	19
	APPROACH %	50%	50%	0%	0%	18%	82%	0%	50%	50%	0%	75%	25%	
	APP/DEPART	2	/	2	11	/	3	2	/	1	4	/	13	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	1	1	0	0	1	8	0	0	0	0	2	1	14
	APPROACH %	50%	50%	0%	0%	11%	89%	0%	0%	0%	0%	67%	33%	
	PEAK HR FACTOR		0.250			0.563			0.000			0.375		0.875
	APP/DEPART	2	/	2	9	/	1	0	/	0	3	/	11	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

20th WEST SIDE EAST SIDE **20th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	5
WEDNESDAY	EAST & WEST:	16th	CONTROL:	STOP W

PCE Adjusted	NOTES:								AM		▲ N	
	Class	1	2	3	4	5	6		PM			
	Factor	1	1.5	2	3	2	2		MD	◀ W		E ▶
									OTHER		S	
									OTHER		▼	

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 16th			WESTBOUND 16th				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	X	1	0	0	1	X	X	X	X	1	X	1						
AM 7:00 AM	0	29	1	53	28	0	0	0	0	0	0	56	166					0
7:15 AM	0	21	1	59	23	0	0	0	0	1	0	48	152					0
7:30 AM	0	25	2	56	17	0	0	0	0	0	0	54	154					0
7:45 AM	0	11	0	49	18	0	0	0	0	0	0	44	121					0
8:00 AM	0	8	0	52	23	0	0	0	0	0	0	33	116					0
8:15 AM	0	16	0	51	17	0	0	0	0	1	0	26	110					0
8:30 AM	0	12	1	33	11	0	0	0	0	4	0	42	102					0
8:45 AM	0	14	3	48	11	0	0	0	0	4	0	34	113					0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
VOLUMES	0	134	8	399	147	0	0	0	0	10	0	335	1,033	0	0	0	0	0
APPROACH %	0%	94%	6%	73%	27%	0%	0%	0%	0%	3%	0%	97%						
APP/DEPART	142	/	469	546	/	157	0	/	407	345	/	0	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	85	4	217	86	0	0	0	0	1	0	200	592					
APPROACH %	0%	96%	4%	72%	28%	0%	0%	0%	0%	0%	0%	100%						
PEAK HR FACTOR		0.754			0.921			0.000			0.905		0.892					
APP/DEPART	89	/	285	302	/	87	0	/	221	201	/	0	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
4:00 PM	0	14	2	84	24	0	0	0	0	2	0	43	169					0
4:15 PM	0	11	0	49	21	0	0	0	0	2	0	40	122					0
4:30 PM	0	10	2	54	23	0	0	0	0	0	0	52	141					0
4:45 PM	0	20	2	59	30	0	0	0	0	2	0	34	146					0
5:00 PM	0	9	2	58	30	0	0	0	0	4	0	46	148					0
5:15 PM	0	11	1	63	27	0	0	0	0	1	0	46	149					0
5:30 PM	0	16	0	65	24	0	0	0	0	1	0	43	149					0
5:45 PM	0	13	0	69	16	0	0	0	0	0	0	40	138					0
VOLUMES	0	104	8	500	194	0	0	0	0	11	0	343	1,159	0	0	0	0	0
APPROACH %	0%	93%	7%	72%	28%	0%	0%	0%	0%	3%	0%	97%						
APP/DEPART	112	/	446	694	/	205	0	/	508	354	/	0	0					
BEGIN PEAK HR		4:45 PM																
VOLUMES	0	56	5	245	111	0	0	0	0	8	0	169	591					
APPROACH %	0%	93%	8%	69%	31%	0%	0%	0%	0%	4%	0%	96%						
PEAK HR FACTOR		0.714			0.992			0.000			0.898		0.992					
APP/DEPART	60	/	224	355	/	118	0	/	249	176	/	0	0					

State

NORTH SIDE

16th WEST SIDE

EAST SIDE **16th**

SOUTH SIDE

State

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC2069

ALL HOURS

State (north leg)

TOTAL	1,185	0	341	899
PM	662	0	194	500
AM	523	0	147	399

TOTAL	885
PM	430
AM	455

16th (west leg)

TOTAL	0	0	0	0	0
PM	0	0	0	0	0
AM	0	0	0	0	0

16th (east leg)

AM	337	335	0	10	391
PM	337	343	0	11	487
TOTAL	674	678	0	21	878

State (south leg)

AM	152
PM	192
TOTAL	344

AM	0	134	8	138
PM	0	104	8	110
TOTAL	0	238	16	248

PEAK HOUR

AM 7:00 AM

PM 4:45 PM

State (north leg)

TOTAL	657	0	196	461
PM	355	0	111	245
AM	302	0	86	217

TOTAL	509
PM	224
AM	285

16th (west leg)

TOTAL	0	0	0	0	0
PM	0	0	0	0	0
AM	0	0	0	0	0

16th (east leg)

AM	201	200	0	1	221
PM	176	169	0	8	249
TOTAL	377	369	0	9	470

State (south leg)

AM	88
PM	118
Total	206

AM	0	85	4	90
PM	0	56	5	60
Total	0	141	9	150

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	State	LOCATION #:	5
	EAST & WEST:	16th	CONTROL:	STOP W

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

Add U-Turns to Left Turns

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 16th			WESTBOUND 16th			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	X	1	0	0	1	X	X	X	X	1	X	1	
AM 7:00 AM	0	28	1	52	28	0	0	0	0	0	0	55	164
7:15 AM	0	20	1	58	22	0	0	0	0	1	0	46	148
7:30 AM	0	24	2	54	17	0	0	0	0	0	0	52	149
7:45 AM	0	11	0	45	15	0	0	0	0	0	0	42	113
8:00 AM	0	8	0	50	21	0	0	0	0	0	0	31	110
8:15 AM	0	13	0	48	16	0	0	0	0	1	0	26	104
8:30 AM	0	11	1	32	10	0	0	0	0	4	0	41	99
8:45 AM	0	13	3	44	11	0	0	0	0	4	0	34	109
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	128	8	383	140	0	0	0	0	10	0	327	998
APPROACH %	0%	93%	6%	73%	27%	0%	0%	0%	0%	3%	0%	97%	
APP/DEPART	138	/	455	523	/	152	0	/	391	337	/	0	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	83	4	209	82	0	0	0	0	1	0	195	575
APPROACH %	0%	94%	5%	72%	28%	0%	0%	0%	0%	1%	0%	99%	
PEAK HR FACTOR		0.759			0.909			0.000			0.891		0.877
APP/DEPART	88	/	278	291	/	84	0	/	213	196	/	0	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	14	2	77	24	0	0	0	0	1	0	40	158
4:15 PM	0	11	0	47	19	0	0	0	0	2	0	39	118
4:30 PM	0	10	1	53	22	0	0	0	0	0	0	51	137
4:45 PM	0	19	1	58	29	0	0	0	0	2	0	31	140
5:00 PM	0	9	2	56	27	0	0	0	0	3	0	44	141
5:15 PM	0	11	1	60	25	0	0	0	0	1	0	43	141
5:30 PM	0	16	0	62	21	0	0	0	0	1	0	40	140
5:45 PM	0	13	0	67	15	0	0	0	0	0	0	39	134
VOLUMES	0	103	7	480	182	0	0	0	0	10	0	327	1,109
APPROACH %	0%	94%	6%	73%	27%	0%	0%	0%	0%	3%	0%	97%	
APP/DEPART	110	/	430	662	/	192	0	/	487	337	/	0	0
BEGIN PEAK HR		4:45 PM											
VOLUMES	0	55	4	236	102	0	0	0	0	7	0	158	562
APPROACH %	0%	93%	7%	70%	30%	0%	0%	0%	0%	4%	0%	96%	
PEAK HR FACTOR		0.738			0.971			0.000			0.878		0.996
APP/DEPART	59	/	213	338	/	109	0	/	240	165	/	0	0

U-TURNS	NB	SB	EB	WB	TTL
	0	0	0	0	
7:00 AM	0	0	0	0	0
7:15 AM	1	0	0	0	1
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	1	0	0	0	1
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	2	0	0	0	2
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

16th WEST SIDE EAST SIDE **16th**

SOUTH SIDE

State

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	5
WEDNESDAY	EAST & WEST:	16th	CONTROL:	STOP W

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	State			State			16th			16th			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	X	1	0	0	1	X	X	X	X	1	X	1	
AM													
7:00 AM	0	27	1	50	28	0	0	0	0	0	0	54	160
7:15 AM	0	19	1	56	20	0	0	0	0	1	0	44	141
7:30 AM	0	23	2	51	17	0	0	0	0	0	0	49	142
7:45 AM	0	11	0	40	12	0	0	0	0	0	0	40	103
8:00 AM	0	8	0	47	20	0	0	0	0	0	0	28	103
8:15 AM	0	11	0	44	15	0	0	0	0	1	0	26	97
8:30 AM	0	10	1	30	9	0	0	0	0	4	0	39	93
8:45 AM	0	12	3	40	11	0	0	0	0	4	0	34	104
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	121	8	358	132	0	0	0	0	10	0	314	943
APPROACH %	0%	94%	6%	73%	27%	0%	0%	0%	0%	3%	0%	97%	
APP/DEPART	129	/	435	490	/	142	0	/	366	324	/	0	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	80	4	197	77	0	0	0	0	1	0	187	546
APPROACH %	0%	95%	5%	72%	28%	0%	0%	0%	0%	1%	0%	99%	
PEAK HR FACTOR		0.750			0.878			0.000			0.870		0.853
APP/DEPART	84	/	267	274	/	78	0	/	201	188	/	0	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	14	2	68	24	0	0	0	0	0	0	37	145
4:15 PM	0	11	0	44	16	0	0	0	0	2	0	38	111
4:30 PM	0	10	0	51	20	0	0	0	0	0	0	49	130
4:45 PM	0	18	0	56	27	0	0	0	0	2	0	27	130
5:00 PM	0	9	2	53	23	0	0	0	0	2	0	41	130
5:15 PM	0	11	1	55	21	0	0	0	0	1	0	38	127
5:30 PM	0	16	0	58	18	0	0	0	0	1	0	37	130
5:45 PM	0	13	0	63	13	0	0	0	0	0	0	38	127
VOLUMES	0	102	5	448	162	0	0	0	0	8	0	305	1,030
APPROACH %	0%	95%	5%	73%	27%	0%	0%	0%	0%	3%	0%	97%	
APP/DEPART	107	/	407	610	/	170	0	/	453	313	/	0	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	0	54	3	222	89	0	0	0	0	6	0	143	517
APPROACH %	0%	95%	5%	71%	29%	0%	0%	0%	0%	4%	0%	96%	
PEAK HR FACTOR		0.792			0.937			0.000			0.760		0.994
APP/DEPART	57	/	197	311	/	95	0	/	225	149	/	0	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

State

NORTH SIDE

16th WEST SIDE

EAST SIDE **16th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	5
WEDNESDAY	EAST & WEST:	16th	CONTROL:	STOP W

CLASS 2:	NOTES:	AM
2-AXLE		PM
WORK		MD
VEHICLES/		OTHER
TRUCKS		OTHER

▲ N, ◄ W, E ►, S ▼

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 16th			WESTBOUND 16th			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	X	1	0	0	1	X	X	X	X	1	X	1	
AM													
7:00 AM	0	1	0	2	0	0	0	0	0	0	0	1	4
7:15 AM	0	1	0	2	2	0	0	0	0	0	0	1	6
7:30 AM	0	0	0	2	0	0	0	0	0	0	0	3	5
7:45 AM	0	0	0	3	1	0	0	0	0	0	0	1	5
8:00 AM	0	0	0	3	0	0	0	0	0	0	0	2	5
8:15 AM	0	0	0	3	1	0	0	0	0	0	0	0	4
8:30 AM	0	1	0	2	1	0	0	0	0	0	0	2	6
8:45 AM	0	1	0	3	0	0	0	0	0	0	0	0	4
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	4	0	20	5	0	0	0	0	0	0	10	41
APPROACH %	0%	67%	0%	80%	20%	0%	0%	0%	0%	0%	0%	100%	
APP/DEPART	6	/	14	25	/	7	0	/	20	10	/	0	0
BEGIN PEAK HR		7:15 AM											
VOLUMES	0	1	0	10	3	0	0	0	0	0	0	7	22
APPROACH %	0%	50%	0%	77%	23%	0%	0%	0%	0%	0%	0%	100%	
PEAK HR FACTOR		0.250			0.813			0.000			0.583		0.786
APP/DEPART	2	/	8	13	/	4	0	/	10	7	/	0	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	6	0	0	0	0	0	1	0	2	9
4:15 PM	0	0	0	3	3	0	0	0	0	0	0	1	7
4:30 PM	0	0	1	2	2	0	0	0	0	0	0	2	7
4:45 PM	0	1	1	2	2	0	0	0	0	0	0	2	8
5:00 PM	0	0	0	2	3	0	0	0	0	1	0	3	9
5:15 PM	0	0	0	5	4	0	0	0	0	0	0	4	13
5:30 PM	0	0	0	2	2	0	0	0	0	0	0	2	6
5:45 PM	0	0	0	4	2	0	0	0	0	0	0	1	7
VOLUMES	0	1	2	26	18	0	0	0	0	2	0	17	66
APPROACH %	0%	33%	67%	59%	41%	0%	0%	0%	0%	11%	0%	89%	
APP/DEPART	3	/	18	44	/	20	0	/	28	19	/	0	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	0	1	2	11	11	0	0	0	0	1	0	11	37
APPROACH %	0%	33%	67%	50%	50%	0%	0%	0%	0%	8%	0%	92%	
PEAK HR FACTOR		0.375			0.611			0.000			0.750		0.712
APP/DEPART	3	/	12	22	/	12	0	/	13	12	/	0	0

U-TURNS

	NB	SB	EB	WB	TTL
7:00 AM	0	0	0	0	0
7:15 AM	1	0	0	0	1
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	1	0	0	0	1
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	2	0	0	0	2
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

16th WEST SIDE

EAST SIDE **16th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	State	LOCATION #:	5
	EAST & WEST:	16th	CONTROL:	STOP W

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

N W E S

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 16th			WESTBOUND 16th			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
LANES:	X	1	0	0	1	X	X	X	X	1	X	1	
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	1	0	0	0	0	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	1	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	1	0	1	0	0	0	0	0	0	0	0	2
APPROACH %	0%	100%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	1	/	1	1	/	0	0	/	1	0	/	0	0
BEGIN PEAK HR		7:30 AM											
VOLUMES	0	1	0	1	0	0	0	0	0	0	0	0	2
APPROACH %	0%	100%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.250			0.250			0.000			0.000		0.500
APP/DEPART	1	/	1	1	/	0	0	/	1	0	/	0	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	1	0	0	0	0	0	0	0	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	0	0	0	0	0	0
5:00 PM	0	0	0	1	1	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	2	1	0	0	0	0	0	0	1	4
APPROACH %	0%	0%	0%	67%	33%	0%	0%	0%	0%	0%	0%	100%	
APP/DEPART	0	/	1	3	/	1	0	/	2	1	/	0	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	0	0	0	1	1	0	0	0	0	0	0	1	3
APPROACH %	0%	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	100%	
PEAK HR FACTOR		0.000			0.250			0.000			0.250		0.375
APP/DEPART	0	/	1	2	/	1	0	/	1	1	/	0	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

State

NORTH SIDE

16th WEST SIDE

EAST SIDE **16th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	5
WEDNESDAY	EAST & WEST:	16th	CONTROL:	STOP W

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND 16th			WESTBOUND 16th				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	X	1	0	0	1	X	X	X	X	1	X	1						
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
AM	8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
AM	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	0	1	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0
AM	APPROACH %	0%	100%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%						
AM	APP/DEPART	1	/	1	2	/	1	0	/	1	0	/	0	0					
AM	BEGIN PEAK HR		8:00 AM																
AM	VOLUMES	0	1	0	1	1	0	0	0	0	0	0	0	3					
AM	APPROACH %	0%	100%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%						
AM	PEAK HR FACTOR		0.250			0.500			0.000			0.000		0.750					
AM	APP/DEPART	1	/	1	2	/	1	0	/	1	0	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	1	0	0	0	0	0	0	0	1	2	0	0	0	0	0
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:30 PM	0	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0
PM	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	VOLUMES	0	0	0	1	1	0	0	0	0	0	0	2	4	0	0	0	0	0
PM	APPROACH %	0%	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	100%						
PM	APP/DEPART	0	/	2	2	/	1	0	/	1	2	/	0	0					
PM	BEGIN PEAK HR		3:15 PM																
PM	VOLUMES	0	0	0	0	1	0	0	0	0	0	0	1	2					
PM	APPROACH %	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%						
PM	PEAK HR FACTOR		0.000			0.250			0.000			0.250		0.250					
PM	APP/DEPART	0	/	1	1	/	1	0	/	0	1	/	0	0					

State

NORTH SIDE

16th WEST SIDE

EAST SIDE **16th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	5
WEDNESDAY	EAST & WEST:	16th	CONTROL:	STOP W

CLASS 5:	NOTES:	AM / PM / MD / OTHER / OTHER	▲ N ◄ W E ► S ▼
RV			

	NORTHBOUND State			SOUTHBOUND State			EASTBOUND 16th			WESTBOUND 16th				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	X	1	0	0	1	X	X	X	X	1	X	1						
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	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	0	0	0	0	0
7:45 AM	0	0	0	0	0	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	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	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	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
BEGIN PEAK HR		3:00 PM																
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					

State

NORTH SIDE

16th WEST SIDE

EAST SIDE **16th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	State	LOCATION #:	5
WEDNESDAY	EAST & WEST:	16th	CONTROL:	STOP W

CLASS 6:	NOTES:	AM PM MD OTHER OTHER	▲ N ◄ W E ► S ▼
BUSES			

		NORTHBOUND State			SOUTHBOUND State			EASTBOUND 16th			WESTBOUND 16th				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	X	1	0	0	1	X	X	X	X	1	X	1						
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
	7:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	7:45 AM	0	0	0	1	2	0	0	0	0	0	0	1	4	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
	8:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	1	0	3	2	0	0	0	0	0	0	3	9	0	0	0	0	0
	APPROACH %	0%	100%	0%	60%	40%	0%	0%	0%	0%	0%	0%	100%						
	APP/DEPART	1	/	4	5	/	2	0	/	3	3	/	0	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	0	1	0	3	2	0	0	0	0	0	0	2	8					
	APPROACH %	0%	100%	0%	60%	40%	0%	0%	0%	0%	0%	0%	100%						
	PEAK HR FACTOR		0.250			0.417			0.000			0.500		0.500					
	APP/DEPART	1	/	3	5	/	2	0	/	3	2	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	4:15 PM	0	0	0	0	0	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	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	3	0	0	0	0	0	0	0	2	5	0	0	0	0	0
	APPROACH %	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%						
	APP/DEPART	0	/	2	3	/	0	0	/	3	2	/	0	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	0	0	0	2	0	0	0	0	0	0	0	2	4					
	APPROACH %	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%						
	PEAK HR FACTOR		0.000			0.250			0.000			0.250		0.500					
	APP/DEPART	0	/	2	2	/	0	0	/	2	2	/	0	0					

State

NORTH SIDE

16th WEST SIDE EAST SIDE **16th**

SOUTH SIDE

State

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
Wed, Apr 10, 19	NORTH & SOUTH:	University	LOCATION #:	1
	EAST & WEST:	Base Line	CONTROL:	SIGNAL

NOTES:

AM EB queue

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

Add U-Turns to Left Turns

	NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X		0	0	0	0	
AM 7:00 AM	12	0	60	0	0	0	0	66	24	109	78	0	349	0	0	0	0	0
7:15 AM	18	0	130	0	0	0	0	79	64	141	84	0	516	0	0	0	0	0
7:30 AM	16	0	119	0	0	0	0	96	15	95	104	0	445	0	0	0	0	0
7:45 AM	5	0	46	0	0	0	0	115	5	49	83	0	303	0	0	0	0	0
8:00 AM	6	0	19	0	0	0	0	106	7	60	58	0	256	1	0	0	0	1
8:15 AM	4	0	58	0	0	0	0	84	3	64	76	0	289	0	0	0	0	0
8:30 AM	8	0	22	0	0	0	0	81	2	36	73	0	222	2	0	0	0	2
8:45 AM	3	0	17	0	0	0	0	73	1	22	114	0	230	2	0	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	72	0	471	0	0	0	0	700	121	576	670	0	2,610	5	0	0	0	5
APPROACH %	13%	0%	87%	0%	0%	0%	0%	85%	15%	46%	54%	0%						
APP/DEPART	543	/	0	0	/	702	821	/	1,171	1,246	/	737	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	51	0	355	0	0	0	0	356	108	394	349	0	1,613					
APPROACH %	13%	0%	87%	0%	0%	0%	0%	77%	23%	53%	47%	0%						
PEAK HR FACTOR		0.686			0.000			0.811			0.826		0.781					
APP/DEPART	406	/	0	0	/	502	464	/	711	743	/	400	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	2	0	21	0	0	0	0	102	1	20	106	0	252	0	0	0	0	0
4:15 PM	7	0	51	0	0	0	0	122	1	38	138	0	357	0	0	0	0	0
4:30 PM	6	0	52	0	0	0	0	152	8	42	137	0	397	0	0	0	0	0
4:45 PM	8	0	37	0	0	0	0	129	4	27	129	0	334	0	0	0	0	0
5:00 PM	6	0	22	0	0	0	0	144	0	17	131	0	320	0	0	0	0	0
5:15 PM	3	0	20	0	0	0	0	131	3	19	138	0	314	0	0	0	0	0
5:30 PM	7	0	24	0	0	0	0	125	6	16	120	0	298	0	0	0	0	0
5:45 PM	5	0	24	0	0	0	0	126	4	22	110	0	291	0	0	0	0	0
VOLUMES	44	0	251	0	0	0	0	1,031	27	201	1,009	0	2,563	0	0	0	0	0
APPROACH %	15%	0%	85%	0%	0%	0%	0%	97%	3%	17%	83%	0%						
APP/DEPART	295	/	0	0	/	228	1,058	/	1,282	1,210	/	1,053	0					
BEGIN PEAK HR		4:15 PM																
VOLUMES	27	0	162	0	0	0	0	547	13	124	535	0	1,408					
APPROACH %	14%	0%	86%	0%	0%	0%	0%	98%	2%	19%	81%	0%						
PEAK HR FACTOR		0.815			0.000			0.875			0.920		0.887					
APP/DEPART	189	/	0	0	/	137	560	/	709	659	/	562	0					

University

NORTH SIDE

Base Line WEST SIDE EAST SIDE **Base Line**

SOUTH SIDE

University

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
4/10/19	NORTH & SOUTH:	University	LOCATION #:	6
WEDNESDAY	EAST & WEST:	Base Line	CONTROL:	SIGNAL

	NOTES:									AM		▲	
PCE	Class	1	2	3	4	5	6			PM		N	
Adjusted	Factor	1	1.5	2	3	2	2			MD	◄ W		E ►
										OTHER		S	
										OTHER		▼	

		NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	X	1	X	X	X	X	2	0	1	2	X						
AM	7:00 AM	12	0	69	0	0	0	0	79	25	123	88	0	394					0
	7:15 AM	19	0	140	0	0	0	0	89	64	141	88	0	540					0
	7:30 AM	16	0	125	0	0	0	0	106	15	97	114	0	472					0
	7:45 AM	5	0	54	0	0	0	0	122	5	57	85	0	327					0
	8:00 AM	7	0	20	0	0	0	0	124	8	73	60	0	290					0
	8:15 AM	4	0	76	0	0	0	0	89	3	66	80	0	318					0
	8:30 AM	10	0	26	0	0	0	0	89	3	40	84	0	252					0
	8:45 AM	4	0	19	0	0	0	0	81	1	22	127	0	254					0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	VOLUMES	76	0	528	0	0	0	0	777	123	617	724	0	2,845	0	0	0	0	0
	APPROACH %	13%	0%	87%	0%	0%	0%	0%	86%	14%	46%	54%	0%						
	APP/DEPART	604	/	0	0	/	740	900	/	1,305	1,341	/	800	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	52	0	387	0	0	0	0	395	109	417	374	0	1,732					
	APPROACH %	12%	0%	88%	0%	0%	0%	0%	78%	22%	53%	47%	0%						
	PEAK HR FACTOR		0.692			0.000			0.823			0.864		0.802					
	APP/DEPART	439	/	0	0	/	525	504	/	782	790	/	426	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	4:00 PM	2	0	21	0	0	0	0	104	1	21	117	0	266					0
	4:15 PM	7	0	68	0	0	0	0	126	2	41	141	0	384					0
	4:30 PM	6	0	52	0	0	0	0	155	10	43	141	0	406					0
	4:45 PM	8	0	37	0	0	0	0	135	4	27	131	0	341					0
	5:00 PM	6	0	23	0	0	0	0	145	0	20	136	0	329					0
	5:15 PM	3	0	21	0	0	0	0	136	3	20	143	0	325					0
	5:30 PM	7	0	25	0	0	0	0	127	6	16	126	0	306					0
	5:45 PM	5	0	25	0	0	0	0	131	5	22	115	0	303					0
	VOLUMES	44	0	271	0	0	0	0	1,057	31	209	1,047	0	2,658	0	0	0	0	0
	APPROACH %	14%	0%	86%	0%	0%	0%	0%	97%	3%	17%	83%	0%						
	APP/DEPART	315	/	0	0	/	240	1,088	/	1,328	1,256	/	1,091	0					
	BEGIN PEAK HR		4:15 PM																
	VOLUMES	27	0	180	0	0	0	0	560	16	130	547	0	1,459					
	APPROACH %	13%	0%	87%	0%	0%	0%	0%	97%	3%	19%	81%	0%						
	PEAK HR FACTOR		0.688			0.000			0.875			0.925		0.900					
	APP/DEPART	207	/	0	0	/	146	576	/	740	677	/	574	0					

University

NORTH SIDE

Base Line WEST SIDE

EAST SIDE **Base Line**

SOUTH SIDE

University

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC

ALL HOURS

University (north leg)

TOTAL	**0**	**0**	**0**	**0**		**0**
PM	**0**	0	0	0		0
AM	**0**	0	0	0		0

Base Line (west leg)

TOTAL	**1,891**	**0**	**1,834**	**154**	**1,988**
PM	1,091	0	1,057	31	**1,088**
AM	800	0	777	123	**900**

Base Line (east leg)

AM	**1,341**	0	724	617	1,305
PM	**1,256**	0	1,047	209	1,328
TOTAL	**2,597**	**0**	**1,771**	**826**	**2,632**

University (south leg)

740	AM	76	0	528	**604**
240	PM	44	0	271	**315**
980	TOTAL	**120**	**0**	**798**	**918**

PEAK HOUR

AM 7:00 AM

PM 4:15 PM

University (north leg)

TOTAL	**0**	**0**	**0**	**0**		**0**
PM	**0**	0	0	0		0
AM	**0**	0	0	0		0

Base Line (west leg)

TOTAL	**1,000**	**0**	**955**	**124**	**1,079**
PM	574	0	560	16	**576**
AM	426	0	395	109	**504**

Base Line (east leg)

AM	**790**	0	374	417	782
PM	**677**	0	547	130	740
TOTAL	**1,467**	**0**	**921**	**547**	**1,521**

University (south leg)

525	AM	52	0	387	**439**
146	PM	27	0	180	**207**
671	Total	**79**	**0**	**566**	**645**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
4/10/19	NORTH & SOUTH:	University	LOCATION #:	6
WEDNESDAY	EAST & WEST:	Base Line	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X	
AM													
7:00 AM	12	0	52	0	0	0	0	55	23	95	70	0	307
7:15 AM	16	0	120	0	0	0	0	68	64	141	81	0	490
7:30 AM	16	0	115	0	0	0	0	85	15	93	94	0	418
7:45 AM	5	0	41	0	0	0	0	109	5	40	81	0	281
8:00 AM	5	0	18	0	0	0	0	90	6	48	56	0	223
8:15 AM	4	0	41	0	0	0	0	79	3	63	73	0	263
8:30 AM	5	0	20	0	0	0	0	74	1	33	62	0	195
8:45 AM	1	0	16	0	0	0	0	68	1	22	104	0	212
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	64	0	423	0	0	0	0	628	118	535	621	0	2,389
APPROACH %	13%	0%	87%	0%	0%	0%	0%	84%	16%	46%	54%	0%	
APP/DEPART	487	/	0	0	/	654	746	/	1,051	1,156	/	684	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	49	0	328	0	0	0	0	317	107	369	326	0	1,496
APPROACH %	13%	0%	87%	0%	0%	0%	0%	75%	25%	53%	47%	0%	
PEAK HR FACTOR		0.693			0.000			0.803			0.783		0.763
APP/DEPART	377	/	0	0	/	476	424	/	645	695	/	375	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	2	0	21	0	0	0	0	99	1	19	95	0	237
4:15 PM	7	0	34	0	0	0	0	117	0	35	134	0	327
4:30 PM	6	0	52	0	0	0	0	148	6	41	131	0	384
4:45 PM	8	0	37	0	0	0	0	124	4	27	126	0	326
5:00 PM	6	0	21	0	0	0	0	143	0	15	124	0	309
5:15 PM	3	0	19	0	0	0	0	124	3	18	129	0	296
5:30 PM	7	0	23	0	0	0	0	121	6	16	114	0	287
5:45 PM	5	0	23	0	0	0	0	121	3	22	107	0	281
VOLUMES	44	0	230	0	0	0	0	997	23	193	960	0	2,447
APPROACH %	16%	0%	84%	0%	0%	0%	0%	98%	2%	17%	83%	0%	
APP/DEPART	274	/	0	0	/	216	1,020	/	1,227	1,153	/	1,004	0
BEGIN PEAK HR		4:15 PM											
VOLUMES	27	0	144	0	0	0	0	532	10	118	515	0	1,346
APPROACH %	16%	0%	84%	0%	0%	0%	0%	98%	2%	19%	81%	0%	
PEAK HR FACTOR		0.737			0.000			0.880			0.920		0.876
APP/DEPART	171	/	0	0	/	128	542	/	676	633	/	542	0

U-TURNS

Time	NB	SB	EB	WB	TTL
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	1	0	0	0	1
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	1	0	0	0	1
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

University

NORTH SIDE

Base Line WEST SIDE

EAST SIDE **Base Line**

SOUTH SIDE

University

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
4/10/19	NORTH & SOUTH:	University	LOCATION #:	6
WEDNESDAY	EAST & WEST:	Base Line	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

		NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	X	1	X	X	X	X	2	0	1	2	X	
AM	7:00 AM	0	0	1	0	0	0	0	4	1	1	1	0	8
	7:15 AM	2	0	1	0	0	0	0	6	0	0	1	0	10
	7:30 AM	0	0	0	0	0	0	0	3	0	1	3	0	7
	7:45 AM	0	0	1	0	0	0	0	3	0	3	0	0	7
	8:00 AM	1	0	0	0	0	0	0	5	1	1	0	0	8
	8:15 AM	0	0	0	0	0	0	0	2	0	0	1	0	3
	8:30 AM	3	0	0	0	0	0	0	2	0	0	4	0	9
	8:45 AM	2	0	0	0	0	0	0	1	0	0	2	0	5
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	8	0	3	0	0	0	0	26	2	6	12	0	57
	APPROACH %	73%	0%	27%	0%	0%	0%	0%	93%	7%	33%	67%	0%	
	APP/DEPART	11	/	0	0	/	12	28	/	29	18	/	16	0
	BEGIN PEAK HR		7:00 AM											
	VOLUMES	3	0	2	0	0	0	0	17	1	5	4	0	32
	APPROACH %	60%	0%	40%	0%	0%	0%	0%	94%	6%	56%	44%	0%	
	PEAK HR FACTOR		0.417			0.000			0.750			0.563		0.800
	APP/DEPART	5	/	0	0	/	6	18	/	19	9	/	7	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	3	0	0	6	0	9
	4:15 PM	0	0	0	0	0	0	0	4	1	0	3	0	8
	4:30 PM	0	0	0	0	0	0	0	3	0	1	5	0	9
	4:45 PM	0	0	0	0	0	0	0	1	0	0	3	0	4
	5:00 PM	0	0	1	0	0	0	0	0	0	1	5	0	7
	5:15 PM	0	0	1	0	0	0	0	5	0	0	8	0	14
	5:30 PM	0	0	1	0	0	0	0	4	0	0	3	0	8
	5:45 PM	0	0	0	0	0	0	0	2	0	0	1	0	3
	VOLUMES	0	0	3	0	0	0	0	22	1	2	34	0	62
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	96%	4%	6%	94%	0%	
	APP/DEPART	3	/	0	0	/	3	23	/	25	36	/	34	0
	BEGIN PEAK HR		4:30 PM											
	VOLUMES	0	0	2	0	0	0	0	9	0	2	21	0	34
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	100%	0%	9%	91%	0%	
	PEAK HR FACTOR		0.500			0.000			0.450			0.719		0.607
	APP/DEPART	2	/	0	0	/	2	9	/	11	23	/	21	0

U-TURNS

	NB	SB	EB	WB	TTL
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	2	0	0	0	2
8:45 AM	2	0	0	0	2
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	4	0	0	0	4
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

University

NORTH SIDE

Base Line WEST SIDE

EAST SIDE **Base Line**

SOUTH SIDE

University

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
4/10/19	NORTH & SOUTH:	University	LOCATION #:	6
WEDNESDAY	EAST & WEST:	Base Line	CONTROL:	SIGNAL

CLASS 3:	NOTES:	AM
3-AXLE TRUCKS		PM
		MD
		OTHER
		OTHER

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		NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	X	1	X	X	X	X	2	0	1	2	X						
AM	7:00 AM	0	0	0	0	0	0	0	1	0	0	3	0	4	0	0	0	0	0
AM	7:15 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
AM	7:30 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0
AM	7:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
AM	8:00 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
AM	8:15 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
AM	8:30 AM	0	0	0	0	0	0	0	0	1	2	4	0	7	0	0	0	0	0
AM	8:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	0	0	0	0	0	0	0	4	1	2	19	0	26	0	0	0	0	0
AM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	80%	20%	10%	90%	0%						
AM	APP/DEPART	0	/	0	0	/	3	5	/	4	21	/	19	0					
AM	BEGIN PEAK HR		8:00 AM																
AM	VOLUMES	0	0	0	0	0	0	0	2	1	2	9	0	14					
AM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	67%	33%	18%	82%	0%						
AM	PEAK HR FACTOR		0.000			0.000			0.750			0.458		0.500					
AM	APP/DEPART	0	/	0	0	/	3	3	/	2	11	/	9	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
PM	4:30 PM	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0
PM	4:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0
PM	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
PM	5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
PM	5:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
PM	VOLUMES	0	0	0	0	0	0	0	4	2	1	4	0	11	0	0	0	0	0
PM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	67%	33%	20%	80%	0%						
PM	APP/DEPART	0	/	0	0	/	3	6	/	4	5	/	4	0					
PM	BEGIN PEAK HR		4:00 PM																
PM	VOLUMES	0	0	0	0	0	0	0	2	2	1	2	0	7					
PM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	50%	50%	33%	67%	0%						
PM	PEAK HR FACTOR		0.000			0.000			0.500			0.375		0.875					
PM	APP/DEPART	0	/	0	0	/	3	4	/	2	3	/	2	0					

University

NORTH SIDE

Base Line WEST SIDE EAST SIDE **Base Line**

SOUTH SIDE

University

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
4/10/19	NORTH & SOUTH:	University	LOCATION #:	6
WEDNESDAY	EAST & WEST:	Base Line	CONTROL:	SIGNAL

CLASS 4:	NOTES:	AM		▲ N	
4 OR MORE AXLE TRUCKS		PM			
		MD	◄ W		E ►
		OTHER		S ▼	
		OTHER			

AM

	NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X	
7:00 AM	0	0	1	0	0	0	0	4	0	0	2	0	7
7:15 AM	0	0	0	0	0	0	0	2	0	0	1	0	3
7:30 AM	0	0	2	0	0	0	0	0	0	0	1	0	3
7:45 AM	0	0	3	0	0	0	0	2	0	0	0	0	5
8:00 AM	0	0	0	0	0	0	0	4	0	1	0	0	5
8:15 AM	0	0	1	0	0	0	0	1	0	1	1	0	4
8:30 AM	0	0	2	0	0	0	0	2	0	1	2	0	7
8:45 AM	0	0	1	0	0	0	0	3	0	0	4	0	8
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	10	0	0	0	0	18	0	3	11	0	42
APPROACH %	0%	0%	100%	0%	0%	0%	0%	100%	0%	21%	79%	0%	
APP/DEPART	10	/	0	0	/	3	18	/	28	14	/	11	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	0	0	4	0	0	0	0	10	0	3	7	0	24
APPROACH %	0%	0%	100%	0%	0%	0%	0%	100%	0%	30%	70%	0%	
PEAK HR FACTOR		0.500			0.000			0.625			0.625		0.750
APP/DEPART	4	/	0	0	/	3	10	/	14	10	/	7	0

PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	3
4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
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	1	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
5:45 PM	0	0	0	0	0	0	0	1	0	0	2	0	3
VOLUMES	0	0	0	0	0	0	0	3	0	1	6	0	10
APPROACH %	0%	0%	0%	0%	0%	0%	0%	100%	0%	14%	86%	0%	
APP/DEPART	0	/	0	0	/	1	3	/	3	7	/	6	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	0	0	0	0	0	0	0	1	0	1	3	0	5
APPROACH %	0%	0%	0%	0%	0%	0%	0%	100%	0%	25%	75%	0%	
PEAK HR FACTOR		0.000			0.000			0.250			0.333		0.417
APP/DEPART	0	/	0	0	/	1	1	/	1	4	/	3	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0

	NB	SB	EB	WB	TTL
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

University

NORTH SIDE

Base Line WEST SIDE EAST SIDE **Base Line**

SOUTH SIDE

University

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
4/10/19	NORTH & SOUTH:	University	LOCATION #:	6
WEDNESDAY	EAST & WEST:	Base Line	CONTROL:	SIGNAL

CLASS 5:	NOTES:	AM PM MD OTHER OTHER	▲ N ◄ W E ► S ▼
RV			

		NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	X	1	X	X	X	X	2	0	1	2	X						
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
AM	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
AM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%						
AM	APP/DEPART	0	/	0	0	/	0	1	/	1	0	/	0	0					
AM	BEGIN PEAK HR		7:15 AM																
AM	VOLUMES	0	0	0	0	0	0	0	1	0	0	0	0	1					
AM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%						
AM	PEAK HR FACTOR		0.000			0.000			0.250			0.000		0.250					
AM	APP/DEPART	0	/	0	0	/	0	1	/	1	0	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PM	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
PM	BEGIN PEAK HR		3:00 PM																
PM	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
PM	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PM	PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
PM	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					

University

NORTH SIDE

Base Line WEST SIDE

EAST SIDE **Base Line**

SOUTH SIDE

University

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC
4/10/19	NORTH & SOUTH:	University	LOCATION #:	6
WEDNESDAY	EAST & WEST:	Base Line	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

		NORTHBOUND University			SOUTHBOUND University			EASTBOUND Base Line			WESTBOUND Base Line				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	X	1	X	X	X	X	2	0	1	2	X						
AM	7:00 AM	0	0	6	0	0	0	0	2	0	13	2	0	23	0	0	0	0	0
	7:15 AM	0	0	9	0	0	0	0	2	0	0	0	0	11	0	0	0	0	0
	7:30 AM	0	0	2	0	0	0	0	8	0	1	2	0	13	0	0	0	0	0
	7:45 AM	0	0	1	0	0	0	0	1	0	6	0	0	8	0	0	0	0	0
	8:00 AM	0	0	1	0	0	0	0	5	0	10	1	0	17	0	0	0	0	0
	8:15 AM	0	0	16	0	0	0	0	1	0	0	0	0	17	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	3	0	0	1	0	4	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	35	0	0	0	0	23	0	30	7	0	95	0	0	0	0	0
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	100%	0%	81%	19%	0%						
	APP/DEPART	35	/	0	0	/	30	23	/	58	37	/	7	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	0	20	0	0	0	0	15	0	17	3	0	55					
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	100%	0%	85%	15%	0%						
	PEAK HR FACTOR		0.313			0.000			0.469			0.333		0.598					
	APP/DEPART	20	/	0	0	/	17	15	/	35	20	/	3	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
	4:15 PM	0	0	17	0	0	0	0	0	0	3	0	0	20	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	1	0	0	2	0	3	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
	5:45 PM	0	0	1	0	0	0	0	1	1	0	0	0	3	0	0	0	0	0
	VOLUMES	0	0	18	0	0	0	0	5	1	4	5	0	33	0	0	0	0	0
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	83%	17%	44%	56%	0%						
	APP/DEPART	18	/	0	0	/	5	6	/	23	9	/	5	0					
	BEGIN PEAK HR		4:15 PM																
	VOLUMES	0	0	17	0	0	0	0	3	0	3	3	0	26					
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	100%	0%	50%	50%	0%						
	PEAK HR FACTOR		0.250			0.000			0.750			0.500		0.325					
	APP/DEPART	17	/	0	0	/	3	3	/	20	6	/	3	0					

University

NORTH SIDE

Base Line WEST SIDE

EAST SIDE **Base Line**

SOUTH SIDE

University

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	Rancho	LOCATION #:	7a
	EAST & WEST:	Foothill	CONTROL:	STOP N

PCE Adjusted

NOTES:

Class	1	2	3	4	5	6
Factor	1	1.5	2	3	2	2

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X						
AM 7:00 AM	8	0	41	0	0	0	0	111	29	45	96	0	329					0
7:15 AM	10	0	48	0	0	0	0	127	40	43	112	0	378					0
7:30 AM	12	0	46	0	0	0	0	162	46	48	129	0	443					0
7:45 AM	12	0	38	0	0	0	0	144	33	34	114	0	375					0
8:00 AM	19	0	43	0	0	0	0	140	23	33	99	0	356					0
8:15 AM	10	0	48	0	0	0	0	150	21	51	101	0	380					0
8:30 AM	11	0	51	0	0	0	0	166	25	56	99	0	407					0
8:45 AM	11	0	49	0	0	0	0	105	11	70	107	0	353					0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
VOLUMES	92	0	363	0	0	0	0	1,104	227	379	856	0	3,019	0	0	0	0	0
APPROACH %	20%	0%	80%	0%	0%	0%	0%	83%	17%	31%	69%	0%						
APP/DEPART	454	/	0	0	/	606	1,331	/	1,466	1,234	/	947	0					
BEGIN PEAK HR		7:30 AM																
VOLUMES	52	0	174	0	0	0	0	595	123	166	443	0	1,552					
APPROACH %	23%	0%	77%	0%	0%	0%	0%	83%	17%	27%	73%	0%						
PEAK HR FACTOR		0.926			0.000			0.863			0.861		0.877					
APP/DEPART	226	/	0	0	/	289	718	/	769	608	/	495	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
4:00 PM	31	0	52	0	0	0	0	188	16	41	131	0	458					0
4:15 PM	20	0	55	0	0	0	0	189	16	40	176	0	494					0
4:30 PM	24	0	47	0	0	0	0	162	22	52	159	0	464					0
4:45 PM	27	0	61	0	0	0	0	187	34	46	165	0	518					0
5:00 PM	17	0	67	0	0	0	0	192	28	53	195	0	551					0
5:15 PM	23	0	48	0	0	0	0	183	29	45	195	0	522					0
5:30 PM	26	0	49	0	0	0	0	152	31	30	147	0	435					0
5:45 PM	22	0	42	0	0	0	0	188	30	41	137	0	460					0
VOLUMES	188	0	420	0	0	0	0	1,440	204	347	1,303	0	3,900	0	0	0	0	0
APPROACH %	31%	0%	69%	0%	0%	0%	0%	88%	12%	21%	79%	0%						
APP/DEPART	607	/	0	0	/	551	1,644	/	1,860	1,649	/	1,490	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	90	0	222	0	0	0	0	724	112	196	712	0	2,055					
APPROACH %	29%	0%	71%	0%	0%	0%	0%	87%	13%	22%	78%	0%						
PEAK HR FACTOR		0.890			0.000			0.949			0.917		0.933					
APP/DEPART	312	/	0	0	/	308	836	/	946	908	/	802	0					

Rancho

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Rancho

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC2069

ALL HOURS

Rancho (north leg)

TOTAL	**0**	**0**	**0**	**0**	**0**
PM	**0**	0	0	0	0
AM	**0**	0	0	0	0

Foothill (east leg)

AM	**975**	0	856	379	1,220
PM	**1,449**	0	1,303	347	1,632
TOTAL	**2,424**	**0**	**2,158**	**725**	**2,852**

Foothill (west leg)

TOTAL	**2,133**	**0**	**2,544**	**431**	**2,602**
PM	1,340	0	1,440	204	**1,449**
AM	793	0	1,104	227	**1,153**

Rancho (south leg)

AM	479	92	0	363	**364**
PM	476	188	0	420	**550**
TOTAL	**955**	**279**	**0**	**782**	**914**

PEAK HOUR

AM 7:15 AM

PM 4:30 PM

Rancho (north leg)

TOTAL	**0**	**0**	**0**	**0**	**0**
PM	**0**	0	0	0	0
AM	**0**	0	0	0	0

Foothill (east leg)

AM	**608**	0	443	166	769
PM	**908**	0	712	196	946
TOTAL	**1,516**	**0**	**1,155**	**361**	**1,715**

Foothill (west leg)

TOTAL	**1,296**	**0**	**1,319**	**235**	**1,554**
PM	802	0	724	112	**836**
AM	495	0	595	123	**718**

Rancho (south leg)

AM	289	52	0	174	**226**
PM	308	90	0	222	**312**
Total	**596**	**142**	**0**	**396**	**538**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	Rancho	LOCATION #:	7a
	EAST & WEST:	Foothill	CONTROL:	STOP N

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

Add U-Turns to Left Turns

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X		0	0	0	0	
AM 7:00 AM	8	0	30	0	0	0	0	100	27	38	78	0	281	0	0	0	0	0
7:15 AM	9	0	43	0	0	0	0	120	36	37	95	0	340	0	0	0	0	0
7:30 AM	12	0	39	0	0	0	0	144	45	41	112	0	393	0	0	0	0	0
7:45 AM	12	0	31	0	0	0	0	127	32	25	98	0	325	0	0	0	0	0
8:00 AM	16	0	32	0	0	0	0	119	21	25	80	0	293	0	0	0	0	0
8:15 AM	7	0	31	0	0	0	0	113	19	30	79	0	279	0	0	0	0	0
8:30 AM	10	0	40	0	0	0	0	125	23	34	77	0	309	0	0	0	0	0
8:45 AM	9	0	35	0	0	0	0	91	11	35	91	0	272	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	83	0	281	0	0	0	0	939	214	265	710	0	2,492	0	0	0	0	0
APPROACH %	23%	0%	77%	0%	0%	0%	0%	81%	19%	27%	73%	0%						
APP/DEPART	364	/	0	0	/	479	1,153	/	1,220	975	/	793	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	49	0	145	0	0	0	0	510	134	128	385	0	1,351					
APPROACH %	25%	0%	75%	0%	0%	0%	0%	79%	21%	25%	75%	0%						
PEAK HR FACTOR		0.933			0.000			0.852			0.838		0.859					
APP/DEPART	194	/	0	0	/	262	644	/	655	513	/	434	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	27	0	47	0	0	0	0	161	15	35	112	0	397	0	0	0	0	0
4:15 PM	19	0	49	0	0	0	0	161	14	31	158	0	432	0	0	0	0	0
4:30 PM	22	0	40	0	0	0	0	145	21	39	135	0	402	0	0	0	0	0
4:45 PM	25	0	53	0	0	0	0	159	31	37	150	0	455	0	0	0	0	0
5:00 PM	16	0	58	0	0	0	0	169	27	45	172	0	487	0	0	0	0	0
5:15 PM	22	0	45	0	0	0	0	164	29	37	177	0	474	0	0	0	0	0
5:30 PM	23	0	43	0	0	0	0	136	26	25	136	0	389	0	0	0	0	0
5:45 PM	21	0	40	0	0	0	0	162	29	35	125	0	412	0	0	0	0	0
VOLUMES	175	0	375	0	0	0	0	1,257	192	284	1,165	0	3,448	0	0	0	0	0
APPROACH %	32%	0%	68%	0%	0%	0%	0%	87%	13%	20%	80%	0%						
APP/DEPART	550	/	0	0	/	476	1,449	/	1,632	1,449	/	1,340	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	85	0	196	0	0	0	0	637	108	158	634	0	1,818					
APPROACH %	30%	0%	70%	0%	0%	0%	0%	86%	14%	20%	80%	0%						
PEAK HR FACTOR		0.901			0.000			0.950			0.912		0.933					
APP/DEPART	281	/	0	0	/	266	745	/	833	792	/	719	0					

Rancho

NORTH SIDE

Foothill WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

Rancho

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	7a
WEDNESDAY	EAST & WEST:	Foothill	CONTROL:	STOP N

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	X	1	X	X	X	X	2	0	1	2	X						
AM	7:00 AM	8	0	23	0	0	0	0	90	25	31	66	0	243	0	0	0	0	0
	7:15 AM	8	0	37	0	0	0	0	113	33	31	81	0	303	0	0	0	0	0
	7:30 AM	12	0	33	0	0	0	0	129	44	33	101	0	352	0	0	0	0	0
	7:45 AM	12	0	25	0	0	0	0	111	31	18	86	0	283	0	0	0	0	0
	8:00 AM	14	0	23	0	0	0	0	100	18	19	66	0	240	0	0	0	0	0
	8:15 AM	5	0	18	0	0	0	0	88	16	16	61	0	204	0	0	0	0	0
	8:30 AM	8	0	28	0	0	0	0	97	21	20	62	0	236	0	0	0	0	0
	8:45 AM	8	0	22	0	0	0	0	79	11	16	77	0	213	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	75	0	209	0	0	0	0	807	199	184	600	0	2,074	0	0	0	0	0
	APPROACH %	26%	0%	74%	0%	0%	0%	0%	80%	20%	23%	77%	0%						
	APP/DEPART	284	/	0	0	/	383	1,006	/	1,016	784	/	675	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	40	0	118	0	0	0	0	443	133	113	334	0	1,181					
	APPROACH %	25%	0%	75%	0%	0%	0%	0%	77%	23%	25%	75%	0%						
	PEAK HR FACTOR		0.878			0.000			0.832			0.834		0.839					
	APP/DEPART	158	/	0	0	/	246	576	/	561	447	/	374	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	23	0	41	0	0	0	0	140	14	29	97	0	344	0	0	0	0	0
	4:15 PM	18	0	43	0	0	0	0	141	12	23	142	0	379	0	0	0	0	0
	4:30 PM	20	0	33	0	0	0	0	132	20	28	117	0	350	0	0	0	0	0
	4:45 PM	22	0	47	0	0	0	0	142	29	29	136	0	405	0	0	0	0	0
	5:00 PM	15	0	50	0	0	0	0	154	25	36	155	0	435	0	0	0	0	0
	5:15 PM	21	0	42	0	0	0	0	151	29	28	164	0	435	0	0	0	0	0
	5:30 PM	20	0	38	0	0	0	0	125	21	20	125	0	349	0	0	0	0	0
	5:45 PM	19	0	38	0	0	0	0	144	28	29	115	0	373	0	0	0	0	0
	VOLUMES	158	0	332	0	0	0	0	1,129	178	222	1,051	0	3,070	0	0	0	0	0
	APPROACH %	32%	0%	68%	0%	0%	0%	0%	86%	14%	17%	83%	0%						
	APP/DEPART	490	/	0	0	/	400	1,307	/	1,461	1,273	/	1,209	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	78	0	172	0	0	0	0	579	103	121	572	0	1,625					
	APPROACH %	31%	0%	69%	0%	0%	0%	0%	85%	15%	17%	83%	0%						
	PEAK HR FACTOR		0.906			0.000			0.947			0.902		0.934					
	APP/DEPART	250	/	0	0	/	224	682	/	751	693	/	650	0					

Rancho

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	7a
WEDNESDAY	EAST & WEST:	Foothill	CONTROL:	STOP N

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X	
AM													
7:00 AM	0	0	2	0	0	0	0	4	1	2	1	0	10
7:15 AM	1	0	3	0	0	0	0	3	0	3	4	0	14
7:30 AM	0	0	2	0	0	0	0	4	0	4	1	0	11
7:45 AM	0	0	2	0	0	0	0	5	0	2	4	0	13
8:00 AM	1	0	1	0	0	0	0	6	2	1	4	0	15
8:15 AM	1	0	1	0	0	0	0	1	2	0	6	0	11
8:30 AM	2	0	2	0	0	0	0	6	1	1	4	0	16
8:45 AM	0	0	2	0	0	0	0	4	0	0	7	0	13
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	5	0	15	0	0	0	0	33	6	13	31	0	103
APPROACH %	25%	0%	75%	0%	0%	0%	0%	85%	15%	30%	70%	0%	
APP/DEPART	20	/	0	0	/	19	39	/	48	44	/	36	0
BEGIN PEAK HR		7:45 AM											
VOLUMES	4	0	6	0	0	0	0	17	5	2	21	0	55
APPROACH %	40%	0%	60%	0%	0%	0%	0%	77%	23%	9%	91%	0%	
PEAK HR FACTOR		0.625			0.000			0.688			0.821		0.859
APP/DEPART	10	/	0	0	/	7	22	/	23	23	/	25	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	3	0	4	0	0	0	0	8	0	1	5	0	21
4:15 PM	1	0	3	0	0	0	0	7	1	1	8	0	21
4:30 PM	1	0	2	0	0	0	0	4	1	1	5	0	14
4:45 PM	3	0	0	0	0	0	0	3	1	0	7	0	14
5:00 PM	1	0	3	0	0	0	0	4	2	2	3	0	15
5:15 PM	0	0	1	0	0	0	0	4	0	4	3	0	12
5:30 PM	2	0	2	0	0	0	0	2	2	0	6	0	14
5:45 PM	2	0	0	0	0	0	0	4	1	0	2	0	9
VOLUMES	13	0	15	0	0	0	0	36	8	9	39	0	120
APPROACH %	46%	0%	54%	0%	0%	0%	0%	82%	18%	19%	81%	0%	
APP/DEPART	28	/	0	0	/	17	44	/	51	48	/	52	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	8	0	9	0	0	0	0	22	3	3	25	0	70
APPROACH %	47%	0%	53%	0%	0%	0%	0%	88%	12%	11%	89%	0%	
PEAK HR FACTOR		0.607			0.000			0.781			0.778		0.833
APP/DEPART	17	/	0	0	/	6	25	/	31	28	/	33	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	Rancho	LOCATION #:	7a
	EAST & WEST:	Foothill	CONTROL:	STOP N

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X						
AM 7:00 AM	0	0	0	0	0	0	0	2	0	4	1	0	7	0	0	0	0	0
7:15 AM	0	0	3	0	0	0	0	2	1	2	4	0	12	0	0	0	0	0
7:30 AM	0	0	2	0	0	0	0	5	1	3	3	0	14	0	0	0	0	0
7:45 AM	0	0	1	0	0	0	0	2	0	2	1	0	6	0	0	0	0	0
8:00 AM	0	0	6	0	0	0	0	5	1	3	2	0	17	0	0	0	0	0
8:15 AM	0	0	8	0	0	0	0	4	0	7	3	0	22	0	0	0	0	0
8:30 AM	0	0	10	0	0	0	0	2	1	5	1	0	19	0	0	0	0	0
8:45 AM	0	0	9	0	0	0	0	3	0	3	1	0	16	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	39	0	0	0	0	25	4	29	16	0	113	0	0	0	0	0
APPROACH %	0%	0%	100%	0%	0%	0%	0%	86%	14%	64%	36%	0%						
APP/DEPART	39	/	0	0	/	33	29	/	64	45	/	16	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	0	0	33	0	0	0	0	14	2	18	7	0	74					
APPROACH %	0%	0%	100%	0%	0%	0%	0%	88%	13%	72%	28%	0%						
PEAK HR FACTOR		0.825			0.000			0.667			0.625		0.841					
APP/DEPART	33	/	0	0	/	20	16	/	47	25	/	7	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	1	0	0	0	0	1	1	5	3	0	11	0	0	0	0	0
4:15 PM	0	0	2	0	0	0	0	2	1	6	2	0	13	0	0	0	0	0
4:30 PM	1	0	4	0	0	0	0	1	0	8	2	0	16	0	0	0	0	0
4:45 PM	0	0	4	0	0	0	0	1	0	7	1	0	13	0	0	0	0	0
5:00 PM	0	0	3	0	0	0	0	0	0	7	6	0	16	0	0	0	0	0
5:15 PM	1	0	2	0	0	0	0	0	0	4	2	0	9	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	0	3	2	5	1	0	12	0	0	0	0	0
5:45 PM	0	0	2	0	0	0	0	1	0	5	4	0	12	0	0	0	0	0
VOLUMES	2	0	19	0	0	0	0	9	4	47	21	0	102	0	0	0	0	0
APPROACH %	10%	0%	90%	0%	0%	0%	0%	69%	31%	69%	31%	0%						
APP/DEPART	21	/	0	0	/	51	13	/	28	68	/	23	0					
BEGIN PEAK HR		4:15 PM																
VOLUMES	1	0	13	0	0	0	0	4	1	28	11	0	58					
APPROACH %	7%	0%	93%	0%	0%	0%	0%	80%	20%	72%	28%	0%						
PEAK HR FACTOR		0.700			0.000			0.417			0.750		0.906					
APP/DEPART	14	/	0	0	/	29	5	/	17	39	/	12	0					

Rancho

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	7a
WEDNESDAY	EAST & WEST:	Foothill	CONTROL:	STOP N

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X	
AM 7:00 AM	0	0	5	0	0	0	0	3	0	1	6	0	15
7:15 AM	0	0	0	0	0	0	0	1	1	1	5	0	8
7:30 AM	0	0	2	0	0	0	0	5	0	1	6	0	14
7:45 AM	0	0	2	0	0	0	0	3	0	3	6	0	14
8:00 AM	1	0	2	0	0	0	0	5	0	2	7	0	17
8:15 AM	1	0	4	0	0	0	0	12	0	7	7	0	31
8:30 AM	0	0	0	0	0	0	0	16	0	8	9	0	33
8:45 AM	1	0	2	0	0	0	0	4	0	16	5	0	28
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	3	0	17	0	0	0	0	49	1	39	51	0	160
APPROACH %	15%	0%	85%	0%	0%	0%	0%	98%	2%	43%	57%	0%	
APP/DEPART	20	/	0	0	/	40	50	/	66	90	/	54	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	3	0	8	0	0	0	0	37	0	33	28	0	109
APPROACH %	27%	0%	73%	0%	0%	0%	0%	100%	0%	54%	46%	0%	
PEAK HR FACTOR		0.550			0.000			0.578			0.726		0.826
APP/DEPART	11	/	0	0	/	33	37	/	45	61	/	31	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	0	1	0	0	0	0	10	0	0	6	0	18
4:15 PM	0	0	1	0	0	0	0	11	0	1	6	0	19
4:30 PM	0	0	1	0	0	0	0	6	0	2	8	0	17
4:45 PM	0	0	2	0	0	0	0	12	1	1	4	0	20
5:00 PM	0	0	2	0	0	0	0	10	0	0	7	0	19
5:15 PM	0	0	0	0	0	0	0	8	0	1	6	0	15
5:30 PM	1	0	2	0	0	0	0	6	1	0	3	0	13
5:45 PM	0	0	0	0	0	0	0	10	0	0	3	0	13
VOLUMES	2	0	9	0	0	0	0	73	2	5	43	0	134
APPROACH %	18%	0%	82%	0%	0%	0%	0%	97%	3%	10%	90%	0%	
APP/DEPART	11	/	0	0	/	7	75	/	82	48	/	45	0
BEGIN PEAK HR		4:15 PM											
VOLUMES	0	0	6	0	0	0	0	39	1	4	25	0	75
APPROACH %	0%	0%	100%	0%	0%	0%	0%	98%	3%	14%	86%	0%	
PEAK HR FACTOR		0.750			0.000			0.769			0.725		0.938
APP/DEPART	6	/	0	0	/	5	40	/	45	29	/	25	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	7a
WEDNESDAY	EAST & WEST:	Foothill	CONTROL:	STOP N

CLASS 5: RV

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	X	1	X	X	X	X	2	0	1	2	X	
AM													
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	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	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	1	0	1
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	
APP/DEPART	0	/	0	0	/	0	0	/	0	1	/	1	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	0	0	0	0	0	0	0	0	0	0	1	0	1
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	
PEAK HR FACTOR		0.000			0.000			0.000			0.250		0.250
APP/DEPART	0	/	0	0	/	0	0	/	0	1	/	1	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	7a
WEDNESDAY	EAST & WEST:	Foothill	CONTROL:	STOP N

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Foothill			WESTBOUND Foothill			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
LANES:	1	X	1	X	X	X	X	2	0	1	2	X	
AM													
7:00 AM	0	0	0	0	0	0	0	1	1	0	4	0	6
7:15 AM	0	0	0	0	0	0	0	1	1	0	1	0	3
7:30 AM	0	0	0	0	0	0	0	1	0	0	1	0	2
7:45 AM	0	0	1	0	0	0	0	6	1	0	1	0	9
8:00 AM	0	0	0	0	0	0	0	3	0	0	1	0	4
8:15 AM	0	0	0	0	0	0	0	8	1	0	2	0	11
8:30 AM	0	0	0	0	0	0	0	4	0	0	1	0	5
8:45 AM	0	0	0	0	0	0	0	1	0	0	1	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	1	0	0	0	0	25	4	0	12	0	42
APPROACH %	0%	0%	100%	0%	0%	0%	0%	86%	14%	0%	100%	0%	
APP/DEPART	1	/	0	0	/	4	29	/	26	12	/	12	0
BEGIN PEAK HR		7:45 AM											
VOLUMES	0	0	1	0	0	0	0	21	2	0	5	0	29
APPROACH %	0%	0%	100%	0%	0%	0%	0%	91%	9%	0%	100%	0%	
PEAK HR FACTOR		0.250			0.000			0.639			0.625		0.659
APP/DEPART	1	/	0	0	/	2	23	/	22	5	/	5	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	2	0	0	1	0	3
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	2	0	0	3	0	5
4:45 PM	0	0	0	0	0	0	0	1	0	0	2	0	3
5:00 PM	0	0	0	0	0	0	0	1	0	0	1	0	2
5:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
5:45 PM	0	0	0	0	0	0	0	3	0	1	1	0	5
VOLUMES	0	0	0	0	0	0	0	10	0	1	10	0	21
APPROACH %	0%	0%	0%	0%	0%	0%	0%	100%	0%	9%	91%	0%	
APP/DEPART	0	/	0	0	/	1	10	/	10	11	/	10	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	0	0	0	0	0	0	0	5	0	0	7	0	12
APPROACH %	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%	0%	
PEAK HR FACTOR		0.000			0.000			0.625			0.583		0.600
APP/DEPART	0	/	0	0	/	0	5	/	5	7	/	7	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	8
WEDNESDAY	EAST & WEST:	Rialto	CONTROL:	SIGNAL

PCE Adjusted	NOTES:								AM		▲	
	Class	1	2	3	4	5	6		PM		N	
	Factor	1	1.5	2	3	2	2		MD	◄ W		E ►
									OTHER		S	
									OTHER		▼	

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	1	1	1	1	0	1	2	0	1	2	0						
AM	7:00 AM	12	23	19	22	52	10	4	53	23	10	53	23	303					0
AM	7:15 AM	14	43	28	23	64	20	9	94	30	16	50	11	401					0
AM	7:30 AM	20	44	37	26	67	10	7	94	27	25	53	17	424					0
AM	7:45 AM	23	37	47	17	49	8	13	88	29	18	57	12	394					0
AM	8:00 AM	17	43	27	21	31	8	10	68	25	13	44	12	316					0
AM	8:15 AM	15	32	20	18	34	8	5	52	18	8	30	11	249					0
AM	8:30 AM	25	31	22	22	37	7	5	53	30	12	54	11	307					0
AM	8:45 AM	10	24	17	26	35	1	8	54	12	17	43	28	274					0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
AM	VOLUMES	136	275	216	174	367	70	60	555	193	117	382	123	2,665	0	0	0	0	0
AM	APPROACH %	22%	44%	34%	28%	60%	11%	7%	69%	24%	19%	61%	20%						
AM	APP/DEPART	626	/	458	611	/	677	807	/	944	622	/	588	0					
AM	BEGIN PEAK HR		7:15 AM																
AM	VOLUMES	74	166	138	86	210	45	38	343	110	71	203	51	1,534					
AM	APPROACH %	20%	44%	37%	25%	62%	13%	8%	70%	22%	22%	62%	16%						
AM	PEAK HR FACTOR		0.887			0.801			0.926			0.864		0.905					
AM	APP/DEPART	378	/	255	340	/	391	491	/	567	325	/	322	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
PM	4:00 PM	36	52	30	27	28	4	10	59	41	19	64	19	388					0
PM	4:15 PM	37	57	16	17	30	4	9	62	21	26	105	10	391					0
PM	4:30 PM	36	42	32	19	34	5	8	69	31	39	75	17	404					0
PM	4:45 PM	32	61	16	25	62	13	8	52	14	28	97	26	432					0
PM	5:00 PM	41	57	23	23	62	5	9	53	34	34	96	20	456					0
PM	5:15 PM	36	48	29	20	49	12	9	62	28	41	95	19	448					0
PM	5:30 PM	30	48	36	22	43	5	6	82	32	31	89	26	447					0
PM	5:45 PM	32	46	23	21	56	8	12	55	26	35	75	11	399					0
PM	VOLUMES	279	409	204	172	362	56	71	494	226	252	694	147	3,363	0	0	0	0	0
PM	APPROACH %	31%	46%	23%	29%	61%	9%	9%	62%	29%	23%	64%	13%						
PM	APP/DEPART	891	/	626	590	/	840	790	/	870	1,093	/	1,028	0					
PM	BEGIN PEAK HR		4:45 PM																
PM	VOLUMES	139	213	104	89	215	35	32	249	108	134	376	91	1,782					
PM	APPROACH %	30%	47%	23%	26%	63%	10%	8%	64%	28%	22%	63%	15%						
PM	PEAK HR FACTOR		0.940			0.854			0.808			0.969		0.978					
PM	APP/DEPART	455	/	336	338	/	456	388	/	442	601	/	549	0					

Rancho

NORTH SIDE

Rialto WEST SIDE

EAST SIDE **Rialto**

SOUTH SIDE

Rancho

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC2069

ALL HOURS

Rancho

TOTAL	**1,009**	**126**	**729**	**346**	**945**
PM	**517**	56	362	172	567
AM	**492**	70	367	174	378

Rialto

TOTAL	**1,500**	**130**	**1,048**	**419**	**1,515**
PM	993	71	494	226	**751**
AM	507	60	555	193	**764**

Rialto

AM	**512**	123	382	117	860
PM	**1,018**	147	694	252	780
TOTAL	**1,530**	**270**	**1,076**	**369**	**1,640**

AM	610	136	275	216	**587**
PM	803	279	409	204	**857**
TOTAL	**1,413**	**414**	**684**	**420**	**1,444**

Rancho

Rancho

PEAK HOUR

AM 7:15 AM

PM 4:45 PM

TOTAL	**678**	**79**	**424**	**175**	**591**
PM	**338**	35	215	89	336
AM	**340**	45	210	86	255

Rialto

TOTAL	**871**	**70**	**592**	**218**	**879**
PM	549	32	249	108	**388**
AM	322	38	343	110	**491**

Rialto

AM	**325**	51	203	71	567
PM	**601**	91	376	134	442
TOTAL	**926**	**142**	**579**	**205**	**1,008**

AM	391	74	166	138	**378**
PM	456	139	213	104	**455**
Total	**847**	**213**	**379**	**242**	**833**

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	Rancho	LOCATION #:	8
	EAST & WEST:	Rialto	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◀ W
E ▶
S ▼

Add U-Turns to Left Turns

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	1	1	1	1	0	1	2	0	1	2	0		0	0	0	0	
AM 7:00 AM	12	23	19	16	46	8	4	48	21	10	41	10	258	0	0	0	0	0
7:15 AM	13	43	26	16	53	9	8	91	28	16	45	8	356	0	0	0	0	0
7:30 AM	18	38	36	23	61	8	7	86	23	19	46	10	375	0	0	0	0	0
7:45 AM	22	34	45	14	47	4	13	86	27	17	51	9	369	0	0	0	0	0
8:00 AM	17	36	25	14	28	5	6	67	23	13	41	8	283	0	0	0	0	0
8:15 AM	14	29	20	12	31	6	5	51	17	8	28	6	227	0	0	0	0	0
8:30 AM	22	26	20	12	30	5	5	50	26	9	42	6	253	0	0	0	0	0
8:45 AM	9	24	16	13	30	1	6	54	12	15	39	15	234	0	0	1	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	127	253	207	120	326	46	54	533	177	107	333	72	2,355	0	0	1	0	1
APPROACH %	22%	43%	35%	24%	66%	9%	7%	70%	23%	21%	65%	14%						
APP/DEPART	587	/	378	492	/	610	764	/	860	512	/	507	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	70	151	132	67	189	26	34	330	101	65	183	35	1,383					
APPROACH %	20%	43%	37%	24%	67%	9%	7%	71%	22%	23%	65%	12%						
PEAK HR FACTOR		0.874			0.766			0.915			0.919		0.922					
APP/DEPART	353	/	220	282	/	355	465	/	529	283	/	279	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	34	49	27	20	28	4	9	57	40	14	61	16	359	0	0	0	0	0
4:15 PM	36	53	15	11	30	4	7	57	20	25	99	8	365	0	0	0	0	0
4:30 PM	35	41	29	13	33	5	7	64	30	36	73	11	377	0	0	0	0	0
4:45 PM	32	60	16	14	58	10	8	49	13	28	91	17	396	0	0	0	0	0
5:00 PM	40	53	23	17	61	5	8	49	32	33	93	14	428	0	0	0	0	0
5:15 PM	36	47	27	14	47	12	8	60	28	39	94	15	427	0	0	0	0	0
5:30 PM	28	45	34	15	39	3	6	80	31	30	85	22	418	0	0	0	0	0
5:45 PM	31	44	22	14	52	8	10	53	25	31	74	9	373	0	0	0	0	0
VOLUMES	272	392	193	118	348	51	63	469	219	236	670	112	3,143	0	0	0	0	0
APPROACH %	32%	46%	23%	23%	67%	10%	8%	62%	29%	23%	66%	11%						
APP/DEPART	857	/	567	517	/	803	751	/	780	1,018	/	993	0					
BEGIN PEAK HR		4:45 PM																
VOLUMES	136	205	100	60	205	30	30	238	104	130	363	68	1,669					
APPROACH %	31%	46%	23%	20%	69%	10%	8%	64%	28%	23%	65%	12%						
PEAK HR FACTOR		0.950			0.889			0.795			0.948		0.975					
APP/DEPART	441	/	303	295	/	439	372	/	398	561	/	529	0					

Rancho

NORTH SIDE

Rialto WEST SIDE

EAST SIDE **Rialto**

SOUTH SIDE

Rancho

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	8
WEDNESDAY	EAST & WEST:	Rialto	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM
PM
MD
OTHER
OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	1	1	1	1	0	1	2	0	1	2	0						
AM																		
7:00 AM	12	23	19	10	42	7	4	44	18	10	34	0	223	0	0	0	0	0
7:15 AM	12	43	23	10	45	3	7	87	26	16	40	5	317	0	0	0	0	0
7:30 AM	17	33	35	20	56	6	7	78	19	15	41	5	332	0	0	0	0	0
7:45 AM	21	32	43	12	45	1	13	82	24	16	47	6	342	0	0	0	0	0
8:00 AM	17	32	23	7	24	3	2	66	21	13	39	5	252	0	0	0	0	0
8:15 AM	13	27	20	8	29	4	5	50	16	8	26	3	209	0	0	0	0	0
8:30 AM	19	21	19	5	26	4	5	48	23	7	31	1	209	0	0	0	0	0
8:45 AM	8	24	15	6	27	1	4	54	12	12	37	3	203	0	0	1	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	119	235	197	78	294	29	47	509	159	97	295	28	2,087	0	0	1	0	1
APPROACH %	22%	43%	36%	19%	73%	7%	7%	71%	22%	23%	70%	7%						
APP/DEPART	551	/	309	401	/	550	715	/	784	420	/	444	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	67	140	124	49	170	13	29	313	90	60	167	21	1,243					
APPROACH %	20%	42%	37%	21%	73%	6%	7%	72%	21%	24%	67%	8%						
PEAK HR FACTOR		0.862			0.707			0.900			0.899		0.909					
APP/DEPART	331	/	190	232	/	320	432	/	486	248	/	247	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	32	44	24	12	28	4	7	55	39	11	58	14	328	0	0	0	0	0
4:15 PM	35	49	14	5	30	4	6	52	19	24	90	6	334	0	0	0	0	0
4:30 PM	34	40	26	7	31	5	5	58	29	34	71	6	346	0	0	0	0	0
4:45 PM	32	59	16	4	54	8	8	47	12	28	86	10	364	0	0	0	0	0
5:00 PM	38	48	23	11	60	5	7	44	29	32	90	9	396	0	0	0	0	0
5:15 PM	36	46	26	8	44	12	7	57	28	35	93	11	403	0	0	0	0	0
5:30 PM	26	43	32	8	36	2	6	76	30	29	81	18	387	0	0	0	0	0
5:45 PM	30	41	20	8	47	8	9	50	24	27	73	6	343	0	0	0	0	0
VOLUMES	263	370	181	63	330	48	55	439	210	220	642	80	2,901	0	0	0	0	0
APPROACH %	32%	45%	22%	14%	75%	11%	8%	62%	30%	23%	68%	8%						
APP/DEPART	814	/	505	441	/	760	704	/	683	942	/	953	0					
BEGIN PEAK HR		4:45 PM																
VOLUMES	132	196	97	31	194	27	28	224	99	124	350	48	1,550					
APPROACH %	31%	46%	23%	12%	77%	11%	8%	64%	28%	24%	67%	9%						
PEAK HR FACTOR		0.975			0.829			0.783			0.939		0.962					
APP/DEPART	425	/	272	252	/	417	351	/	352	522	/	509	0					

Rancho

NORTH SIDE

Rialto WEST SIDE

EAST SIDE **Rialto**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	8
WEDNESDAY	EAST & WEST:	Rialto	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	1	1	1	1	0	1	2	0	1	2	0						
AM	7:00 AM	0	0	0	2	1	0	0	0	2	0	0	1	6	0	0	0	0	0
	7:15 AM	0	0	2	1	3	0	1	2	0	0	2	0	11	0	0	0	0	0
	7:30 AM	0	3	1	1	2	1	0	3	0	1	2	1	15	0	0	0	0	0
	7:45 AM	0	0	1	1	1	1	0	4	3	1	1	1	14	0	0	0	0	0
	8:00 AM	0	1	0	2	3	1	3	1	1	0	1	0	13	0	0	0	0	0
	8:15 AM	0	1	0	0	0	1	0	1	0	0	1	1	5	0	0	0	0	0
	8:30 AM	1	3	0	0	0	0	0	0	1	1	7	0	13	0	0	0	0	0
	8:45 AM	0	0	1	0	0	0	1	0	0	3	0	0	5	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	1	8	5	7	10	4	5	11	7	6	14	4	82	0	0	0	0	0
	APPROACH %	7%	57%	36%	33%	48%	19%	22%	48%	30%	25%	58%	17%						
	APP/DEPART	14	/	17	21	/	23	23	/	23	24	/	19	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	0	4	4	5	9	3	4	10	4	2	6	2	53					
	APPROACH %	0%	50%	50%	29%	53%	18%	22%	56%	22%	20%	60%	20%						
	PEAK HR FACTOR		0.500			0.708			0.643			0.625		0.883					
	APP/DEPART	8	/	10	17	/	15	18	/	19	10	/	9	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	5	2	2	0	0	2	0	0	1	1	0	13	0	0	0	0	0
	4:15 PM	1	3	1	1	0	0	0	2	1	1	8	1	19	0	0	0	0	0
	4:30 PM	0	1	2	1	2	0	2	3	0	1	1	1	14	0	0	0	0	0
	4:45 PM	0	1	0	0	3	1	0	0	1	0	1	0	7	0	0	0	0	0
	5:00 PM	2	4	0	1	1	0	1	2	2	0	2	0	15	0	0	0	0	0
	5:15 PM	0	0	0	2	2	0	0	2	0	4	0	0	10	0	0	0	0	0
	5:30 PM	1	1	1	1	1	0	0	4	0	0	3	2	14	0	0	0	0	0
	5:45 PM	1	2	2	0	3	0	0	2	0	2	0	2	14	0	0	0	0	0
	VOLUMES	5	17	8	8	12	1	5	15	4	9	16	6	106	0	0	0	0	0
	APPROACH %	17%	57%	27%	38%	57%	5%	21%	63%	17%	29%	52%	19%						
	APP/DEPART	30	/	28	21	/	25	24	/	31	31	/	22	0					
	BEGIN PEAK HR		4:15 PM																
	VOLUMES	3	9	3	3	6	1	3	7	4	2	12	2	55					
	APPROACH %	20%	60%	20%	30%	60%	10%	21%	50%	29%	13%	75%	13%						
	PEAK HR FACTOR		0.625			0.625			0.700			0.400		0.724					
	APP/DEPART	15	/	14	10	/	12	14	/	13	16	/	16	0					

Rancho

NORTH SIDE

Rialto WEST SIDE EAST SIDE **Rialto**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	8
WEDNESDAY	EAST & WEST:	Rialto	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N, ◀ W, E ▶, S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	1	1	1	1	0	1	2	0	1	2	0						
AM 7:00 AM	0	0	0	3	1	0	0	1	0	0	0	6	11	0	0	0	0	0
7:15 AM	0	0	1	4	0	1	0	1	0	0	2	3	12	0	0	0	0	0
7:30 AM	0	0	0	2	1	0	0	3	1	1	0	2	10	0	0	0	0	0
7:45 AM	0	0	1	0	1	0	0	0	0	0	0	2	4	0	0	0	0	0
8:00 AM	0	0	1	4	1	0	0	0	0	0	0	2	8	0	0	0	0	0
8:15 AM	1	0	0	2	1	0	0	0	0	0	1	0	5	0	0	0	0	0
8:30 AM	1	1	0	4	1	0	0	1	0	0	0	5	13	0	0	0	0	0
8:45 AM	0	0	0	1	1	0	1	0	0	0	0	11	14	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	2	1	3	20	7	1	1	6	1	1	3	31	77	0	0	0	0	0
APPROACH %	33%	17%	50%	71%	25%	4%	13%	75%	13%	3%	9%	89%						
APP/DEPART	6	/	33	28	/	9	8	/	29	35	/	6	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	2	1	1	11	4	0	1	1	0	0	1	18	40					
APPROACH %	50%	25%	25%	73%	27%	0%	50%	50%	0%	0%	5%	95%						
PEAK HR FACTOR		0.500			0.750			0.500			0.432		0.714					
APP/DEPART	4	/	20	15	/	4	2	/	13	19	/	3	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	6	0	0	0	1	0	0	2	1	10	0	0	0	0	0
4:15 PM	0	0	0	5	0	0	0	2	0	0	0	1	8	0	0	0	0	0
4:30 PM	0	0	0	5	0	0	0	3	0	0	1	3	12	0	0	0	0	0
4:45 PM	0	0	0	9	0	0	0	1	0	0	3	5	18	0	0	0	0	0
5:00 PM	0	0	0	5	0	0	0	2	0	1	0	4	12	0	0	0	0	0
5:15 PM	0	1	0	3	1	0	1	1	0	0	1	4	12	0	0	0	0	0
5:30 PM	0	0	1	6	1	0	0	0	0	1	0	1	10	0	0	0	0	0
5:45 PM	0	1	0	5	1	0	0	1	0	1	1	1	11	0	0	0	0	0
VOLUMES	0	2	1	44	3	0	1	11	0	3	8	20	93	0	0	0	0	0
APPROACH %	0%	67%	33%	94%	6%	0%	8%	92%	0%	10%	26%	65%						
APP/DEPART	3	/	23	47	/	6	12	/	56	31	/	8	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	0	1	0	22	1	0	1	7	0	1	5	16	54					
APPROACH %	0%	100%	0%	96%	4%	0%	13%	88%	0%	5%	23%	73%						
PEAK HR FACTOR		0.250			0.639			0.667			0.688		0.750					
APP/DEPART	1	/	18	23	/	2	8	/	29	22	/	5	0					

Rancho

NORTH SIDE

Rialto WEST SIDE EAST SIDE **Rialto**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	8
WEDNESDAY	EAST & WEST:	Rialto	CONTROL:	SIGNAL

CLASS 4:
4 OR MORE
AXLE
TRUCKS

NOTES:

AM
PM
MD
OTHER
OTHER

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		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	1	1	1	1	0	1	2	0	1	2	0	
AM	7:00 AM	0	0	0	1	2	1	0	1	0	0	5	3	13
	7:15 AM	0	0	0	1	4	5	0	0	0	0	1	0	11
	7:30 AM	1	2	0	0	2	0	0	1	0	2	3	2	13
	7:45 AM	0	1	0	1	0	1	0	0	0	0	2	0	5
	8:00 AM	0	3	0	1	0	1	1	0	0	0	1	1	8
	8:15 AM	0	1	0	2	1	0	0	0	0	0	0	2	6
	8:30 AM	0	1	1	3	3	1	0	1	1	1	4	0	16
	8:45 AM	0	0	0	6	2	0	0	0	0	0	2	1	11
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	1	8	1	15	14	9	1	3	1	3	18	9	83
	APPROACH %	10%	80%	10%	39%	37%	24%	20%	60%	20%	10%	60%	30%	
	APP/DEPART	10	/	18	38	/	18	5	/	19	30	/	28	0
	BEGIN PEAK HR		7:00 AM											
	VOLUMES	1	3	0	3	8	7	0	2	0	2	11	5	42
	APPROACH %	25%	75%	0%	17%	44%	39%	0%	100%	0%	11%	61%	28%	
	PEAK HR FACTOR		0.333			0.450			0.500			0.563		0.808
	APP/DEPART	4	/	8	18	/	10	2	/	5	18	/	19	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	1	0	0	0	0	0	0	2	0	1	4
	4:15 PM	0	1	0	0	0	0	1	1	0	0	1	0	4
	4:30 PM	0	0	1	0	0	0	0	0	0	1	0	1	3
	4:45 PM	0	0	0	1	1	1	0	1	0	0	1	2	7
	5:00 PM	0	1	0	0	0	0	0	0	0	0	1	1	3
	5:15 PM	0	0	1	1	0	0	0	0	0	0	0	0	2
	5:30 PM	0	1	0	0	1	1	0	0	0	0	1	1	5
	5:45 PM	0	0	0	1	0	0	1	0	0	1	0	0	3
	VOLUMES	0	3	3	3	2	2	2	2	0	4	4	6	31
	APPROACH %	0%	50%	50%	43%	29%	29%	50%	50%	0%	29%	29%	43%	
	APP/DEPART	6	/	11	7	/	6	4	/	8	14	/	6	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	0	1	2	1	1	1	1	2	0	3	2	4	18
	APPROACH %	0%	33%	67%	33%	33%	33%	33%	67%	0%	33%	22%	44%	
	PEAK HR FACTOR		0.750			0.250			0.375			0.750		0.643
	APP/DEPART	3	/	6	3	/	4	3	/	5	9	/	3	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Rialto WEST SIDE

EAST SIDE **Rialto**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	8
WEDNESDAY	EAST & WEST:	Rialto	CONTROL:	SIGNAL

CLASS 5:	NOTES:
RV	

AM / PM / MD / OTHER / OTHER

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	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	1	1	0	1	2	0	1	2	0	
AM													
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	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	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
BEGIN PEAK HR		3:00 PM											
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Rancho

NORTH SIDE

Rialto WEST SIDE EAST SIDE **Rialto**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:				
2/6/19	LOCATION:	San Bernardino	PROJECT #:	SC2069
WEDNESDAY	NORTH & SOUTH:	Rancho	LOCATION #:	8
	EAST & WEST:	Rialto	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

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	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Rialto			WESTBOUND Rialto			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	1	1	0	1	2	0	1	2	0	
AM													
7:00 AM	0	0	0	0	0	0	0	2	1	0	2	0	5
7:15 AM	1	0	0	0	1	0	0	1	2	0	0	0	5
7:30 AM	0	0	0	0	0	1	0	1	3	0	0	0	5
7:45 AM	1	1	0	0	0	1	0	0	0	0	1	0	4
8:00 AM	0	0	1	0	0	0	0	0	1	0	0	0	2
8:15 AM	0	0	0	0	0	1	0	0	1	0	0	0	2
8:30 AM	1	0	0	0	0	0	0	0	1	0	0	0	2
8:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	4	1	1	0	1	3	0	4	9	0	3	0	26
APPROACH %	67%	17%	17%	0%	25%	75%	0%	31%	69%	0%	100%	0%	
APP/DEPART	6	/	1	4	/	10	13	/	5	3	/	10	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	2	1	0	0	1	2	0	4	6	0	3	0	19
APPROACH %	67%	33%	0%	0%	33%	67%	0%	40%	60%	0%	100%	0%	
PEAK HR FACTOR		0.375			0.750			0.625			0.375		0.950
APP/DEPART	3	/	1	3	/	7	10	/	4	3	/	7	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	2	0	0	0	0	0	0	1	1	0	0	0	4
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	0	0	0	0	0	0	1	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	1	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	1	0	0	0	0	0	0	0	1	0	0	0	2
5:45 PM	0	0	0	0	1	0	0	0	1	0	0	0	2
VOLUMES	4	0	0	0	1	0	0	2	5	0	0	0	12
APPROACH %	100%	0%	0%	0%	100%	0%	0%	29%	71%	0%	0%	0%	
APP/DEPART	4	/	0	1	/	6	7	/	2	0	/	4	0
BEGIN PEAK HR		3:45 PM											
VOLUMES	1	0	0	0	1	0	0	1	3	0	0	0	6
APPROACH %	100%	0%	0%	0%	100%	0%	0%	25%	75%	0%	0%	0%	
PEAK HR FACTOR		0.125			0.250			0.500			0.000		0.375
APP/DEPART	1	/	0	1	/	4	4	/	1	0	/	1	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Rialto WEST SIDE

EAST SIDE **Rialto**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY				
LOCATION:	San Bernardino		PROJECT #:	SC2069
NORTH & SOUTH:	Rancho		LOCATION #:	9
EAST & WEST:	Mill		CONTROL:	SIGNAL

PCE Adjusted	NOTES:								
	Class	1	2	3	4	5	6		
	Factor	1	1.5	2	3	2	2		

AM
PM
MD
OTHER
OTHER

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	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	2	0	1	1	1	1	2	0						
AM 7:00 AM	19	33	23	23	73	46	16	71	30	29	93	17	471					0
7:15 AM	21	60	35	17	86	40	35	88	40	27	75	15	538					0
7:30 AM	32	59	38	28	98	35	36	94	50	28	73	14	582					0
7:45 AM	24	61	38	32	78	24	32	101	74	27	60	8	557					0
8:00 AM	33	46	28	25	51	10	35	88	35	35	68	17	469					0
8:15 AM	22	37	25	24	46	8	13	71	14	16	62	22	358					0
8:30 AM	14	39	18	30	58	13	8	78	20	19	47	12	355					0
8:45 AM	12	47	19	24	42	17	7	85	21	15	54	12	352					0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
VOLUMES	176	381	223	201	530	191	181	675	282	195	530	116	3,679	0	0	0	0	0
APPROACH %	23%	49%	29%	22%	57%	21%	16%	59%	25%	23%	63%	14%						
APP/DEPART	779	/	678	922	/	1,007	1,137	/	1,098	841	/	896	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	96	213	133	100	334	144	118	354	193	111	300	54	2,147					
APPROACH %	22%	48%	30%	17%	58%	25%	18%	53%	29%	24%	65%	12%						
PEAK HR FACTOR		0.860			0.902			0.806			0.838		0.923					
APP/DEPART	441	/	385	578	/	638	665	/	586	464	/	539	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
4:00 PM	38	67	35	26	60	9	22	91	26	28	121	20	540					0
4:15 PM	33	88	36	17	56	16	20	89	25	30	86	32	524					0
4:30 PM	36	83	37	20	72	14	19	76	21	18	89	29	511					0
4:45 PM	30	88	38	25	68	18	21	108	39	26	105	28	592					0
5:00 PM	38	97	39	32	89	19	17	106	37	30	89	15	605					0
5:15 PM	41	96	35	24	69	17	20	104	40	37	101	24	605					0
5:30 PM	40	92	47	36	73	18	18	115	29	41	98	26	631					0
5:45 PM	45	82	33	27	80	15	23	98	34	25	121	34	614					0
VOLUMES	299	691	297	206	566	123	159	785	250	233	808	207	4,620	0	0	0	0	0
APPROACH %	23%	54%	23%	23%	63%	14%	13%	66%	21%	19%	65%	17%						
APP/DEPART	1,287	/	1,056	895	/	1,048	1,193	/	1,287	1,247	/	1,230	0					
BEGIN PEAK HR		5:00 PM																
VOLUMES	163	366	152	119	311	68	78	422	140	131	408	98	2,454					
APPROACH %	24%	54%	22%	24%	63%	14%	12%	66%	22%	21%	64%	15%						
PEAK HR FACTOR		0.954			0.892			0.979			0.892		0.973					
APP/DEPART	681	/	542	498	/	582	639	/	693	637	/	639	0					

Rancho

NORTH SIDE

Mill WEST SIDE

EAST SIDE **Mill**

SOUTH SIDE

Rancho

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC2069

ALL HOURS

Rancho (north leg)

1,700	**314**	**1,096**	**407**	**TOTAL**	**1,650**
857	123	566	206	**PM**	1,015
843	191	530	201	**AM**	635

Mill (west leg)

	TOTAL	PM	AM
	2,013	1,194	819
	339	159	181
	1,459	785	675
	532	250	282
	2,238	**1,160**	**1,078**

Mill (east leg)

	AM	PM	TOTAL
	793	**1,213**	**2,006**
	116	207	**323**
	530	808	**1,337**
	195	233	**428**
	1,055	1,249	**2,304**

Rancho (south leg)

966	**AM**	176	381	223	**761**
1,012	**PM**	299	691	297	**1,240**
1,978	**TOTAL**	**475**	**1,072**	**519**	**2,001**

Rancho (north leg)

1,075	**212**	**645**	**219**	**TOTAL**	**926**
498	68	311	119	**PM**	542
578	144	334	100	**AM**	385

PEAK HOUR

AM 7:00 AM

PM 5:00 PM

Mill (west leg)

	TOTAL	PM	AM
	1,178	639	539
	196	78	118
	775	422	354
	333	140	193
	1,303	**639**	**665**

Mill (east leg)

	AM	PM	TOTAL
	464	**637**	**1,101**
	54	98	**152**
	300	408	**708**
	111	131	**242**
	586	693	**1,278**

Rancho (south leg)

638	**AM**	96	213	133	**441**
582	**PM**	163	366	152	**681**
1,219	**Total**	**259**	**579**	**285**	**1,122**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Feb 6, 19	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	Rancho	LOCATION #:	9
	EAST & WEST:	Mill	CONTROL:	SIGNAL

NOTES:

AM PM MD OTHER OTHER

▲ N ◀ W E ▶ S ▼

Add U-Turns to Left Turns

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	1	1	1	2	0	
AM 7:00 AM	19	33	22	22	71	39	16	70	29	27	88	15	451
7:15 AM	19	59	35	17	82	31	34	85	40	27	72	13	514
7:30 AM	32	55	37	24	93	27	31	87	49	27	67	13	542
7:45 AM	24	60	36	30	76	24	27	101	73	27	58	8	544
8:00 AM	32	45	28	24	47	9	26	82	34	35	63	16	441
8:15 AM	20	35	24	22	45	5	13	69	13	15	54	19	334
8:30 AM	13	38	18	27	52	7	4	74	19	19	45	11	327
8:45 AM	12	46	19	23	36	10	7	79	16	14	49	11	322
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	171	371	219	189	502	152	158	647	273	191	496	106	3,475
APPROACH %	22%	49%	29%	22%	60%	18%	15%	60%	25%	24%	63%	13%	
APP/DEPART	761	/	635	843	/	966	1,078	/	1,055	793	/	819	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	94	207	130	93	322	121	108	343	191	108	285	49	2,051
APPROACH %	22%	48%	30%	17%	60%	23%	17%	53%	30%	24%	64%	11%	
PEAK HR FACTOR		0.869			0.931			0.799			0.850		0.943
APP/DEPART	431	/	364	536	/	621	642	/	566	442	/	500	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	34	65	33	25	57	8	18	87	26	26	116	19	514
4:15 PM	32	84	33	17	55	14	19	86	24	28	85	29	506
4:30 PM	35	79	37	19	69	13	17	75	20	18	87	27	496
4:45 PM	29	86	37	23	66	16	20	104	34	26	103	28	572
5:00 PM	36	93	38	29	86	18	17	104	37	29	86	15	588
5:15 PM	40	92	33	23	68	16	20	103	39	34	100	24	592
5:30 PM	40	87	43	35	71	14	18	110	29	37	95	24	603
5:45 PM	43	79	32	26	75	14	22	97	34	24	120	33	599
VOLUMES	289	665	286	197	547	113	151	766	243	222	792	199	4,470
APPROACH %	23%	54%	23%	23%	64%	13%	13%	66%	21%	18%	65%	16%	
APP/DEPART	1,240	/	1,015	857	/	1,012	1,160	/	1,249	1,213	/	1,194	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	159	351	146	113	300	62	77	414	139	124	401	96	2,382
APPROACH %	24%	54%	22%	24%	63%	13%	12%	66%	22%	20%	65%	15%	
PEAK HR FACTOR		0.965			0.893			0.972			0.877		0.988
APP/DEPART	656	/	524	475	/	563	630	/	673	621	/	622	0

U-TURNS

	NB	SB	EB	WB	TTL
	0	0	0	0	
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Mill WEST SIDE EAST SIDE **Mill**

SOUTH SIDE

Rancho

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	9
WEDNESDAY	EAST & WEST:	Mill	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	1	1	1	2	0	
AM 7:00 AM	19	33	21	21	69	35	16	69	27	25	81	13	429
7:15 AM	17	57	35	17	77	25	32	81	40	27	68	11	487
7:30 AM	32	50	36	20	90	22	28	82	48	26	59	12	505
7:45 AM	24	58	34	28	73	24	23	101	72	27	55	8	527
8:00 AM	31	44	28	23	40	8	20	76	32	35	54	15	406
8:15 AM	17	31	22	20	43	3	13	66	12	14	45	16	302
8:30 AM	12	36	18	24	46	4	2	67	18	19	41	10	297
8:45 AM	12	44	19	22	29	6	7	74	11	12	42	10	288
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	164	353	213	175	467	127	141	616	260	185	445	95	3,241
APPROACH %	22%	48%	29%	23%	61%	17%	14%	61%	26%	26%	61%	13%	
APP/DEPART	730	/	589	769	/	912	1,017	/	1,004	725	/	736	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	92	198	126	86	309	106	99	333	187	105	263	44	1,948
APPROACH %	22%	48%	30%	17%	62%	21%	16%	54%	30%	25%	64%	11%	
PEAK HR FACTOR		0.881			0.949			0.790			0.866		0.924
APP/DEPART	416	/	341	501	/	601	619	/	545	412	/	461	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	29	61	30	24	55	7	15	83	26	22	110	18	480
4:15 PM	31	78	28	17	54	12	17	80	23	25	84	27	476
4:30 PM	34	76	37	18	66	12	16	73	19	18	84	24	477
4:45 PM	27	82	36	21	63	15	19	99	30	26	99	28	545
5:00 PM	33	88	37	27	82	17	17	101	37	28	81	15	563
5:15 PM	38	89	30	22	66	15	20	102	38	32	98	24	574
5:30 PM	40	81	37	34	68	11	18	105	29	33	91	22	569
5:45 PM	40	75	31	25	69	13	21	96	34	23	119	32	578
VOLUMES	272	630	266	188	523	102	143	739	236	207	766	190	4,262
APPROACH %	23%	54%	23%	23%	64%	13%	13%	66%	21%	18%	66%	16%	
APP/DEPART	1,168	/	963	813	/	966	1,118	/	1,193	1,163	/	1,140	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	151	333	135	108	285	56	76	404	138	116	389	93	2,284
APPROACH %	24%	54%	22%	24%	63%	12%	12%	65%	22%	19%	65%	16%	
PEAK HR FACTOR		0.979			0.891			0.966			0.859		0.988
APP/DEPART	619	/	502	449	/	539	618	/	647	598	/	596	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Mill WEST SIDE

EAST SIDE **Mill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	9
WEDNESDAY	EAST & WEST:	Mill	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	1	1	1	2	0	
AM													
7:00 AM	0	0	1	0	1	0	0	1	2	0	5	0	10
7:15 AM	1	2	0	0	4	1	2	2	0	0	3	0	15
7:30 AM	0	3	1	2	1	1	1	2	1	1	4	0	17
7:45 AM	0	2	1	1	2	0	1	0	1	0	3	0	11
8:00 AM	1	1	0	0	6	1	1	4	2	0	8	1	25
8:15 AM	2	4	2	1	2	0	0	3	1	1	5	2	23
8:30 AM	1	2	0	1	3	0	0	6	0	0	4	0	17
8:45 AM	0	2	0	1	5	1	0	3	3	2	5	1	23
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	5	16	5	6	24	4	5	21	10	4	37	4	141
APPROACH %	19%	62%	19%	18%	71%	12%	14%	58%	28%	9%	82%	9%	
APP/DEPART	26	/	25	34	/	38	36	/	32	45	/	46	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	4	9	2	3	16	2	1	16	6	3	22	4	88
APPROACH %	27%	60%	13%	14%	76%	10%	4%	70%	26%	10%	76%	14%	
PEAK HR FACTOR		0.469			0.750			0.821			0.806		0.880
APP/DEPART	15	/	14	21	/	25	23	/	21	29	/	28	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	4	4	3	0	1	1	1	3	0	4	5	0	26
4:15 PM	1	5	5	0	1	1	2	6	1	3	1	1	27
4:30 PM	1	1	0	1	2	1	0	2	1	0	3	2	14
4:45 PM	2	4	1	1	3	0	1	3	2	0	4	0	21
5:00 PM	3	4	1	0	2	1	0	3	0	1	5	0	20
5:15 PM	2	1	3	0	2	1	0	1	1	1	2	0	14
5:30 PM	0	4	5	0	2	1	0	3	0	3	2	1	21
5:45 PM	3	3	1	0	4	0	1	0	0	1	1	1	15
VOLUMES	16	26	19	2	17	6	5	21	5	13	23	5	158
APPROACH %	26%	43%	31%	8%	68%	24%	16%	68%	16%	32%	56%	12%	
APP/DEPART	61	/	36	25	/	35	31	/	42	41	/	45	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	8	14	9	2	7	3	4	14	4	7	13	3	88
APPROACH %	26%	45%	29%	17%	58%	25%	18%	64%	18%	30%	57%	13%	
PEAK HR FACTOR		0.705			0.750			0.611			0.639		0.815
APP/DEPART	31	/	21	12	/	18	22	/	25	23	/	24	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Mill WEST SIDE

EAST SIDE **Mill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	Rancho	LOCATION #:	9
	EAST & WEST:	Mill	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill			
LANES:	NL 1	NT 2	NR 0	SL 1	ST 2	SR 0	EL 1	ET 1	ER 1	WL 1	WT 2	WR 0	TOTAL
AM 7:00 AM	0	0	0	0	1	0	0	0	0	1	0	1	3
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
7:30 AM	0	2	0	0	0	0	0	0	0	0	2	0	4
7:45 AM	0	0	0	1	1	0	1	0	0	0	0	0	3
8:00 AM	0	0	0	0	1	0	1	0	0	0	1	0	3
8:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2
8:30 AM	0	0	0	1	2	0	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	2	0	2	6	0	2	0	0	1	6	2	21
APPROACH %	0%	100%	0%	25%	75%	0%	100%	0%	0%	11%	67%	22%	
APP/DEPART	2	/	6	8	/	7	2	/	2	9	/	6	0
BEGIN PEAK HR		7:30 AM											
VOLUMES	0	2	0	1	2	0	2	0	0	0	5	0	12
APPROACH %	0%	100%	0%	33%	67%	0%	100%	0%	0%	0%	100%	0%	
PEAK HR FACTOR		0.250			0.375			0.500			0.625		0.750
APP/DEPART	2	/	4	3	/	2	2	/	1	5	/	5	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
5:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	2
5:30 PM	0	1	0	1	1	0	0	1	0	0	1	0	5
5:45 PM	0	1	0	0	1	1	0	1	0	0	0	0	4
VOLUMES	0	4	0	2	4	1	1	2	0	0	1	0	15
APPROACH %	0%	100%	0%	29%	57%	14%	33%	67%	0%	0%	100%	0%	
APP/DEPART	4	/	5	7	/	4	3	/	4	1	/	2	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	0	3	0	2	4	1	0	2	0	0	1	0	13
APPROACH %	0%	100%	0%	29%	57%	14%	0%	100%	0%	0%	100%	0%	
PEAK HR FACTOR		0.750			0.875			0.500			0.250		0.650
APP/DEPART	3	/	3	7	/	4	2	/	4	1	/	2	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Mill WEST SIDE

EAST SIDE **Mill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	9
WEDNESDAY	EAST & WEST:	Mill	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	1	1	1	2	0						
AM	7:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	3	0	0	0	0	0
AM	7:15 AM	0	0	0	0	1	3	0	0	0	0	0	0	4	0	0	0	0	0
AM	7:30 AM	0	0	0	1	2	3	2	3	0	0	0	0	11	0	0	0	0	0
AM	7:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
AM	8:00 AM	0	0	0	0	0	0	3	2	0	0	0	0	5	0	0	0	0	0
AM	8:15 AM	0	0	0	0	0	1	0	0	0	0	1	1	3	0	0	0	0	0
AM	8:30 AM	0	0	0	0	1	3	2	0	0	0	0	0	6	0	0	0	0	0
AM	8:45 AM	0	0	0	0	1	3	0	2	1	0	0	0	7	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	0	0	0	1	5	16	8	7	1	0	1	1	40	0	0	0	0	0
AM	APPROACH %	0%	0%	0%	5%	23%	73%	50%	44%	6%	0%	50%	50%						
AM	APP/DEPART	0	/	9	22	/	6	16	/	8	2	/	17	0					
AM	BEGIN PEAK HR		7:15 AM																
AM	VOLUMES	0	0	0	0	2	7	5	4	1	0	1	1	21					
AM	APPROACH %	0%	0%	0%	0%	22%	78%	50%	40%	10%	0%	50%	50%						
AM	PEAK HR FACTOR		0.000			0.375			0.500			0.250		0.477					
AM	APP/DEPART	0	/	6	9	/	3	10	/	4	2	/	8	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	1	0	0	0	1	0	1	1	0	0	1	0	5	0	0	0	0	0
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
PM	4:30 PM	0	1	0	0	1	0	1	0	0	0	0	0	3	0	0	0	0	0
PM	4:45 PM	0	0	0	0	0	1	0	0	2	0	0	0	3	0	0	0	0	0
PM	5:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
PM	5:15 PM	0	1	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0
PM	5:30 PM	0	1	0	0	0	1	0	1	0	1	0	0	4	0	0	0	0	0
PM	5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
PM	VOLUMES	1	4	0	1	3	2	2	2	2	2	1	1	21	0	0	0	0	0
PM	APPROACH %	20%	80%	0%	17%	50%	33%	33%	33%	33%	50%	25%	25%						
PM	APP/DEPART	5	/	7	6	/	7	6	/	3	4	/	4	0					
PM	BEGIN PEAK HR		4:00 PM																
PM	VOLUMES	1	1	0	0	2	1	2	1	2	0	1	1	12					
PM	APPROACH %	50%	50%	0%	0%	67%	33%	40%	20%	40%	0%	50%	50%						
PM	PEAK HR FACTOR		0.500			0.750			0.625			0.500		0.600					
PM	APP/DEPART	2	/	4	3	/	4	5	/	1	2	/	3	0					

Rancho

NORTH SIDE

Mill WEST SIDE

EAST SIDE **Mill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	9
WEDNESDAY	EAST & WEST:	Mill	CONTROL:	SIGNAL

CLASS 5: RV

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	2	0	1	1	1	1	2	0						
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	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	0	0	0	0	0
7:45 AM	0	0	0	0	0	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	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	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	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
BEGIN PEAK HR		3:00 PM																
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					

Rancho

NORTH SIDE

Mill WEST SIDE

EAST SIDE **Mill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	9
WEDNESDAY	EAST & WEST:	Mill	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Mill			WESTBOUND Mill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	1	1	1	2	0	
AM													
7:00 AM	0	0	0	1	0	1	0	0	0	1	2	1	6
7:15 AM	1	0	0	0	0	2	0	2	0	0	1	1	7
7:30 AM	0	0	0	1	0	1	0	0	0	0	2	1	5
7:45 AM	0	0	1	0	0	0	1	0	0	0	0	0	2
8:00 AM	0	0	0	1	0	0	1	0	0	0	0	0	2
8:15 AM	1	0	0	1	0	1	0	0	0	0	1	0	4
8:30 AM	0	0	0	1	0	0	0	1	1	0	0	1	4
8:45 AM	0	0	0	0	0	0	0	0	1	0	1	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	2	0	1	5	0	5	2	3	2	1	7	4	32
APPROACH %	67%	0%	33%	50%	0%	50%	29%	43%	29%	8%	58%	33%	
APP/DEPART	3	/	6	10	/	3	7	/	9	12	/	14	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	1	0	1	2	0	4	1	2	0	1	5	3	20
APPROACH %	50%	0%	50%	33%	0%	67%	33%	67%	0%	11%	56%	33%	
PEAK HR FACTOR		0.500			0.750			0.375			0.563		0.714
APP/DEPART	2	/	4	6	/	1	3	/	5	9	/	10	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	1	0	0	0	0	0	0	0	1	2
4:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
4:45 PM	0	0	0	1	0	0	0	2	0	0	0	0	3
5:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	1	0	0	0	0	1	1	4
5:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	1
VOLUMES	0	1	1	4	0	2	0	2	0	0	1	3	14
APPROACH %	0%	50%	50%	67%	0%	33%	0%	100%	0%	0%	25%	75%	
APP/DEPART	2	/	4	6	/	0	2	/	7	4	/	3	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	0	0	1	2	0	1	0	2	0	0	1	1	8
APPROACH %	0%	0%	100%	67%	0%	33%	0%	100%	0%	0%	50%	50%	
PEAK HR FACTOR		0.250			0.750			0.250			0.250		0.500
APP/DEPART	1	/	1	3	/	0	2	/	5	2	/	2	0

U-TURNS	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Mill WEST SIDE

EAST SIDE **Mill**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	10
WEDNESDAY	EAST & WEST:	Laurel	CONTROL:	SIGNAL

PCE Adjusted	NOTES:							AM / PM / MD / OTHER / OTHER	N ▲ ◄ W E ► S ▼
	Class	1	2	3	4	5	6		
	Factor	1	1.5	2	3	2	2		

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	2	0	1	2	0	0	1	0	0	1	0	
AM	7:00 AM	24	71	19	12	187	7	5	8	17	16	4	7	376
	7:15 AM	43	135	31	13	239	7	2	17	26	15	13	13	553
	7:30 AM	20	149	58	39	196	9	9	24	31	24	11	29	599
	7:45 AM	6	111	39	65	182	6	3	26	25	20	9	45	536
	8:00 AM	14	82	15	24	125	7	6	11	12	21	3	34	352
	8:15 AM	4	89	5	6	116	0	2	5	6	12	3	7	255
	8:30 AM	2	72	9	5	110	0	0	4	6	10	3	4	224
	8:45 AM	5	70	2	8	83	1	3	2	7	5	1	2	187
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	117	777	178	171	1,237	37	30	96	129	122	47	141	3,080
	APPROACH %	11%	72%	17%	12%	86%	3%	12%	38%	50%	39%	15%	45%	
	APP/DEPART	1,072	/	948	1,444	/	1,487	255	/	445	310	/	201	0
	BEGIN PEAK HR		7:00 AM											
	VOLUMES	92	466	147	129	803	29	19	74	99	75	37	94	2,063
	APPROACH %	13%	66%	21%	13%	84%	3%	10%	39%	52%	36%	18%	46%	
	PEAK HR FACTOR		0.778			0.927			0.750			0.696		0.862
	APP/DEPART	705	/	579	961	/	977	192	/	350	206	/	158	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	12	167	10	7	131	2	1	4	10	7	7	19	377
	4:15 PM	11	186	6	9	111	3	3	2	15	11	0	13	367
	4:30 PM	10	182	11	9	107	2	4	5	4	11	5	21	370
	4:45 PM	15	202	9	11	121	3	1	3	4	17	3	12	400
	5:00 PM	10	196	14	14	140	3	3	1	10	9	5	15	418
	5:15 PM	11	217	7	12	122	9	1	9	5	16	13	15	437
	5:30 PM	7	193	9	15	120	6	3	13	13	17	9	18	423
	5:45 PM	6	192	18	14	133	5	4	8	11	18	13	10	431
	VOLUMES	81	1,533	82	91	984	33	20	45	71	105	55	122	3,220
	APPROACH %	5%	90%	5%	8%	89%	3%	14%	33%	52%	37%	20%	43%	
	APP/DEPART	1,696	/	1,674	1,108	/	1,160	136	/	218	282	/	168	0
	BEGIN PEAK HR		5:00 PM											
	VOLUMES	34	797	48	55	515	23	11	31	39	60	40	58	1,708
	APPROACH %	4%	91%	5%	9%	87%	4%	14%	39%	48%	38%	25%	37%	
	PEAK HR FACTOR		0.936			0.946			0.694			0.892		0.978
	APP/DEPART	878	/	865	593	/	613	81	/	134	157	/	97	0

U-TURNS

	NB	SB	EB	WB	TTL
7:00 AM					0
7:15 AM					0
7:30 AM					0
7:45 AM					0
8:00 AM					0
8:15 AM					0
8:30 AM					0
8:45 AM					0
9:00 AM					0
9:15 AM					0
9:30 AM					0
9:45 AM					0
VOLUMES	0	0	0	0	0
03:00 PM					0
3:15 PM					0
3:30 PM					0
3:45 PM					0
4:00 PM					0
4:15 PM					0
4:30 PM					0
4:45 PM					0
5:00 PM					0
5:15 PM					0
5:30 PM					0
5:45 PM					0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Laurel WEST SIDE

EAST SIDE **Laurel**

SOUTH SIDE

Rancho

AimTD LLC

TURNING MOVEMENT COUNTS

Rancho

2,472	**70**	**2,221**	**262**	**TOTAL**	**2,558**
1,075	33	984	91	**PM**	1,634
1,397	37	1,237	171	**AM**	924

Laurel

TOTAL	**PM**	**AM**
359	166	193
50	20	30
141	45	96
200	71	129
375	**134**	**241**

San Bernardino

SC2069

ALL HOURS

Laurel

AM	**PM**	**TOTAL**
301	**273**	**574**
141	122	**262**
47	55	**102**
122	105	**227**
437	215	**652**

1,429	**AM**	117	777	178	**1,044**
1,122	**PM**	81	1,533	82	**1,655**
2,551	**TOTAL**	**198**	**2,310**	**260**	**2,699**

Rancho

Rancho

1,553	**52**	**1,318**	**184**	**TOTAL**	**1,444**
593	23	515	55	**PM**	865
961	29	803	129	**AM**	579

Laurel

TOTAL	**PM**	**AM**
255	97	158
30	11	19
105	31	74
138	39	99
273	**81**	**192**

PEAK HOUR

AM 7:00 AM

PM 5:00 PM

Laurel

AM	**PM**	**TOTAL**
206	**157**	**363**
94	58	**152**
37	40	**77**
75	60	**135**
350	134	**483**

977	**AM**	92	466	147	**705**
613	**PM**	34	797	48	**878**
1,590	**Total**	**126**	**1,262**	**195**	**1,583**

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	Rancho	LOCATION #:	10
	EAST & WEST:	Laurel	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

N
◄ W
E ►
S

Add U-Turns to Left Turns

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	2	0	1	2	0	0	1	0	0	1	0	
AM	7:00 AM	23	69	19	10	181	7	5	8	17	15	4	7	365
	7:15 AM	40	133	31	13	234	7	2	16	25	15	13	13	542
	7:30 AM	20	139	58	39	190	9	7	24	28	24	11	29	578
	7:45 AM	6	111	39	64	175	6	3	25	25	20	9	45	528
	8:00 AM	13	80	15	22	120	6	6	11	9	17	3	34	336
	8:15 AM	3	87	5	6	112	0	2	4	6	10	3	6	244
	8:30 AM	2	68	8	5	106	0	0	4	4	9	2	4	212
	8:45 AM	4	69	2	7	77	1	3	2	5	5	1	2	178
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	111	756	177	166	1,195	36	28	94	119	115	46	140	2,983
	APPROACH %	11%	72%	17%	12%	86%	3%	12%	39%	49%	38%	15%	47%	
	APP/DEPART	1,044	/	924	1,397	/	1,429	241	/	437	301	/	193	0
	BEGIN PEAK HR		7:00 AM											
	VOLUMES	89	452	147	126	780	29	17	73	95	74	37	94	2,013
	APPROACH %	13%	66%	21%	13%	83%	3%	9%	39%	51%	36%	18%	46%	
	PEAK HR FACTOR		0.793			0.920			0.784			0.693		0.871
	APP/DEPART	688	/	563	935	/	949	185	/	346	205	/	155	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	12	165	9	7	123	2	1	4	10	7	7	18	365
	4:15 PM	10	183	5	9	107	2	2	2	14	9	0	13	356
	4:30 PM	9	176	10	9	106	2	4	5	4	11	5	20	361
	4:45 PM	14	199	9	11	115	3	1	3	4	14	3	11	387
	5:00 PM	10	189	13	14	136	3	3	1	9	9	5	14	406
	5:15 PM	11	211	7	12	120	9	1	9	5	16	13	15	429
	5:30 PM	7	186	9	15	117	6	3	13	13	17	9	18	413
	5:45 PM	6	188	17	14	128	5	4	8	11	17	13	9	420
	VOLUMES	79	1,497	79	91	952	32	19	45	70	100	55	118	3,137
	APPROACH %	5%	90%	5%	8%	89%	3%	14%	34%	52%	37%	20%	43%	
	APP/DEPART	1,655	/	1,634	1,075	/	1,122	134	/	215	273	/	166	0
	BEGIN PEAK HR		5:00 PM											
	VOLUMES	34	774	46	55	501	23	11	31	38	59	40	56	1,668
	APPROACH %	4%	91%	5%	9%	87%	4%	14%	39%	48%	38%	26%	36%	
	PEAK HR FACTOR		0.932			0.946			0.690			0.881		0.972
	APP/DEPART	854	/	841	579	/	598	80	/	132	155	/	97	0

U-TURNS

	NB	SB	EB	WB	TTL
	0	0	0	0	
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Laurel WEST SIDE

EAST SIDE **Laurel**

SOUTH SIDE

Rancho

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	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	0	0
	7:45 AM	0	0	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	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	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	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	10
WEDNESDAY	EAST & WEST:	Laurel	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	0	1	0	0	1	0						
AM	7:00 AM	22	67	19	9	172	7	5	8	17	14	4	7	351	0	0	0	0	0
	7:15 AM	37	129	31	13	226	7	2	15	24	15	13	13	525	0	0	0	0	0
	7:30 AM	20	130	58	39	181	9	5	24	26	24	11	29	556	0	0	0	0	0
	7:45 AM	6	111	39	63	169	6	3	24	25	20	9	45	520	0	0	0	0	0
	8:00 AM	12	78	15	20	113	5	6	11	7	13	3	34	317	0	0	0	0	0
	8:15 AM	2	83	5	6	105	0	2	3	6	9	3	5	229	0	0	0	0	0
	8:30 AM	2	62	7	5	100	0	0	4	2	8	1	4	195	0	0	0	0	0
	8:45 AM	3	68	2	6	70	1	3	2	3	5	1	2	166	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	104	728	176	161	1,136	35	26	91	110	108	45	139	2,859	0	0	0	0	0
	APPROACH %	10%	72%	17%	12%	85%	3%	11%	40%	48%	37%	15%	48%						
	APP/DEPART	1,008	/	893	1,332	/	1,354	227	/	428	292	/	184	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	85	437	147	124	748	29	15	71	92	73	37	94	1,952					
	APPROACH %	13%	65%	22%	14%	83%	3%	8%	40%	52%	36%	18%	46%						
	PEAK HR FACTOR		0.804			0.916			0.809			0.689		0.878					
	APP/DEPART	669	/	546	901	/	913	178	/	342	204	/	151	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	12	161	8	7	115	2	1	4	10	7	7	16	350	0	0	0	0	0
	4:15 PM	9	179	4	9	103	1	1	2	13	8	0	13	342	0	0	0	0	0
	4:30 PM	8	170	9	9	104	2	4	5	4	11	5	19	350	0	0	0	0	0
	4:45 PM	13	193	9	11	109	3	1	3	4	12	3	10	371	0	0	0	0	0
	5:00 PM	10	179	12	14	130	3	3	1	8	9	5	12	386	0	0	0	0	0
	5:15 PM	11	204	7	12	117	9	1	9	5	16	13	15	419	0	0	0	0	0
	5:30 PM	7	177	9	15	114	6	3	13	13	17	9	18	401	0	0	0	0	0
	5:45 PM	6	181	15	14	122	5	4	8	11	16	13	8	403	0	0	0	0	0
	VOLUMES	76	1,444	73	91	914	31	18	45	68	96	55	111	3,022	0	0	0	0	0
	APPROACH %	5%	91%	5%	9%	88%	3%	14%	34%	52%	37%	21%	42%						
	APP/DEPART	1,593	/	1,573	1,036	/	1,078	131	/	209	262	/	162	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	34	741	43	55	483	23	11	31	37	58	40	53	1,609					
	APPROACH %	4%	91%	5%	10%	86%	4%	14%	39%	47%	38%	26%	35%						
	PEAK HR FACTOR		0.921			0.954			0.681			0.858		0.960					
	APP/DEPART	818	/	805	561	/	578	79	/	129	151	/	97	0					

Rancho

NORTH SIDE

Laurel WEST SIDE

EAST SIDE **Laurel**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	10
WEDNESDAY	EAST & WEST:	Laurel	CONTROL:	SIGNAL

CLASS 2:	NOTES:	AM	▲ N
2-AXLE WORK VEHICLES/ TRUCKS		PM MD OTHER OTHER	◄ W E ► S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	0	1	0	0	1	0						
AM	7:00 AM	1	0	0	0	7	0	0	0	0	0	0	0	8	0	0	0	0	0
	7:15 AM	1	4	0	0	6	0	0	1	0	0	0	0	12	0	0	0	0	0
	7:30 AM	0	3	0	0	8	0	0	0	0	0	0	0	11	0	0	0	0	0
	7:45 AM	0	0	0	1	3	0	0	1	0	0	0	0	5	0	0	0	0	0
	8:00 AM	0	1	0	1	6	0	0	0	1	1	0	0	10	0	0	0	0	0
	8:15 AM	0	4	0	0	6	0	0	0	0	0	0	1	11	0	0	0	0	0
	8:30 AM	0	5	0	0	4	0	0	0	1	1	0	0	11	0	0	0	0	0
	8:45 AM	0	1	0	1	3	0	0	0	1	0	0	0	6	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	2	18	0	3	43	0	0	2	3	2	0	1	74	0	0	0	0	0
	APPROACH %	10%	90%	0%	7%	93%	0%	0%	40%	60%	67%	0%	33%						
	APP/DEPART	20	/	19	46	/	48	5	/	5	3	/	2	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	0	11	0	2	19	0	0	0	3	2	0	1	38					
	APPROACH %	0%	100%	0%	10%	90%	0%	0%	0%	100%	67%	0%	33%						
	PEAK HR FACTOR		0.550			0.656			0.750			0.750		0.792					
	APP/DEPART	11	/	12	21	/	24	3	/	2	3	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	4	1	0	4	0	0	0	0	0	0	2	11	0	0	0	0	0
	4:15 PM	1	3	1	0	3	1	1	0	1	0	0	0	11	0	0	0	0	0
	4:30 PM	1	2	1	0	2	0	0	0	0	0	0	1	7	0	0	0	0	0
	4:45 PM	1	6	0	0	4	0	0	0	0	1	0	1	13	0	0	0	0	0
	5:00 PM	0	9	1	0	5	0	0	0	1	0	0	2	18	0	0	0	0	0
	5:15 PM	0	5	0	0	2	0	0	0	0	0	0	0	7	0	0	0	0	0
	5:30 PM	0	6	0	0	2	0	0	0	0	0	0	0	8	0	0	0	0	0
	5:45 PM	0	7	2	0	4	0	0	0	0	1	0	1	15	0	0	0	0	0
	VOLUMES	3	42	6	0	26	1	1	0	2	2	0	7	90	0	0	0	0	0
	APPROACH %	6%	82%	12%	0%	96%	4%	33%	0%	67%	22%	0%	78%						
	APP/DEPART	51	/	50	27	/	30	3	/	6	9	/	4	0					
	BEGIN PEAK HR		4:15 PM																
	VOLUMES	3	20	3	0	14	1	1	0	2	1	0	4	49					
	APPROACH %	12%	77%	12%	0%	93%	7%	33%	0%	67%	20%	0%	80%						
	PEAK HR FACTOR		0.650			0.750			0.375			0.625		0.681					
	APP/DEPART	26	/	25	15	/	17	3	/	3	5	/	4	0					

Rancho

NORTH SIDE

Laurel WEST SIDE EAST SIDE **Laurel**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	10
WEDNESDAY	EAST & WEST:	Laurel	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	0	1	0	0	1	0						
AM	7:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
	7:15 AM	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
	7:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	7:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
	8:00 AM	0	1	0	1	0	1	0	0	0	1	0	0	4	0	0	0	0	0
	8:15 AM	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
	8:30 AM	0	1	0	0	1	0	0	0	1	0	0	0	3	0	0	0	0	0
	8:45 AM	1	0	0	0	2	0	0	0	1	0	0	0	4	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	2	5	0	1	8	1	0	0	2	1	0	0	20	0	0	0	0	0
	APPROACH %	29%	71%	0%	10%	80%	10%	0%	0%	100%	100%	0%	0%						
	APP/DEPART	7	/	5	10	/	11	2	/	1	1	/	3	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	2	2	0	1	4	1	0	0	2	1	0	0	13					
	APPROACH %	50%	50%	0%	17%	67%	17%	0%	0%	100%	100%	0%	0%						
	PEAK HR FACTOR		1.000			0.750			0.500			0.250		0.813					
	APP/DEPART	4	/	2	6	/	7	2	/	1	1	/	3	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
	5:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
	5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	5	0	0	4	0	0	0	0	0	0	0	9	0	0	0	0	0
	APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
	APP/DEPART	5	/	5	4	/	4	0	/	0	0	/	0	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	0	4	0	0	2	0	0	0	0	0	0	0	6					
	APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
	PEAK HR FACTOR		0.333			0.500			0.000			0.000		0.500					
	APP/DEPART	4	/	4	2	/	2	0	/	0	0	/	0	0					

Rancho

NORTH SIDE

Laurel WEST SIDE

EAST SIDE **Laurel**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	10
WEDNESDAY	EAST & WEST:	Laurel	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	0	1	0	0	1	0	
AM 7:00 AM	0	0	0	1	0	0	0	0	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	2	0	0	1	0	0	0	1	0	0	0	4
7:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	1	0	0	0	1	0	0	0	2
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	2	0	1	4	0	0	0	2	1	0	0	10
APPROACH %	0%	100%	0%	20%	80%	0%	0%	0%	100%	100%	0%	0%	
APP/DEPART	2	/	2	5	/	7	2	/	1	1	/	0	0
BEGIN PEAK HR		7:30 AM											
VOLUMES	0	2	0	0	4	0	0	0	2	1	0	0	9
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	100%	100%	0%	0%	
PEAK HR FACTOR		0.250			0.500			0.500			0.250		0.563
APP/DEPART	2	/	2	4	/	7	2	/	0	1	/	0	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	0	1	0	0	0	0	1	0	0	2
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	2	0	0	0	0	1	0	0	3
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
VOLUMES	0	4	0	0	7	0	0	0	0	2	0	0	13
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	
APP/DEPART	4	/	4	7	/	9	0	/	0	2	/	0	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	0	1	0	0	5	0	0	0	0	2	0	0	8
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	
PEAK HR FACTOR		0.250			0.625			0.000			0.500		0.667
APP/DEPART	1	/	1	5	/	7	0	/	0	2	/	0	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Laurel WEST SIDE

EAST SIDE **Laurel**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	10
WEDNESDAY	EAST & WEST:	Laurel	CONTROL:	SIGNAL

CLASS 5: RV

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel			TOTAL
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	LANES:	1	2	0	1	2	0	0	1	0	0	1	0	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	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	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	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
	BEGIN PEAK HR		7:00 AM											
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	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	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
	BEGIN PEAK HR		3:00 PM											
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Rancho

NORTH SIDE

Laurel WEST SIDE

EAST SIDE **Laurel**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	10
WEDNESDAY	EAST & WEST:	Laurel	CONTROL:	SIGNAL

CLASS 6:	NOTES:	AM PM MD OTHER OTHER	▲ N ◄ W E ► S ▼
BUSES			

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Laurel			WESTBOUND Laurel				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	0	1	0	0	1	0						
AM	7:00 AM	0	1	0	0	1	0	0	0	0	1	0	0	3	0	0	0	0	0
AM	7:15 AM	2	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0
AM	7:30 AM	0	2	0	0	0	0	2	0	1	0	0	0	5	0	0	0	0	0
AM	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:00 AM	1	0	0	0	0	0	0	0	0	2	0	0	3	0	0	0	0	0
AM	8:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
AM	8:30 AM	0	0	1	0	1	0	0	0	0	0	1	0	3	0	0	0	0	0
AM	8:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	3	3	1	0	4	0	2	1	2	3	1	0	20	0	0	0	0	0
AM	APPROACH %	43%	43%	14%	0%	100%	0%	40%	20%	40%	75%	25%	0%						
AM	APP/DEPART	7	/	5	4	/	9	5	/	2	4	/	4	0					
AM	BEGIN PEAK HR		7:00 AM																
AM	VOLUMES	3	2	0	0	0	0	2	0	2	2	0	0	11					
AM	APPROACH %	60%	40%	0%	0%	0%	0%	50%	0%	50%	100%	0%	0%						
AM	PEAK HR FACTOR		0.625			0.000			0.333			0.250		0.550					
AM	APP/DEPART	5	/	4	0	/	4	4	/	0	2	/	3	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
PM	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
PM	5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
PM	VOLUMES	0	2	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0
PM	APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
PM	APP/DEPART	2	/	2	1	/	1	0	/	0	0	/	0	0					
PM	BEGIN PEAK HR		5:00 PM																
PM	VOLUMES	0	1	0	0	1	0	0	0	0	0	0	0	2					
PM	APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%						
PM	PEAK HR FACTOR		0.250			0.250			0.000			0.000		0.500					
PM	APP/DEPART	1	/	1	1	/	1	0	/	0	0	/	0	0					

Rancho

NORTH SIDE

Laurel WEST SIDE

EAST SIDE **Laurel**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	Rancho	LOCATION #:	11
	EAST & WEST:	Valley	CONTROL:	SIGNAL

PCE Adjusted	NOTES:									
	Class	1	2	3	4	5	6			AM
	Factor	1	1.5	2	3	2	2			PM
										MD
										OTHER
										OTHER

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		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	1	1						
AM	7:00 AM	62	90	50	18	111	5	7	43	55	29	38	60	565					0
	7:15 AM	57	120	46	31	100	7	11	49	62	54	63	89	687					0
	7:30 AM	57	101	24	29	90	11	5	55	80	23	58	78	609					0
	7:45 AM	49	131	25	27	143	3	9	72	73	17	46	25	617					0
	8:00 AM	34	79	25	26	119	3	8	66	58	29	33	20	498					0
	8:15 AM	38	92	21	13	88	12	8	36	41	17	30	17	410					0
	8:30 AM	59	58	23	17	89	9	3	35	39	15	28	10	383					0
	8:45 AM	29	55	27	23	65	6	8	40	27	19	29	12	338					0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	VOLUMES	383	724	240	182	803	54	58	395	433	201	324	310	4,105	0	0	0	0	0
	APPROACH %	28%	54%	18%	18%	77%	5%	6%	45%	49%	24%	39%	37%						
	APP/DEPART	1,347	/	1,092	1,039	/	1,437	886	/	817	835	/	761	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	224	441	144	104	443	25	31	218	270	123	204	252	2,477					
	APPROACH %	28%	55%	18%	18%	78%	4%	6%	42%	52%	21%	35%	44%						
	PEAK HR FACTOR		0.909			0.826			0.844			0.701		0.902					
	APP/DEPART	809	/	724	572	/	835	519	/	466	578	/	453	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	4:00 PM	44	199	62	28	103	9	14	64	48	16	45	25	655					0
	4:15 PM	51	165	48	35	87	10	13	101	60	20	51	23	661					0
	4:30 PM	48	166	59	31	88	11	11	80	52	20	57	31	651					0
	4:45 PM	54	170	47	31	95	6	16	62	54	12	59	26	629					0
	5:00 PM	51	196	44	23	102	6	20	83	50	22	51	28	675					0
	5:15 PM	58	191	46	33	90	5	13	84	43	25	90	28	705					0
	5:30 PM	49	167	37	34	101	9	15	85	51	25	75	28	674					0
	5:45 PM	56	183	42	19	116	9	14	67	41	27	64	22	658					0
	VOLUMES	410	1,435	382	233	781	65	115	624	398	165	490	211	5,307	0	0	0	0	0
	APPROACH %	18%	64%	17%	22%	72%	6%	10%	55%	35%	19%	57%	24%						
	APP/DEPART	2,226	/	1,760	1,078	/	1,344	1,137	/	1,239	866	/	964	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	214	736	168	109	409	29	62	318	185	98	280	106	2,711					
	APPROACH %	19%	66%	15%	20%	75%	5%	11%	56%	33%	20%	58%	22%						
	PEAK HR FACTOR		0.949			0.948			0.925			0.847		0.962					
	APP/DEPART	1,118	/	904	546	/	691	565	/	594	483	/	523	0					

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC2069

ALL HOURS

Rancho (north)

TOTAL	**2,026**	**119**	**1,583**	**415**
PM	**1,036**	65	781	233
AM	**990**	54	803	182

TOTAL	**2,763**
PM	1,711
AM	1,052

Valley (west)

TOTAL	**1,649**
PM	930
AM	719

TOTAL	**172**	**1,019**	**831**	**1,930**
PM	115	624	398	**1,093**
AM	58	395	433	**837**

Valley (east)

AM	**799**	310	324	201
PM	**839**	211	490	165
TOTAL	**1,638**	**521**	**814**	**366**

AM	816
PM	1,188
TOTAL	**2,004**

Rancho (south)

AM	1,315
PM	1,268
TOTAL	**2,583**

AM	383	724	240	**1,276**
PM	410	1,435	382	**2,129**
TOTAL	**793**	**2,159**	**622**	**3,405**

PEAK HOUR

AM 7:00 AM

PM 5:00 PM

Rancho (north)

TOTAL	**1,118**	**54**	**852**	**212**
PM	**546**	29	409	109
AM	**572**	25	443	104

TOTAL	**1,627**
PM	904
AM	724

Valley (west)

TOTAL	**976**
PM	523
AM	453

TOTAL	**93**	**536**	**455**	**1,083**
PM	62	318	185	**565**
AM	31	218	270	**519**

Valley (east)

AM	**578**	252	204	123
PM	**483**	106	280	98
TOTAL	**1,061**	**358**	**484**	**220**

AM	512
PM	605
TOTAL	**1,117**

Rancho (south)

AM	789
PM	680
Total	**1,469**

AM	224	441	144	**809**
PM	214	736	168	**1,118**
Total	**438**	**1,177**	**312**	**1,927**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	Rancho	LOCATION #:	11
	EAST & WEST:	Valley	CONTROL:	SIGNAL

NOTES:

AM SB queue

AM / PM / MD / OTHER / OTHER

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Add U-Turns to Left Turns

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	2	0	1	2	0	1	1	1		0	0	0	0	
AM 7:00 AM	59	87	46	16	107	5	6	40	54	26	34	60	540	0	0	0	10	10
7:15 AM	56	114	42	29	93	6	11	48	59	53	60	88	659	0	0	0	24	24
7:30 AM	53	94	22	28	88	8	4	50	78	23	55	77	580	0	0	0	10	10
7:45 AM	48	128	22	27	135	3	8	67	72	17	41	23	591	0	0	0	2	2
8:00 AM	33	74	19	25	111	3	8	57	54	27	30	19	460	0	0	0	4	4
8:15 AM	37	88	19	13	85	11	7	34	38	17	28	17	394	0	0	0	6	6
8:30 AM	56	55	20	17	84	8	3	32	36	13	25	10	359	0	0	0	2	2
8:45 AM	28	51	25	21	61	6	8	38	25	18	26	12	319	0	0	0	1	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	370	691	215	176	764	50	55	366	416	194	299	306	3,902	0	0	0	59	59
APPROACH %	29%	54%	17%	18%	77%	5%	7%	44%	50%	24%	37%	38%						
APP/DEPART	1,276	/	1,052	990	/	1,315	837	/	816	799	/	719	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	216	423	132	100	423	22	29	205	263	119	190	248	2,370					
APPROACH %	28%	55%	17%	18%	78%	4%	6%	41%	53%	21%	34%	45%						
PEAK HR FACTOR		0.909			0.826			0.845			0.693		0.899					
APP/DEPART	771	/	700	545	/	759	497	/	483	557	/	428	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	42	191	56	28	98	8	11	61	47	16	41	25	624	0	0	0	4	4
4:15 PM	49	160	44	32	81	10	12	92	59	19	48	23	629	0	0	0	7	7
4:30 PM	45	159	52	29	86	10	11	75	52	17	56	31	623	0	0	0	3	3
4:45 PM	52	164	41	31	84	6	15	60	52	12	57	26	600	0	0	0	1	1
5:00 PM	50	190	39	23	99	6	18	79	50	22	49	28	653	0	0	0	1	1
5:15 PM	55	186	40	32	87	5	13	82	41	23	87	27	678	0	0	0	2	2
5:30 PM	48	162	33	34	98	9	15	79	51	22	72	28	651	0	0	0	2	2
5:45 PM	54	180	37	19	112	9	14	64	40	26	62	22	639	0	0	0	6	6
VOLUMES	395	1,392	342	228	745	63	109	592	392	157	472	210	5,097	0	0	0	26	26
APPROACH %	19%	65%	16%	22%	72%	6%	10%	54%	36%	19%	56%	25%						
APP/DEPART	2,129	/	1,711	1,036	/	1,268	1,093	/	1,188	839	/	930	0					
BEGIN PEAK HR		5:00 PM																
VOLUMES	207	718	149	108	396	29	60	304	182	93	270	105	2,621					
APPROACH %	19%	67%	14%	20%	74%	5%	11%	56%	33%	20%	58%	22%						
PEAK HR FACTOR		0.956			0.945			0.929			0.854		0.966					
APP/DEPART	1,074	/	883	533	/	660	546	/	572	468	/	506	0					

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	11
WEDNESDAY	EAST & WEST:	Valley	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

N ▲ ◄ W E ► S ▼

		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	1	1						
AM	7:00 AM	54	83	39	13	101	5	5	36	52	23	31	60	502	0	0	0	10	10
	7:15 AM	54	106	37	27	84	5	11	47	57	52	56	87	623	0	0	0	24	24
	7:30 AM	49	88	21	27	84	6	3	44	75	23	50	76	546	0	0	0	10	10
	7:45 AM	47	125	20	27	125	3	7	59	70	17	34	21	555	0	0	0	2	2
	8:00 AM	31	69	12	23	103	3	8	47	48	24	26	18	412	0	0	0	4	4
	8:15 AM	36	84	17	13	81	10	6	32	35	17	26	17	374	0	0	0	6	6
	8:30 AM	51	50	18	17	79	7	3	28	31	11	23	10	328	0	0	0	2	2
	8:45 AM	26	47	22	18	56	6	8	36	23	17	22	12	293	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	348	652	186	165	713	45	51	329	391	184	268	301	3,633	0	0	0	58	58
	APPROACH %	29%	55%	16%	18%	77%	5%	7%	43%	51%	24%	36%	40%						
	APP/DEPART	1,186	/	1,004	923	/	1,230	771	/	738	753	/	661	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	204	402	117	94	394	19	26	186	254	69	171	244	2,226					
	APPROACH %	28%	56%	16%	19%	78%	4%	6%	40%	55%	13%	32%	46%						
	PEAK HR FACTOR		0.918			0.818			0.857			0.679		0.893					
	APP/DEPART	723	/	672	507	/	717	466	/	443	530	/	394	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	38	179	49	28	91	7	9	56	46	16	38	25	582	0	0	0	4	4
	4:15 PM	47	154	38	30	75	10	11	83	57	17	44	23	589	0	0	0	7	7
	4:30 PM	40	150	46	28	83	9	11	69	52	15	55	31	589	0	0	0	3	3
	4:45 PM	49	153	36	31	75	6	14	57	49	12	55	26	563	0	0	0	1	1
	5:00 PM	48	181	35	23	94	6	15	75	50	22	46	28	623	0	0	0	1	1
	5:15 PM	49	180	33	31	82	5	13	80	38	21	82	25	639	0	0	0	2	2
	5:30 PM	47	155	29	34	94	9	15	74	51	20	68	28	624	0	0	0	2	2
	5:45 PM	51	175	32	19	108	9	14	60	38	25	59	22	612	0	0	0	6	6
	VOLUMES	369	1,327	298	224	702	61	102	554	381	148	447	208	4,821	0	0	0	26	26
	APPROACH %	19%	67%	15%	23%	71%	6%	10%	53%	37%	18%	56%	26%						
	APP/DEPART	1,994	/	1,637	987	/	1,205	1,037	/	1,102	803	/	877	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	195	691	129	107	378	29	57	289	177	77	255	103	2,498					
	APPROACH %	19%	68%	13%	21%	74%	6%	11%	55%	34%	17%	57%	23%						
	PEAK HR FACTOR		0.961			0.938			0.934			0.871		0.977					
	APP/DEPART	1,015	/	851	514	/	632	523	/	536	446	/	479	0					

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	Rancho	LOCATION #:	11
	EAST & WEST:	Valley	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

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	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	2	0	1	2	0	1	1	1						
AM 7:00 AM	4	2	6	3	5	0	1	3	2	1	1	0	28	0	0	0	0	0
7:15 AM	2	6	3	1	7	1	0	0	1	0	2	0	23	0	0	0	0	0
7:30 AM	3	1	0	1	4	1	1	4	2	0	4	0	21	0	0	0	0	0
7:45 AM	1	1	1	0	6	0	0	7	2	0	5	1	24	0	0	0	0	0
8:00 AM	2	2	4	2	5	0	0	6	5	3	2	1	32	0	0	0	0	0
8:15 AM	1	1	1	0	3	1	1	0	2	0	1	0	11	0	0	0	0	0
8:30 AM	5	4	0	0	3	1	0	2	5	1	0	0	21	0	0	0	0	0
8:45 AM	2	3	2	3	2	0	0	0	1	1	2	0	16	0	0	0	1	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	20	20	17	10	35	4	3	22	20	6	17	2	176	0	0	0	1	1
APPROACH %	35%	35%	30%	20%	71%	8%	7%	49%	44%	24%	68%	8%						
APP/DEPART	57	/	25	49	/	60	45	/	50	25	/	41	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	8	10	8	4	22	2	1	17	10	3	13	2	100					
APPROACH %	31%	38%	31%	14%	79%	7%	4%	61%	36%	17%	72%	11%						
PEAK HR FACTOR		0.591			0.778			0.636			0.750		0.781					
APP/DEPART	26	/	13	28	/	35	28	/	29	18	/	23	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	4	11	5	0	6	0	0	5	1	0	1	0	33	0	0	0	0	0
4:15 PM	1	3	5	1	4	0	1	4	2	2	3	0	26	0	0	0	0	0
4:30 PM	5	6	3	0	3	1	0	3	0	1	0	0	22	0	0	0	0	0
4:45 PM	3	11	2	0	5	0	1	2	3	0	1	0	28	0	0	0	0	0
5:00 PM	2	8	1	0	4	0	3	2	0	0	2	0	22	0	0	0	0	0
5:15 PM	6	4	5	1	4	0	0	0	2	1	4	2	29	0	0	0	0	0
5:30 PM	0	5	2	0	3	0	0	1	0	1	3	0	15	0	0	0	0	0
5:45 PM	2	5	3	0	2	0	0	3	2	1	2	0	20	0	0	0	0	0
VOLUMES	23	53	26	2	31	1	5	20	10	6	16	2	195	0	0	0	0	0
APPROACH %	23%	52%	25%	6%	91%	3%	14%	57%	29%	25%	67%	8%						
APP/DEPART	102	/	60	34	/	47	35	/	48	24	/	40	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	13	31	15	1	18	1	2	14	6	3	5	0	109					
APPROACH %	22%	53%	25%	5%	90%	5%	9%	64%	27%	38%	63%	0%						
PEAK HR FACTOR		0.738			0.833			0.786			0.400		0.826					
APP/DEPART	59	/	33	20	/	27	22	/	30	8	/	19	0					

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	11
WEDNESDAY	EAST & WEST:	Valley	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

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	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	2	0	1	1	1	
AM													
7:00 AM	0	1	1	0	1	0	0	0	0	0	0	0	3
7:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
7:45 AM	0	0	0	0	2	0	0	0	0	0	1	1	4
8:00 AM	0	0	1	0	0	0	0	0	1	0	0	0	2
8:15 AM	0	2	0	0	1	0	0	0	0	0	0	0	3
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	2	0	0	0	1	0	0	0	4
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	3	3	1	6	0	0	0	2	0	1	2	18
APPROACH %	0%	50%	50%	14%	86%	0%	0%	0%	100%	0%	33%	67%	
APP/DEPART	6	/	5	7	/	8	2	/	4	3	/	1	0
BEGIN PEAK HR		7:30 AM											
VOLUMES	0	2	1	0	3	0	0	0	1	0	1	2	10
APPROACH %	0%	67%	33%	0%	100%	0%	0%	0%	100%	0%	33%	67%	
PEAK HR FACTOR		0.375			0.375			0.250			0.375		0.625
APP/DEPART	3	/	4	3	/	4	1	/	1	3	/	1	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	1	2	1	0	0	0	0	0	0	0	0	0	4
4:30 PM	0	1	1	0	0	0	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	1	0	1	0	0	1	0	0	0	0	3
5:15 PM	0	1	1	0	1	0	0	1	1	1	0	0	6
5:30 PM	1	1	0	0	1	0	0	0	0	0	0	0	3
5:45 PM	1	0	1	0	1	0	0	0	0	0	0	0	3
VOLUMES	3	5	5	0	4	0	0	2	1	1	0	0	21
APPROACH %	23%	38%	38%	0%	100%	0%	0%	67%	33%	100%	0%	0%	
APP/DEPART	13	/	5	4	/	6	3	/	7	1	/	3	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	2	2	3	0	4	0	0	2	1	1	0	0	15
APPROACH %	29%	29%	43%	0%	100%	0%	0%	67%	33%	100%	0%	0%	
PEAK HR FACTOR		0.875			1.000			0.375			0.250		0.625
APP/DEPART	7	/	2	4	/	6	3	/	5	1	/	2	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	11
WEDNESDAY	EAST & WEST:	Valley	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	2	0	1	1	1	
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
7:15 AM	0	1	0	0	1	0	0	0	1	0	0	0	3
7:30 AM	1	1	1	0	0	1	0	1	0	0	0	0	5
7:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	2
8:00 AM	0	1	1	0	2	0	0	2	0	0	0	0	6
8:15 AM	0	0	0	0	0	0	0	0	1	0	0	0	1
8:30 AM	0	0	1	0	1	0	0	0	0	0	1	0	3
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	4	4	0	5	1	0	3	2	0	2	0	22
APPROACH %	11%	44%	44%	0%	83%	17%	0%	60%	40%	0%	100%	0%	
APP/DEPART	9	/	4	6	/	7	5	/	7	2	/	4	0
BEGIN PEAK HR		7:15 AM											
VOLUMES	1	3	3	0	4	1	0	3	1	0	0	0	16
APPROACH %	14%	43%	43%	0%	80%	20%	0%	75%	25%	0%	0%	0%	
PEAK HR FACTOR		0.583			0.625			0.500			0.000		0.667
APP/DEPART	7	/	3	5	/	5	4	/	6	0	/	2	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	1	1	0	1	0	1	0	0	0	1	0	5
4:15 PM	0	0	0	1	2	0	0	2	0	0	0	0	5
4:30 PM	0	1	2	1	0	0	0	0	0	1	0	0	5
4:45 PM	0	0	2	0	4	0	0	0	0	0	0	0	6
5:00 PM	0	1	1	0	0	0	0	1	0	0	0	0	3
5:15 PM	0	1	1	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	1	0	0	0	0	1	0	1	0	0	3
5:45 PM	0	0	1	0	1	0	0	0	0	0	0	0	2
VOLUMES	0	4	9	2	8	0	1	4	0	2	1	0	31
APPROACH %	0%	31%	69%	20%	80%	0%	20%	80%	0%	67%	33%	0%	
APP/DEPART	13	/	5	10	/	10	5	/	15	3	/	1	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	0	2	5	2	7	0	1	2	0	1	1	0	21
APPROACH %	0%	29%	71%	22%	78%	0%	33%	67%	0%	50%	50%	0%	
PEAK HR FACTOR		0.583			0.563			0.375			0.500		0.875
APP/DEPART	7	/	3	9	/	8	3	/	9	2	/	1	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	11
WEDNESDAY	EAST & WEST:	Valley	CONTROL:	SIGNAL

CLASS 5:	NOTES:	
RV		AM PM MD OTHER OTHER

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		NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	1	1						
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	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	0	0	0	0	0
	7:45 AM	0	0	0	0	0	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	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	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	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
	BEGIN PEAK HR		3:00 PM																
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Rancho	LOCATION #:	11
WEDNESDAY	EAST & WEST:	Valley	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM
PM
MD
OTHER
OTHER

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	NORTHBOUND Rancho			SOUTHBOUND Rancho			EASTBOUND Valley			WESTBOUND Valley				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	2	0	1	2	0	1	1	1						
AM																		
7:00 AM	1	1	0	0	0	0	0	1	0	2	1	0	6	0	0	0	0	0
7:15 AM	0	1	2	0	1	0	0	1	0	1	2	1	9	0	0	0	0	0
7:30 AM	0	4	0	0	0	0	0	1	1	0	1	0	7	0	0	0	0	0
7:45 AM	0	2	0	0	1	0	1	1	0	0	1	0	6	0	0	0	0	0
8:00 AM	0	2	1	0	1	0	0	2	0	0	2	0	8	0	0	0	0	0
8:15 AM	0	1	1	0	0	0	0	2	0	0	1	0	5	0	0	0	0	0
8:30 AM	0	1	1	0	1	0	0	2	0	1	1	0	7	0	0	0	0	0
8:45 AM	0	0	0	0	1	0	0	2	0	0	2	0	5	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	12	5	0	5	0	1	12	1	4	11	1	53	0	0	0	0	0
APPROACH %	6%	67%	28%	0%	100%	0%	7%	86%	7%	25%	69%	6%						
APP/DEPART	18	/	14	5	/	10	14	/	17	16	/	12	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	0	9	3	0	3	0	1	5	1	1	6	1	30					
APPROACH %	0%	75%	25%	0%	100%	0%	14%	71%	14%	13%	75%	13%						
PEAK HR FACTOR		0.750			0.750			0.875			0.500		0.833					
APP/DEPART	12	/	11	3	/	5	7	/	8	8	/	6	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	1	0	0	1	1	0	0	0	1	0	4	0	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	3	0	0	1	0	5	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	3	0	0	1	0	5	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	0	1	0	0	1	0	3	0	0	0	0	0
5:00 PM	0	0	1	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
5:30 PM	0	1	1	0	0	0	0	3	0	0	1	0	6	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
VOLUMES	0	3	4	0	0	1	1	12	0	0	8	0	29	0	0	0	0	0
APPROACH %	0%	43%	57%	0%	0%	100%	8%	92%	0%	0%	100%	0%						
APP/DEPART	7	/	4	1	/	0	13	/	16	8	/	9	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	0	2	2	0	0	1	1	7	0	0	4	0	17					
APPROACH %	0%	50%	50%	0%	0%	100%	13%	88%	0%	0%	100%	0%						
PEAK HR FACTOR		1.000			0.250			0.667			1.000		0.850					
APP/DEPART	4	/	3	1	/	0	8	/	9	4	/	5	0					

Rancho

NORTH SIDE

Valley WEST SIDE

EAST SIDE **Valley**

SOUTH SIDE

Rancho

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Pepper	LOCATION #:	12
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

PCE Adjusted	NOTES:								
	Class	1	2	3	4	5	6		AM
	Factor	1	1.5	2	3	2	2		PM
									MD
									OTHER
									OTHER

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		NORTHBOUND Pepper			SOUTHBOUND Pepper			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	2	0						
AM	7:00 AM	49	97	11	42	133	13	14	65	24	16	92	25	580					0
	7:15 AM	31	116	14	59	160	24	23	71	49	16	90	33	685					0
	7:30 AM	32	132	11	38	175	24	23	82	50	19	68	46	699					0
	7:45 AM	40	153	21	32	244	22	27	86	36	13	70	34	776					0
	8:00 AM	31	114	18	26	132	24	33	89	30	12	64	30	600					0
	8:15 AM	18	83	8	21	125	20	16	44	28	11	53	29	453					0
	8:30 AM	17	86	14	12	78	21	16	54	20	12	53	23	404					0
	8:45 AM	12	95	17	9	88	24	17	38	27	28	70	5	427					0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	VOLUMES	228	874	113	237	1,134	171	168	528	263	127	558	223	4,622	0	0	0	0	0
	APPROACH %	19%	72%	9%	15%	74%	11%	18%	55%	27%	14%	61%	25%						
	APP/DEPART	1,215	/	1,265	1,542	/	1,524	959	/	878	908	/	956	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	133	514	64	154	711	93	106	328	165	60	291	142	2,759					
	APPROACH %	19%	72%	9%	16%	74%	10%	18%	55%	28%	12%	59%	29%						
	PEAK HR FACTOR		0.834			0.804			0.965			0.890		0.889					
	APP/DEPART	711	/	762	957	/	935	598	/	546	493	/	517	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
	4:00 PM	22	104	29	24	108	25	31	109	31	21	97	24	623					0
	4:15 PM	22	108	30	21	128	33	33	100	21	20	102	30	646					0
	4:30 PM	29	94	22	24	129	27	31	107	45	21	90	23	641					0
	4:45 PM	32	109	16	31	149	18	29	121	37	22	106	24	692					0
	5:00 PM	22	131	20	22	133	20	29	134	32	12	98	23	673					0
	5:15 PM	31	105	22	20	127	20	36	99	28	19	103	27	637					0
	5:30 PM	23	123	27	24	110	26	26	99	21	22	106	31	637					0
	5:45 PM	16	90	23	11	107	31	33	108	31	22	95	28	593					0
	VOLUMES	196	862	188	176	990	200	247	876	246	158	795	209	5,140	0	0	0	0	0
	APPROACH %	16%	69%	15%	13%	72%	15%	18%	64%	18%	14%	68%	18%						
	APP/DEPART	1,246	/	1,317	1,365	/	1,393	1,368	/	1,240	1,162	/	1,191	0					
	BEGIN PEAK HR		4:15 PM																
	VOLUMES	105	441	88	98	539	98	121	461	135	75	395	99	2,651					
	APPROACH %	17%	70%	14%	13%	73%	13%	17%	64%	19%	13%	70%	17%						
	PEAK HR FACTOR		0.917			0.928			0.923			0.937		0.958					
	APP/DEPART	633	/	661	734	/	748	717	/	646	568	/	597	0					

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino

SC2069

ALL HOURS

Pepper (north)

TOTAL	**2,780**	**370**	**2,124**	**413**
PM	**1,313**	200	990	176
AM	**1,467**	171	1,134	237

TOTAL	**2,496**
PM	1,285
AM	1,211

Baseline (west)

TOTAL	**2,074**
PM	1,165
AM	909

TOTAL	**415**	**1,404**	**508**	**2,235**
PM	247	876	246	**1,330**
AM	168	528	263	**905**

Baseline (east)

TOTAL	**1,965**	**432**	**1,353**	**285**
PM	**1,113**	209	795	158
AM	**852**	223	558	127

TOTAL	**1,997**
PM	1,165
AM	832

Pepper (south)

AM	1,433
PM	1,323
TOTAL	**2,756**

AM	228	874	113	**1,161**
PM	196	862	188	**1,182**
TOTAL	**424**	**1,736**	**301**	**2,343**

PEAK HOUR

AM 7:15 AM

PM 4:45 PM

Pepper (north)

TOTAL	**1,691**	**191**	**1,249**	**251**
PM	**734**	98	539	98
AM	**957**	93	711	154

TOTAL	**1,422**
PM	661
AM	762

Baseline (west)

TOTAL	**1,114**
PM	597
AM	517

TOTAL	**227**	**789**	**300**	**1,315**
PM	121	461	135	**717**
AM	106	328	165	**598**

Baseline (east)

TOTAL	**1,061**	**241**	**686**	**135**
PM	**568**	99	395	75
AM	**493**	142	291	60

TOTAL	**1,191**
PM	646
AM	546

Pepper (south)

AM	935
PM	748
Total	**1,683**

AM	133	514	64	**711**
PM	105	441	88	**633**
Total	**237**	**955**	**152**	**1,344**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
Wed, Feb 6, 19	NORTH & SOUTH:	Pepper	LOCATION #:	12
	EAST & WEST:	Baseline	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

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◄ W
E ►
S ▼

Add U-Turns to Left Turns

	NORTHBOUND Pepper			SOUTHBOUND Pepper			EASTBOUND Baseline			WESTBOUND Baseline			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	2	0	1	2	0	
AM 7:00 AM	47	96	9	42	127	13	14	61	21	13	88	24	555
7:15 AM	30	110	14	57	156	22	23	67	48	14	84	30	655
7:30 AM	28	128	11	37	171	23	23	77	49	19	65	43	674
7:45 AM	38	145	20	32	234	21	25	79	35	12	69	32	742
8:00 AM	29	110	16	24	126	23	32	83	29	11	62	29	574
8:15 AM	17	76	7	19	110	18	16	43	25	10	51	27	419
8:30 AM	17	82	14	11	73	21	16	49	18	11	48	21	381
8:45 AM	12	89	16	9	80	18	16	35	21	20	65	4	385
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	218	836	107	231	1,077	159	165	494	246	110	532	210	4,385
APPROACH %	19%	72%	9%	16%	73%	11%	18%	55%	27%	13%	62%	25%	
APP/DEPART	1,161	/	1,211	1,467	/	1,433	905	/	832	852	/	909	0
BEGIN PEAK HR		7:15 AM											
VOLUMES	125	493	61	150	687	89	103	306	161	56	280	134	2,645
APPROACH %	18%	73%	9%	16%	74%	10%	18%	54%	28%	12%	60%	29%	
PEAK HR FACTOR		0.836			0.807			0.956			0.918		0.891
APP/DEPART	679	/	730	926	/	904	570	/	517	470	/	494	0
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	21	102	21	22	104	23	31	106	28	14	94	23	589
4:15 PM	22	103	19	20	127	32	32	96	20	15	98	29	613
4:30 PM	29	91	16	22	118	26	31	103	44	17	87	22	606
4:45 PM	31	103	14	29	142	18	29	116	37	18	104	24	665
5:00 PM	22	128	19	21	126	19	28	129	32	10	94	22	650
5:15 PM	31	103	18	20	126	20	34	94	27	19	101	27	620
5:30 PM	23	119	23	24	104	24	26	98	21	19	105	30	616
5:45 PM	16	89	19	10	105	31	32	106	30	20	94	27	579
VOLUMES	195	838	149	168	952	193	243	848	239	132	777	204	4,938
APPROACH %	16%	71%	13%	13%	73%	15%	18%	64%	18%	12%	70%	18%	
APP/DEPART	1,182	/	1,285	1,313	/	1,323	1,330	/	1,165	1,113	/	1,165	0
BEGIN PEAK HR		4:45 PM											
VOLUMES	107	453	74	94	498	81	117	437	117	66	404	103	2,551
APPROACH %	17%	71%	12%	14%	74%	12%	17%	65%	17%	12%	71%	18%	
PEAK HR FACTOR		0.938			0.890			0.888			0.930		0.959
APP/DEPART	634	/	673	673	/	681	671	/	605	573	/	592	0

U-TURNS

	NB	SB	EB	WB	TTL
	0	0	0	0	
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Pepper	LOCATION #:	12
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

		NORTHBOUND Pepper			SOUTHBOUND Pepper			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	2	0						
AM	7:00 AM	44	94	7	42	123	13	14	55	19	9	85	22	527	0	0	0	0	0
AM	7:15 AM	28	104	14	54	152	19	23	61	47	12	77	28	619	0	0	0	0	0
AM	7:30 AM	25	124	11	36	164	21	23	72	48	19	63	41	647	0	0	0	0	0
AM	7:45 AM	36	138	19	32	225	20	24	72	34	10	68	31	709	0	0	0	0	0
AM	8:00 AM	27	103	14	22	119	22	31	76	27	9	60	27	537	0	0	0	0	0
AM	8:15 AM	16	70	6	18	100	15	16	41	23	9	48	25	387	0	0	0	0	0
AM	8:30 AM	17	78	14	10	68	21	16	43	17	10	45	19	358	0	0	0	0	0
AM	8:45 AM	12	85	15	9	73	14	15	32	17	13	59	3	347	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	205	796	100	223	1,024	145	162	452	232	91	505	196	4,131	0	0	0	0	0
AM	APPROACH %	19%	72%	9%	16%	74%	10%	19%	53%	27%	11%	64%	25%						
AM	APP/DEPART	1,101	/	1,154	1,392	/	1,347	846	/	775	792	/	855	0					
AM	BEGIN PEAK HR		7:15 AM																
AM	VOLUMES	116	469	58	144	660	82	101	281	156	50	268	127	2,512					
AM	APPROACH %	18%	73%	9%	16%	74%	9%	19%	52%	29%	11%	60%	29%						
AM	PEAK HR FACTOR		0.833			0.800			0.941			0.904		0.886					
AM	APP/DEPART	643	/	697	886	/	866	538	/	483	445	/	466	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	20	99	16	21	98	22	31	102	25	10	90	21	555	0	0	0	0	0
PM	4:15 PM	22	97	12	18	125	30	31	92	18	10	92	28	575	0	0	0	0	0
PM	4:30 PM	29	86	13	20	108	25	31	100	42	14	83	21	572	0	0	0	0	0
PM	4:45 PM	30	99	13	26	135	18	29	111	37	15	101	24	638	0	0	0	0	0
PM	5:00 PM	22	126	17	20	119	18	27	123	32	8	87	21	620	0	0	0	0	0
PM	5:15 PM	31	99	16	20	124	20	31	86	26	19	97	27	596	0	0	0	0	0
PM	5:30 PM	23	116	21	24	99	23	26	96	21	16	104	28	597	0	0	0	0	0
PM	5:45 PM	16	88	15	9	102	31	31	103	29	18	93	26	561	0	0	0	0	0
PM	VOLUMES	193	810	123	158	910	187	237	813	230	110	747	196	4,714	0	0	0	0	0
PM	APPROACH %	17%	72%	11%	13%	73%	15%	19%	64%	18%	10%	71%	19%						
PM	APP/DEPART	1,126	/	1,243	1,255	/	1,250	1,280	/	1,094	1,053	/	1,127	0					
PM	BEGIN PEAK HR		4:45 PM																
PM	VOLUMES	106	440	67	90	477	79	113	416	116	58	389	100	2,451					
PM	APPROACH %	17%	72%	11%	14%	74%	12%	18%	64%	18%	11%	71%	18%						
PM	PEAK HR FACTOR		0.929			0.902			0.886			0.924		0.960					
PM	APP/DEPART	613	/	653	646	/	651	645	/	573	547	/	574	0					

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Pepper	LOCATION #:	12
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Pepper			SOUTHBOUND Pepper			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	2	0	1	2	0	1	2	0						
AM																		
7:00 AM	2	2	1	0	0	0	0	4	0	2	1	2	14	0	0	0	0	0
7:15 AM	2	2	0	3	2	2	0	4	0	0	4	1	20	0	0	0	0	0
7:30 AM	1	2	0	1	6	2	0	0	0	0	0	1	13	0	0	0	0	0
7:45 AM	1	3	0	0	4	1	0	4	1	2	1	0	17	0	0	0	0	0
8:00 AM	1	7	0	1	5	1	1	2	2	2	1	2	25	0	0	0	0	0
8:15 AM	1	3	1	0	2	2	0	2	1	0	3	1	16	0	0	0	0	0
8:30 AM	0	2	0	1	3	0	0	3	0	0	1	1	11	0	0	0	0	0
8:45 AM	0	1	1	0	4	1	1	1	1	0	4	0	14	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	8	22	3	6	26	9	2	20	5	6	15	8	130	0	0	0	0	0
APPROACH %	24%	67%	9%	15%	63%	22%	7%	74%	19%	21%	52%	28%						
APP/DEPART	33	/	32	41	/	37	27	/	29	29	/	32	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	5	14	0	5	17	6	1	10	3	4	6	4	75					
APPROACH %	26%	74%	0%	18%	61%	21%	7%	71%	21%	29%	43%	29%						
PEAK HR FACTOR		0.594			0.778			0.700			0.700		0.750					
APP/DEPART	19	/	19	28	/	24	14	/	15	14	/	17	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	3	1	0	5	0	0	2	2	0	3	2	19	0	0	0	0	0
4:15 PM	0	4	1	2	2	2	1	1	2	0	5	1	21	0	0	0	0	0
4:30 PM	0	4	0	1	6	0	0	1	2	0	2	1	17	0	0	0	0	0
4:45 PM	1	1	0	2	5	0	0	2	0	0	3	0	14	0	0	0	0	0
5:00 PM	0	1	2	0	4	1	1	5	0	1	6	1	22	0	0	0	0	0
5:15 PM	0	4	0	0	2	0	2	6	0	0	4	0	18	0	0	0	0	0
5:30 PM	0	1	0	0	2	0	0	2	0	1	0	2	8	0	0	0	0	0
5:45 PM	0	0	2	1	3	0	1	2	1	0	1	0	11	0	0	0	0	0
VOLUMES	2	18	6	6	29	3	5	21	7	2	24	7	130	0	0	0	0	0
APPROACH %	8%	69%	23%	16%	76%	8%	15%	64%	21%	6%	73%	21%						
APP/DEPART	26	/	30	38	/	38	33	/	33	33	/	29	0					
BEGIN PEAK HR		4:15 PM																
VOLUMES	1	10	3	5	17	3	2	9	4	1	16	3	74					
APPROACH %	7%	71%	21%	20%	68%	12%	13%	60%	27%	5%	80%	15%						
PEAK HR FACTOR		0.700			0.893			0.625			0.625		0.841					
APP/DEPART	14	/	15	25	/	22	15	/	17	20	/	20	0					

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Pepper	LOCATION #:	12
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Pepper			SOUTHBOUND Pepper			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	2	0	1	2	0	1	2	0						
AM 7:00 AM	0	0	1	0	0	0	0	1	0	1	0	0	3	0	0	0	0	0
7:15 AM	0	2	0	0	1	0	0	0	0	1	0	0	4	0	0	0	0	0
7:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
7:45 AM	0	0	1	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8:15 AM	0	0	0	0	2	1	0	0	0	1	0	1	5	0	0	0	0	0
8:30 AM	0	1	0	0	1	0	0	1	0	1	0	1	5	0	0	0	0	0
8:45 AM	0	1	0	0	0	1	0	0	0	5	1	1	9	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	5	3	0	7	2	0	2	0	9	1	3	32	0	0	0	0	0
APPROACH %	0%	63%	38%	0%	78%	22%	0%	100%	0%	69%	8%	23%						
APP/DEPART	8	/	8	9	/	16	2	/	5	13	/	3	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	0	2	1	0	3	2	0	1	0	7	1	3	20					
APPROACH %	0%	67%	33%	0%	60%	40%	0%	100%	0%	64%	9%	27%						
PEAK HR FACTOR		0.750			0.417			0.250			0.393		0.556					
APP/DEPART	3	/	5	5	/	10	1	/	2	11	/	3	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	1	0	1	0	0	2	0	1	0	0	5	0	0	0	0	0
4:15 PM	0	1	2	0	0	0	0	0	0	5	1	0	9	0	0	0	0	0
4:30 PM	0	1	0	1	0	1	0	1	0	2	0	0	6	0	0	0	0	0
4:45 PM	0	1	0	1	0	0	0	0	0	2	0	0	4	0	0	0	0	0
5:00 PM	0	0	0	1	1	0	0	0	0	1	0	0	3	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	1	0	0	0	0	2	0	0	0	0	0
5:30 PM	0	1	0	0	1	0	0	0	0	2	0	0	4	0	0	0	0	0
5:45 PM	0	0	1	0	0	0	0	0	0	2	0	1	4	0	0	0	0	0
VOLUMES	0	4	4	3	3	1	1	4	0	15	1	1	37	0	0	0	0	0
APPROACH %	0%	50%	50%	43%	43%	14%	20%	80%	0%	88%	6%	6%						
APP/DEPART	8	/	6	7	/	18	5	/	11	17	/	2	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	0	3	3	2	1	1	0	3	0	10	1	0	24					
APPROACH %	0%	50%	50%	50%	25%	25%	0%	100%	0%	91%	9%	0%						
PEAK HR FACTOR		0.500			0.500			0.375			0.458		0.667					
APP/DEPART	6	/	3	4	/	11	3	/	8	11	/	2	0					

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Pepper	LOCATION #:	12
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND				U-TURNS				
		Pepper			Pepper			Baseline			Baseline								
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	2	0						
AM	7:00 AM	0	0	0	0	2	0	0	0	1	0	1	0	4	0	0	0	0	0
	7:15 AM	0	1	0	0	1	0	0	0	0	0	1	1	4	0	0	0	0	0
	7:30 AM	1	1	0	0	0	0	0	0	0	0	1	1	4	0	0	0	0	0
	7:45 AM	0	2	0	0	3	0	1	2	0	0	0	1	9	0	0	0	0	0
	8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
	8:15 AM	0	2	0	1	6	0	0	0	1	0	0	0	10	0	0	0	0	0
	8:30 AM	0	1	0	0	1	0	0	0	1	0	2	0	5	0	0	0	0	0
	8:45 AM	0	2	0	0	3	2	0	0	2	1	1	0	11	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	1	9	0	1	17	2	1	2	5	1	6	3	48	0	0	0	0	0
	APPROACH %	10%	90%	0%	5%	85%	10%	13%	25%	63%	10%	60%	30%						
	APP/DEPART	10	/	13	20	/	23	8	/	3	10	/	9	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	0	5	0	1	11	2	0	0	4	1	3	0	27					
	APPROACH %	0%	100%	0%	7%	79%	14%	0%	0%	100%	25%	75%	0%						
	PEAK HR FACTOR		0.625			0.500			0.500			0.500		0.614					
	APP/DEPART	5	/	5	14	/	16	4	/	1	4	/	5	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	3	1	0	1	0	0	1	3	0	0	9	0	0	0	0	0
	4:15 PM	0	1	4	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
	4:30 PM	0	0	3	0	4	0	0	1	0	1	0	0	9	0	0	0	0	0
	4:45 PM	0	2	1	0	2	0	0	1	0	1	0	0	7	0	0	0	0	0
	5:00 PM	0	1	0	0	2	0	0	1	0	0	0	0	4	0	0	0	0	0
	5:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	5:30 PM	0	1	2	0	2	1	0	0	0	0	0	0	6	0	0	0	0	0
	5:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	VOLUMES	0	5	16	1	10	2	0	3	1	5	0	0	43	0	0	0	0	0
	APPROACH %	0%	24%	76%	8%	77%	15%	0%	75%	25%	100%	0%	0%						
	APP/DEPART	21	/	5	13	/	16	4	/	20	5	/	2	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	0	3	11	1	6	1	0	2	1	5	0	0	30					
	APPROACH %	0%	21%	79%	13%	75%	13%	0%	67%	33%	100%	0%	0%						
	PEAK HR FACTOR		0.700			0.500			0.750			0.417		0.833					
	APP/DEPART	14	/	3	8	/	12	3	/	14	5	/	1	0					

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Pepper	LOCATION #:	12
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 5:	NOTES:	AM
RV		PM
		MD
		OTHER
		OTHER

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◄ W E ►
S ▼

	NORTHBOUND Pepper			SOUTHBOUND Pepper			EASTBOUND Baseline			WESTBOUND Baseline			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	2	0	1	2	0	
AM													
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	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	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	1	0	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	1	0	0	0	1
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	
APP/DEPART	0	/	0	0	/	1	1	/	0	0	/	0	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	0	0	0	0	0	0	0	0	1	0	0	0	1
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.000			0.250			0.000		0.250
APP/DEPART	0	/	0	0	/	1	1	/	0	0	/	0	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0
BEGIN PEAK HR		3:00 PM											
VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000
APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Pepper	LOCATION #:	12
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Pepper			SOUTHBOUND Pepper			EASTBOUND Baseline			WESTBOUND Baseline			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
LANES:	1	2	0	1	2	0	1	2	0	1	2	0	
AM													
7:00 AM	1	0	0	0	2	0	0	1	1	1	1	0	7
7:15 AM	0	1	0	0	0	1	0	2	1	1	2	0	8
7:30 AM	1	0	0	0	0	0	0	5	1	0	1	0	8
7:45 AM	1	2	0	0	0	0	0	1	0	0	0	0	4
8:00 AM	1	0	1	1	1	0	0	5	0	0	1	0	10
8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	2	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	2	0	1	0	0	3
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	4	4	1	1	3	1	0	18	3	3	5	0	43
APPROACH %	44%	44%	11%	20%	60%	20%	0%	86%	14%	38%	63%	0%	
APP/DEPART	9	/	4	5	/	9	21	/	20	8	/	10	0
BEGIN PEAK HR		7:15 AM											
VOLUMES	3	3	1	1	1	1	0	13	2	1	4	0	30
APPROACH %	43%	43%	14%	33%	33%	33%	0%	87%	13%	20%	80%	0%	
PEAK HR FACTOR		0.583			0.375			0.625			0.417		0.750
APP/DEPART	7	/	3	3	/	4	15	/	15	5	/	8	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
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	3	0	0	0	0	3
4:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	2
4:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
5:15 PM	0	0	0	0	0	0	0	1	1	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
5:45 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
VOLUMES	0	1	0	0	0	0	0	7	1	0	5	0	14
APPROACH %	0%	100%	0%	0%	0%	0%	0%	88%	13%	0%	100%	0%	
APP/DEPART	1	/	1	0	/	1	8	/	7	5	/	5	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	0	0	0	0	0	0	0	5	0	0	3	0	8
APPROACH %	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%	0%	
PEAK HR FACTOR		0.000			0.000			0.417			0.375		0.667
APP/DEPART	0	/	0	0	/	0	5	/	5	3	/	3	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Pepper

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Pepper

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Medical Center	LOCATION #:	13
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

PCE Adjusted	NOTES:								AM		N	
	Class	1	2	3	4	5	6		PM			
	Factor	1	1.5	2	3	2	2		MD	◄ W		E ►
									OTHER		S	
									OTHER			

	NORTHBOUND Medical Center			SOUTHBOUND Medical Center			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	1	1	1	2	0	1	2	1						
AM																		
7:00 AM	9	43	7	26	49	59	36	102	16	12	89	29	475					0
7:15 AM	9	75	8	34	99	101	60	173	15	11	154	55	791					0
7:30 AM	11	65	11	46	105	55	56	183	22	14	94	31	690					0
7:45 AM	13	49	9	31	60	25	23	134	14	8	93	20	478					0
8:00 AM	14	50	4	22	37	14	17	107	24	9	89	24	409					0
8:15 AM	17	35	11	26	42	13	18	98	16	3	83	22	381					0
8:30 AM	19	61	8	36	44	19	18	93	10	12	76	19	413					0
8:45 AM	17	45	8	28	21	20	19	70	16	11	90	13	357					0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
VOLUMES	108	420	65	247	455	306	246	959	132	80	767	211	3,992	0	0	0	0	0
APPROACH %	18%	71%	11%	24%	45%	30%	18%	72%	10%	8%	73%	20%						
APP/DEPART	593	/	876	1,007	/	666	1,336	/	1,270	1,057	/	1,180	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	42	231	34	136	312	240	175	591	67	45	430	134	2,434					
APPROACH %	14%	75%	11%	20%	45%	35%	21%	71%	8%	7%	71%	22%						
PEAK HR FACTOR		0.837			0.737			0.797			0.692		0.769					
APP/DEPART	307	/	539	687	/	424	832	/	761	608	/	711	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0					0
4:00 PM	13	48	15	17	48	15	27	116	26	14	103	26	466					0
4:15 PM	10	63	6	33	35	20	26	152	14	19	105	33	514					0
4:30 PM	24	53	14	37	54	30	15	116	25	15	111	23	515					0
4:45 PM	21	52	11	40	43	22	26	112	18	14	115	27	500					0
5:00 PM	25	75	11	28	52	29	24	119	17	16	96	24	512					0
5:15 PM	22	59	12	28	59	22	32	142	27	11	116	30	556					0
5:30 PM	14	61	7	28	55	39	23	119	13	12	123	37	529					0
5:45 PM	22	64	7	18	45	24	30	133	19	11	104	32	508					0
VOLUMES	149	473	83	228	389	200	202	1,006	157	111	873	231	4,100	0	0	0	0	0
APPROACH %	21%	67%	12%	28%	48%	25%	15%	74%	12%	9%	72%	19%						
APP/DEPART	705	/	906	816	/	657	1,365	/	1,316	1,214	/	1,222	0					
BEGIN PEAK HR		5:00 PM																
VOLUMES	82	258	37	101	210	113	109	512	75	49	439	123	2,105					
APPROACH %	22%	68%	10%	24%	50%	27%	16%	74%	11%	8%	72%	20%						
PEAK HR FACTOR		0.855			0.879			0.869			0.887		0.946					
APP/DEPART	376	/	489	424	/	334	695	/	649	610	/	634	0					

Medical Center

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

AimTD LLC

TURNING MOVEMENT COUNTS

San Bernardino — SC2069 — ALL HOURS

Medical Center (north leg)

	Total				Exit
TOTAL	1,757	506	843	474	1,724
PM	786	200	389	228	877
AM	971	306	455	247	847

Baseline (west leg)

	Exit				Total
TOTAL	2,287	448	1,965	289	2,566
PM	1,184	202	1,006	157	1,308
AM	1,103	246	959	132	1,258

Baseline (east leg)

	Total				Exit
AM	985	211	767	80	1,184
PM	1,180	231	873	111	1,258
TOTAL	2,165	441	1,639	191	2,442

Medical Center (south leg)

	Exit				Total
AM	641	108	420	65	561
PM	633	149	473	83	678
TOTAL	1,274	257	893	147	1,239

PEAK HOUR

AM 7:00 AM

PM 5:00 PM

Medical Center (north leg)

	Total				Exit
TOTAL	1,111	353	522	236	1,027
PM	424	113	210	101	489
AM	687	240	312	136	539

Baseline (west leg)

	Exit				Total
TOTAL	1,345	283	1,103	142	1,527
PM	634	109	512	75	695
AM	711	175	591	67	832

Baseline (east leg)

	Total				Exit
AM	608	134	430	45	761
PM	610	123	439	49	649
TOTAL	1,218	256	868	94	1,409

Medical Center (south leg)

	Exit				Total
AM	424	42	231	34	307
PM	334	82	258	37	376
Total	758	124	488	71	683

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Feb 6, 19	LOCATION: San Bernardino	PROJECT #: SC2069	
	NORTH & SOUTH: Medical Center	LOCATION #: 13	
	EAST & WEST: Baseline	CONTROL: SIGNAL	

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

Add U-Turns to Left Turns

	NORTHBOUND (Medical Center)			SOUTHBOUND (Medical Center)			EASTBOUND (Baseline)			WESTBOUND (Baseline)				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	1	1	1	2	0	1	2	1		0	0	0	0	
AM 7:00 AM	7	41	6	24	47	56	36	94	15	12	84	28	450	0	0	0	0	0
7:15 AM	8	72	8	32	98	98	59	167	13	11	144	54	764	0	0	0	0	0
7:30 AM	11	61	10	44	103	54	56	170	21	13	88	30	661	0	0	0	0	0
7:45 AM	12	46	8	29	58	24	22	126	14	7	85	19	450	0	0	0	0	0
8:00 AM	13	47	3	21	35	14	17	96	19	8	78	23	374	0	0	0	0	0
8:15 AM	16	34	11	23	40	13	18	90	14	3	75	20	357	0	0	0	0	0
8:30 AM	19	56	6	33	40	18	17	85	10	12	69	18	383	0	0	0	0	0
8:45 AM	17	42	7	26	21	20	18	65	16	11	80	13	336	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	103	399	59	232	442	297	243	893	122	77	703	205	3,775	0	0	0	0	0
APPROACH %	18%	71%	11%	24%	46%	31%	19%	71%	10%	8%	71%	21%						
APP/DEPART	561	/	847	971	/	641	1,258	/	1,184	985	/	1,103	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	38	220	32	129	306	232	173	557	63	43	401	131	2,325					
APPROACH %	13%	76%	11%	19%	46%	35%	22%	70%	8%	7%	70%	23%						
PEAK HR FACTOR		0.824			0.731			0.803			0.688		0.761					
APP/DEPART	290	/	524	667	/	412	793	/	718	575	/	671	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	12	46	15	17	46	15	27	106	25	14	99	24	446	0	0	0	0	0
4:15 PM	10	59	6	30	33	19	25	141	13	18	102	32	488	0	0	0	0	0
4:30 PM	23	51	14	35	50	30	15	112	24	15	108	23	500	0	0	0	0	0
4:45 PM	20	49	11	39	43	21	26	107	16	14	110	26	482	0	0	0	0	0
5:00 PM	23	71	10	27	51	27	23	112	16	15	91	23	489	0	0	0	0	0
5:15 PM	21	54	12	27	56	20	31	136	25	10	114	28	534	0	0	0	0	0
5:30 PM	14	59	7	27	51	38	23	114	13	12	120	37	515	0	0	0	0	0
5:45 PM	21	63	7	17	43	24	30	129	19	11	102	32	498	0	0	0	0	0
VOLUMES	144	452	82	219	373	194	200	957	151	109	846	225	3,952	0	0	0	0	0
APPROACH %	21%	67%	12%	28%	47%	25%	15%	73%	12%	9%	72%	19%						
APP/DEPART	678	/	877	786	/	633	1,308	/	1,258	1,180	/	1,184	0					
BEGIN PEAK HR		5:00 PM																
VOLUMES	79	247	36	98	201	109	107	491	73	48	427	120	2,036					
APPROACH %	22%	68%	10%	24%	49%	27%	16%	73%	11%	8%	72%	20%						
PEAK HR FACTOR		0.870			0.879			0.874			0.880		0.953					
APP/DEPART	362	/	474	408	/	322	671	/	625	595	/	615	0					

Medical Center

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	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	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	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	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 2/6/19 WEDNESDAY	LOCATION:	San Bernardino	PROJECT #:	SC2069
	NORTH & SOUTH:	Medical Center	LOCATION #:	13
	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 1: PASSENGER VEHICLES

NOTES:

AM PM MD OTHER OTHER

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		NORTHBOUND Medical Center			SOUTHBOUND Medical Center			EASTBOUND Baseline			WESTBOUND Baseline			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	2	0	1	1	1	1	2	0	1	2	1	
AM	7:00 AM	5	39	5	22	45	53	36	84	14	12	80	26	421
AM	7:15 AM	6	69	8	30	97	94	58	160	10	11	133	53	729
AM	7:30 AM	11	56	9	42	100	53	56	159	20	12	82	29	629
AM	7:45 AM	11	42	7	28	56	22	21	118	14	6	75	18	418
AM	8:00 AM	12	43	2	20	33	14	17	86	14	7	66	21	335
AM	8:15 AM	15	33	11	20	38	13	18	82	12	3	69	18	332
AM	8:30 AM	19	52	3	28	35	16	16	77	10	12	62	17	347
AM	8:45 AM	17	38	5	23	21	20	17	59	16	11	70	13	310
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	96	372	50	213	425	285	239	825	110	74	637	195	3,521
AM	APPROACH %	19%	72%	10%	23%	46%	31%	20%	70%	9%	8%	70%	22%	
AM	APP/DEPART	518	/	806	923	/	609	1,174	/	1,088	906	/	1,018	0
AM	BEGIN PEAK HR		7:00 AM											
AM	VOLUMES	33	206	29	122	298	222	171	521	58	41	370	126	2,197
AM	APPROACH %	12%	77%	11%	19%	46%	35%	23%	69%	8%	8%	69%	23%	
AM	PEAK HR FACTOR		0.807			0.726			0.798			0.681		0.753
AM	APP/DEPART	268	/	503	642	/	397	750	/	672	537	/	625	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	11	43	15	17	44	15	27	96	24	14	92	21	419
PM	4:15 PM	10	53	6	26	31	18	24	130	12	17	97	31	455
PM	4:30 PM	22	48	14	33	47	30	15	107	23	15	103	23	480
PM	4:45 PM	19	45	11	38	43	19	26	101	15	14	103	25	459
PM	5:00 PM	20	68	9	26	50	24	22	103	15	14	85	22	458
PM	5:15 PM	20	49	12	25	53	18	29	130	22	9	111	27	505
PM	5:30 PM	14	57	7	26	47	37	23	106	13	12	115	37	494
PM	5:45 PM	20	62	7	16	41	24	30	123	19	11	98	32	483
PM	VOLUMES	136	425	81	207	356	185	196	896	143	106	804	218	3,753
PM	APPROACH %	21%	66%	13%	28%	48%	25%	16%	73%	12%	9%	71%	19%	
PM	APP/DEPART	642	/	839	748	/	605	1,235	/	1,184	1,128	/	1,125	0
PM	BEGIN PEAK HR		5:00 PM											
PM	VOLUMES	74	236	35	93	191	103	104	462	69	46	409	118	1,940
PM	APPROACH %	21%	68%	10%	24%	49%	27%	16%	73%	11%	8%	71%	21%	
PM	PEAK HR FACTOR		0.889			0.880			0.877			0.873		0.960
PM	APP/DEPART	345	/	458	387	/	306	635	/	590	573	/	586	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Medical Center

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:				
2/6/19	LOCATION:	San Bernardino	PROJECT #:	SC2069
WEDNESDAY	NORTH & SOUTH:	Medical Center	LOCATION #:	13
	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 2:	NOTES:
2-AXLE WORK VEHICLES/ TRUCKS	

AM PM MD OTHER OTHER

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		NORTHBOUND Medical Center			SOUTHBOUND Medical Center			EASTBOUND Baseline			WESTBOUND Baseline			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	2	0	1	1	1	1	2	0	1	2	1	
AM	7:00 AM	0	1	1	1	0	0	0	5	1	0	0	2	11
	7:15 AM	2	1	0	1	0	3	1	3	2	0	6	1	20
	7:30 AM	0	3	1	1	3	0	0	0	0	0	3	1	12
	7:45 AM	0	2	0	0	1	2	0	4	0	0	4	1	14
	8:00 AM	1	3	0	0	1	0	0	2	1	0	2	2	12
	8:15 AM	1	1	0	1	1	0	0	0	1	0	1	1	7
	8:30 AM	0	1	3	4	3	2	1	4	0	0	4	1	23
	8:45 AM	0	2	2	3	0	0	1	2	0	0	5	0	15
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	4	14	7	11	9	7	3	20	5	0	25	9	114
	APPROACH %	16%	56%	28%	41%	33%	26%	11%	71%	18%	0%	74%	26%	
	APP/DEPART	25	/	26	27	/	14	28	/	38	34	/	36	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	3	9	1	2	5	5	1	9	3	0	15	5	58
	APPROACH %	23%	69%	8%	17%	42%	42%	8%	69%	23%	0%	75%	25%	
	PEAK HR FACTOR		0.813			0.750			0.542			0.714		0.725
	APP/DEPART	13	/	15	12	/	8	13	/	12	20	/	23	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	2	0	0	1	0	0	1	1	0	6	3	14
	4:15 PM	0	5	0	2	1	0	1	4	0	0	4	1	18
	4:30 PM	1	2	0	0	1	0	0	3	1	0	4	0	12
	4:45 PM	1	2	0	0	0	2	0	3	0	0	6	0	14
	5:00 PM	2	1	1	1	0	2	1	7	1	1	4	1	22
	5:15 PM	1	3	0	2	1	1	2	3	3	1	3	0	20
	5:30 PM	0	1	0	1	1	1	0	6	0	0	4	0	14
	5:45 PM	1	0	0	1	0	0	0	5	0	0	4	0	11
	VOLUMES	6	16	1	7	5	6	4	32	6	2	35	5	125
	APPROACH %	26%	70%	4%	39%	28%	33%	10%	76%	14%	5%	83%	12%	
	APP/DEPART	23	/	25	18	/	13	42	/	40	42	/	47	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	4	7	1	4	2	6	3	19	4	2	17	1	70
	APPROACH %	33%	58%	8%	33%	17%	50%	12%	73%	15%	10%	85%	5%	
	PEAK HR FACTOR		0.750			0.750			0.722			0.833		0.795
	APP/DEPART	12	/	11	12	/	8	26	/	24	20	/	27	0

U-TURNS

	NB	SB	EB	WB	TTL
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
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

Medical Center

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Medical Center	LOCATION #:	13
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

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	NORTHBOUND Medical Center			SOUTHBOUND Medical Center			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	1	1	1	2	0	1	2	1						
AM																		
7:00 AM	1	0	0	0	0	0	0	1	0	0	1	0	3	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0
7:30 AM	0	0	0	0	0	1	0	0	0	1	1	0	3	0	0	0	0	0
7:45 AM	0	0	1	0	0	0	1	0	0	1	0	0	3	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	0	0	1	0	3	0	5	0	0	0	0	0
8:15 AM	0	0	0	2	0	0	0	0	0	0	0	1	3	0	0	0	0	0
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	1	2	2	1	1	1	2	1	2	8	1	23	0	0	0	0	0
APPROACH %	25%	25%	50%	50%	25%	25%	25%	50%	25%	18%	73%	9%						
APP/DEPART	4	/	3	4	/	4	4	/	6	11	/	10	0					
BEGIN PEAK HR		7:30 AM																
VOLUMES	0	0	2	2	0	1	1	0	1	2	4	1	14					
APPROACH %	0%	0%	100%	67%	0%	33%	50%	0%	50%	29%	57%	14%						
PEAK HR FACTOR		0.500			0.375			0.500			0.583		0.700					
APP/DEPART	2	/	2	3	/	3	2	/	4	7	/	5	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	1	0	0	0	1	0	0	0	0	2	0	0	0	0	0
4:45 PM	0	1	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
5:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	2	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	1	1	0	1	0	1	0	7	0	0	0	0	11	0	0	0	0	0
APPROACH %	50%	50%	0%	50%	0%	50%	0%	100%	0%	0%	0%	0%						
APP/DEPART	2	/	1	2	/	0	7	/	8	0	/	2	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	0	1	0	0	0	1	0	5	0	0	0	0	7					
APPROACH %	0%	100%	0%	0%	0%	100%	0%	100%	0%	0%	0%	0%						
PEAK HR FACTOR		0.250			0.250			0.625			0.000		0.875					
APP/DEPART	1	/	1	1	/	0	5	/	5	0	/	1	0					

Medical Center

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Medical Center	LOCATION #:	13
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 4:	NOTES:	AM		▲	
4 OR MORE AXLE TRUCKS		PM		N	
		MD	◀ W		E ▶
		OTHER		S	
		OTHER		▼	

	NORTHBOUND Medical Center			SOUTHBOUND Medical Center			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	2	0	1	1	1	1	2	0	1	2	1						
AM																		
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	2	0	0	1	0	3	0	0	0	0	0
7:45 AM	0	0	0	1	0	0	0	2	0	0	0	0	3	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
8:30 AM	0	1	0	0	0	0	0	2	0	0	2	0	5	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	1	0	1	0	0	0	8	0	0	10	0	20	0	0	0	0	0
APPROACH %	0%	100%	0%	100%	0%	0%	0%	100%	0%	0%	100%	0%						
APP/DEPART	1	/	1	1	/	0	8	/	9	10	/	10	0					
BEGIN PEAK HR		7:45 AM																
VOLUMES	0	1	0	1	0	0	0	6	0	0	4	0	12					
APPROACH %	0%	100%	0%	100%	0%	0%	0%	100%	0%	0%	100%	0%						
PEAK HR FACTOR		0.250			0.250			0.750			0.500		0.600					
APP/DEPART	1	/	1	1	/	0	6	/	7	4	/	4	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0
4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	1	0	0	1	0	3	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	1	0	0	0	1	3	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	2	0	0	1	0	0	4	1	0	2	1	11	0	0	0	0	0
APPROACH %	0%	100%	0%	0%	100%	0%	0%	80%	20%	0%	67%	33%						
APP/DEPART	2	/	3	1	/	2	5	/	4	3	/	2	0					
BEGIN PEAK HR		4:30 PM																
VOLUMES	0	2	0	0	1	0	0	2	1	0	2	1	9					
APPROACH %	0%	100%	0%	0%	100%	0%	0%	67%	33%	0%	67%	33%						
PEAK HR FACTOR		0.500			0.250			0.750			0.750		0.750					
APP/DEPART	2	/	3	1	/	2	3	/	2	3	/	2	0					

Medical Center

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Medical Center	LOCATION #:	13
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 5:	NOTES:	AM	▲ N
RV		PM	◀ W E ▶
		MD	
		OTHER	S ▼
		OTHER	

		NORTHBOUND Medical Center			SOUTHBOUND Medical Center			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	1	1	1	2	0	1	2	1						
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	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	0	0	0	0	0
	7:45 AM	0	0	0	0	0	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	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	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	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					
	BEGIN PEAK HR		3:00 PM																
	VOLUMES	0	0	0	0	0	0	0	0	0	0	0	0	0					
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	PEAK HR FACTOR		0.000			0.000			0.000			0.000		0.000					
	APP/DEPART	0	/	0	0	/	0	0	/	0	0	/	0	0					

Medical Center

NORTH SIDE

Baseline WEST SIDE EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC2069
2/6/19	NORTH & SOUTH:	Medical Center	LOCATION #:	13
WEDNESDAY	EAST & WEST:	Baseline	CONTROL:	SIGNAL

CLASS 6: BUSES

NOTES:

AM / PM / MD / OTHER / OTHER

▲ N · ◄ W · E ► · S ▼

		NORTHBOUND Medical Center			SOUTHBOUND Medical Center			EASTBOUND Baseline			WESTBOUND Baseline				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	1	1	1	2	0	1	2	1						
AM	7:00 AM	1	1	0	1	2	3	0	4	0	0	2	0	14	0	0	0	0	0
	7:15 AM	0	2	0	1	1	1	0	3	1	0	2	0	11	0	0	0	0	0
	7:30 AM	0	2	0	1	0	0	0	9	1	0	1	0	14	0	0	0	0	0
	7:45 AM	1	2	0	0	1	0	0	2	0	0	6	0	12	0	0	0	0	0
	8:00 AM	0	1	0	1	1	0	0	6	3	1	7	0	20	0	0	0	0	0
	8:15 AM	0	0	0	0	1	0	0	8	1	0	3	0	13	0	0	0	0	0
	8:30 AM	0	2	0	1	1	0	0	2	0	0	1	0	7	0	0	0	0	0
	8:45 AM	0	1	0	0	0	0	0	4	0	0	1	0	6	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	2	11	0	5	7	4	0	38	6	1	23	0	97	0	0	0	0	0
	APPROACH %	15%	85%	0%	31%	44%	25%	0%	86%	14%	4%	96%	0%						
	APP/DEPART	13	/	11	16	/	14	44	/	43	24	/	29	0					
	BEGIN PEAK HR		7:30 AM																
	VOLUMES	1	5	0	2	3	0	0	25	5	1	17	0	59					
	APPROACH %	17%	83%	0%	40%	60%	0%	0%	83%	17%	6%	94%	0%						
	PEAK HR FACTOR		0.500			0.625			0.750			0.563		0.738					
	APP/DEPART	6	/	5	5	/	9	30	/	27	18	/	18	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	1	0	0	1	0	0	8	0	0	1	0	11	0	0	0	0	0
	4:15 PM	0	1	0	2	1	1	0	5	1	1	1	0	13	0	0	0	0	0
	4:30 PM	0	1	0	1	1	0	0	1	0	0	1	0	5	0	0	0	0	0
	4:45 PM	0	1	0	1	0	0	0	2	0	0	0	1	5	0	0	0	0	0
	5:00 PM	1	1	0	0	1	1	0	0	0	0	1	0	5	0	0	0	0	0
	5:15 PM	0	1	0	0	2	0	0	1	0	0	0	0	4	0	0	0	0	0
	5:30 PM	0	1	0	0	3	0	0	0	0	0	1	0	5	0	0	0	0	0
	5:45 PM	0	1	0	0	2	0	0	1	0	0	0	0	4	0	0	0	0	0
	VOLUMES	1	8	0	4	11	2	0	18	1	1	5	1	52	0	0	0	0	0
	APPROACH %	11%	89%	0%	24%	65%	12%	0%	95%	5%	14%	71%	14%						
	APP/DEPART	9	/	9	17	/	13	19	/	22	7	/	8	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	0	4	0	4	3	1	0	16	1	1	3	1	34					
	APPROACH %	0%	100%	0%	50%	38%	13%	0%	94%	6%	20%	60%	20%						
	PEAK HR FACTOR		1.000			0.500			0.531			0.625		0.654					
	APP/DEPART	4	/	5	8	/	5	17	/	20	5	/	4	0					

Medical Center

NORTH SIDE

Baseline WEST SIDE

EAST SIDE **Baseline**

SOUTH SIDE

Medical Center

APPENDIX B -

EXISTING CONDITIONS (2019) PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	3	33	50	1	157	27	306	30	75	196	86
Future Volume (veh/h)	103	3	33	50	1	157	27	306	30	75	196	86
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1600	1800	1800
Adj Flow Rate, veh/h	145	4	46	62	1	196	32	364	36	80	209	91
Peak Hour Factor	0.71	0.71	0.71	0.80	0.80	0.80	0.84	0.84	0.84	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	235	25	286	170	289	245	110	997	445	352	804	338
Arrive On Green	0.15	0.20	0.20	0.10	0.16	0.16	0.07	0.29	0.29	0.12	0.34	0.34
Sat Flow, veh/h	1619	124	1421	1619	1800	1525	1619	3420	1525	2956	2346	986
Grp Volume(v), veh/h	145	0	50	62	1	196	32	364	36	80	150	150
Grp Sat Flow(s),veh/h/ln	1619	0	1544	1619	1800	1525	1619	1710	1525	1478	1710	1622
Q Serve(g_s), s	5.3	0.0	1.7	2.3	0.0	7.9	1.2	5.4	1.1	1.6	4.0	4.2
Cycle Q Clear(g_c), s	5.3	0.0	1.7	2.3	0.0	7.9	1.2	5.4	1.1	1.6	4.0	4.2
Prop In Lane	1.00		0.92	1.00		1.00	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	235	0	310	170	289	245	110	997	445	352	586	556
V/C Ratio(X)	0.62	0.00	0.16	0.37	0.00	0.80	0.29	0.37	0.08	0.23	0.26	0.27
Avail Cap(c_a), veh/h	268	0	450	255	511	433	255	997	445	466	586	556
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	0.00	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	25.5	0.0	20.9	26.4	22.4	25.7	28.1	17.8	16.3	25.3	15.0	15.1
Incr Delay (d2), s/veh	3.4	0.0	0.2	1.3	0.0	6.0	1.4	1.0	0.4	0.3	1.1	1.2
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	2.2	0.0	0.6	0.9	0.0	3.1	0.5	2.0	0.4	0.5	1.5	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	0.0	21.2	27.8	22.4	31.7	29.6	18.9	16.7	25.6	16.1	16.3
LnGrp LOS	C	A	C	C	C	C	C	B	B	C	B	B
Approach Vol, veh/h		195			259			432			380	
Approach Delay, s/veh		26.9			30.7			19.5			18.2	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.1	23.0	11.1	17.3	8.8	26.2	13.7	14.7				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.0	18.5	10.0	18.5	10.0	18.5	10.5	18.0				
Max Q Clear Time (g_c+I1), s	3.6	7.4	4.3	3.7	3.2	6.2	7.3	9.9				
Green Ext Time (p_c), s	0.1	1.7	0.0	0.2	0.0	1.1	0.1	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			22.5									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	110	164	210	144	24	92	265	108	43	223	73
Future Volume (veh/h)	82	110	164	210	144	24	92	265	108	43	223	73
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		1.00	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	1700	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	105	141	210	253	173	29	116	335	137	48	251	82
Peak Hour Factor	0.78	0.78	0.78	0.83	0.83	0.83	0.79	0.79	0.79	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	208	596	266	438	571	94	214	1574	489	143	946	422
Arrive On Green	0.13	0.17	0.17	0.15	0.19	0.19	0.13	0.32	0.32	0.09	0.28	0.28
Sat Flow, veh/h	1619	3420	1525	2956	2939	484	1619	4914	1525	1619	3420	1525
Grp Volume(v), veh/h	105	141	210	253	99	103	116	335	137	48	251	82
Grp Sat Flow(s),veh/h/ln	1619	1710	1525	1478	1710	1713	1619	1638	1525	1619	1710	1525
Q Serve(g_s), s	4.0	2.4	8.8	5.3	3.3	3.4	4.5	3.3	4.5	1.9	3.8	2.8
Cycle Q Clear(g_c), s	4.0	2.4	8.8	5.3	3.3	3.4	4.5	3.3	4.5	1.9	3.8	2.8
Prop In Lane	1.00		1.00	1.00		0.28	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	596	266	438	332	333	214	1574	489	143	946	422
V/C Ratio(X)	0.51	0.24	0.79	0.58	0.30	0.31	0.54	0.21	0.28	0.34	0.27	0.19
Avail Cap(c_a), veh/h	242	920	410	464	473	474	242	1574	489	242	946	422
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	27.2	23.8	26.5	26.6	23.1	23.1	27.1	16.6	17.0	28.7	18.9	18.5
Incr Delay (d2), s/veh	1.9	0.2	5.6	1.6	0.5	0.5	2.1	0.3	1.4	1.4	0.7	1.0
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	1.5	0.9	3.3	1.8	1.2	1.3	1.7	1.2	1.6	0.7	1.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	24.0	32.1	28.2	23.6	23.6	29.3	16.9	18.4	30.0	19.6	19.5
LnGrp LOS	C	C	C	C	C	C	C	B	B	C	B	B
Approach Vol, veh/h		456			455			588			381	
Approach Delay, s/veh		28.9			26.1			19.7			20.9	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	25.9	14.4	16.2	13.3	23.0	13.1	17.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.5	18.0	10.0	18.5	10.0	18.5
Max Q Clear Time (g_c+I1), s	3.9	6.5	7.3	10.8	6.5	5.8	6.0	5.4
Green Ext Time (p_c), s	0.0	2.0	0.2	0.8	0.1	1.4	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	95	3	179	217	285	0	0	317	280
Future Volume (veh/h)	0	0	0	95	3	179	217	285	0	0	317	280
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1700	1800	1800	1600	1800	0	0	1800	1800
Adj Flow Rate, veh/h				69	0	229	261	343	0	0	498	226
Peak Hour Factor				0.93	0.93	0.93	0.83	0.83	0.83	0.88	0.88	0.88
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				308	0	580	557	2176	0	0	1300	551
Arrive On Green				0.19	0.00	0.19	0.19	0.64	0.00	0.00	0.36	0.36
Sat Flow, veh/h				1619	0	3051	2956	3510	0	0	3600	1525
Grp Volume(v), veh/h				69	0	229	261	343	0	0	498	226
Grp Sat Flow(s),veh/h/ln				1619	0	1525	1478	1710	0	0	1800	1525
Q Serve(g_s), s				1.9	0.0	3.4	4.1	2.1	0.0	0.0	5.3	5.8
Cycle Q Clear(g_c), s				1.9	0.0	3.4	4.1	2.1	0.0	0.0	5.3	5.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				308	0	580	557	2176	0	0	1300	551
V/C Ratio(X)				0.22	0.00	0.39	0.47	0.16	0.00	0.00	0.38	0.41
Avail Cap(c_a), veh/h				562	0	1059	581	2176	0	0	1300	551
HCM Platoon Ratio				1.00	1.00	1.00	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	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				17.8	0.0	18.4	18.7	3.8	0.0	0.0	12.3	12.4
Incr Delay (d2), s/veh				0.4	0.0	0.4	0.6	0.2	0.0	0.0	0.9	2.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.7	0.0	1.1	1.2	0.4	0.0	0.0	1.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				18.1	0.0	18.8	19.4	4.0	0.0	0.0	13.1	14.7
LnGrp LOS				B	A	B	B	A	A	A	B	B
Approach Vol, veh/h					298			604			724	
Approach Delay, s/veh					18.7			10.6			13.6	
Approach LOS					B			B			B	

Timer - Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		37.5			14.3	23.2		14.4
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5
Max Green Setting (Gmax), s		33.0			10.2	18.3		18.0
Max Q Clear Time (g_c+I1), s		4.1			6.1	7.8		5.4
Green Ext Time (p_c), s		2.1			0.3	2.9		0.9

Intersection Summary	
HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	104	114	7	63	73	79	227	4	23	174	217
Future Volume (veh/h)	203	104	114	7	63	73	79	227	4	23	174	217
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		1.00	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	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	225	252	160	9	78	90	94	270	5	27	206	258
Peak Hour Factor	0.69	0.69	0.69	0.81	0.81	0.81	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	261	525	445	37	117	135	371	1202	22	96	511	866
Arrive On Green	0.16	0.29	0.29	0.02	0.15	0.15	0.13	0.35	0.35	0.06	0.28	0.28
Sat Flow, veh/h	1619	1800	1525	1619	762	879	2956	3435	64	1619	1800	3051
Grp Volume(v), veh/h	225	252	160	9	0	168	94	134	141	27	206	258
Grp Sat Flow(s),veh/h/ln	1619	1800	1525	1619	0	1642	1478	1710	1789	1619	1800	1525
Q Serve(g_s), s	8.8	7.5	5.4	0.4	0.0	6.3	1.9	3.6	3.6	1.0	6.0	4.3
Cycle Q Clear(g_c), s	8.8	7.5	5.4	0.4	0.0	6.3	1.9	3.6	3.6	1.0	6.0	4.3
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	261	525	445	37	0	252	371	598	626	96	511	866
V/C Ratio(X)	0.86	0.48	0.36	0.24	0.00	0.67	0.25	0.22	0.22	0.28	0.40	0.30
Avail Cap(c_a), veh/h	261	525	445	248	0	453	454	598	626	248	511	866
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	19.0	18.3	31.3	0.0	26.0	25.7	14.9	14.9	29.3	18.9	18.3
Incr Delay (d2), s/veh	24.4	0.7	0.5	3.3	0.0	3.0	0.4	0.9	0.8	1.6	2.4	0.9
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	5.0	3.0	1.8	0.2	0.0	2.5	0.6	1.4	1.4	0.4	2.6	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.0	19.7	18.8	34.5	0.0	29.0	26.1	15.8	15.8	30.9	21.2	19.1
LnGrp LOS	D	B	B	C	A	C	C	B	B	C	C	B
Approach Vol, veh/h		637			177			369			491	
Approach Delay, s/veh		30.5			29.3			18.4			20.7	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	27.3	6.0	23.5	12.7	23.0	15.0	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.0	18.5	10.0	18.5	10.5	18.0
Max Q Clear Time (g_c+I1), s	3.0	5.6	2.4	9.5	3.9	8.0	10.8	8.3
Green Ext Time (p_c), s	0.0	1.1	0.0	1.3	0.1	1.6	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	24.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	200	85	4	217	86
Future Vol, veh/h	1	200	85	4	217	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	75	75	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	220	113	5	236	93

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	681	116	0	0	118	0
Stage 1	116	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	419	942	-	-	1483	-
Stage 1	914	-	-	-	-	-
Stage 2	573	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	349	942	-	-	1483	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	573	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	5.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	349	942	1483	-
HCM Lane V/C Ratio	-	-	0.003	0.233	0.159	-
HCM Control Delay (s)	-	-	15.3	10	7.9	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0.9	0.6	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	395	109	417	374	52	387
Future Volume (veh/h)	395	109	417	374	52	387
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	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	1800	1800	1700	1800	1700	1800
Adj Flow Rate, veh/h	482	133	485	435	75	561
Peak Hour Factor	0.82	0.82	0.86	0.86	0.69	0.69
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	588	161	527	2092	419	891
Arrive On Green	0.22	0.22	0.33	0.61	0.26	0.26
Sat Flow, veh/h	2742	727	1619	3510	1619	1525
Grp Volume(v), veh/h	310	305	485	435	75	561
Grp Sat Flow(s),veh/h/ln	1710	1669	1619	1710	1619	1525
Q Serve(g_s), s	12.0	12.1	20.1	3.9	2.5	16.8
Cycle Q Clear(g_c), s	12.0	12.1	20.1	3.9	2.5	16.8
Prop In Lane		0.44	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	379	370	527	2092	419	891
V/C Ratio(X)	0.82	0.83	0.92	0.21	0.18	0.63
Avail Cap(c_a), veh/h	443	432	594	2360	419	891
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	25.7	25.8	22.6	6.0	20.0	9.5
Incr Delay (d2), s/veh	10.0	10.9	18.5	0.0	0.2	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	5.5	9.4	1.0	0.9	4.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.8	36.7	41.1	6.1	20.2	10.9
LnGrp LOS	D	D	D	A	C	B
Approach Vol, veh/h	615			920	636	
Approach Delay, s/veh	36.2			24.5	12.0	
Approach LOS	D			C	B	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	22.5	27.1	19.9	47.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	25.5	18.0	48.0
Max Q Clear Time (g_c+I1), s	18.8	22.1	14.1	5.9
Green Ext Time (p_c), s	0.0	0.6	1.3	2.9

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	595	123	166	443	0	52	0	174	0	0	0
Future Vol, veh/h	0	595	123	166	443	0	52	0	174	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	150	-	-	0	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	93	93	93	25	25	25
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	692	143	193	515	0	56	0	187	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	-	0	0	835	0	0	1336	-	346
Stage 1	-	-	-	-	-	-	692	-	-
Stage 2	-	-	-	-	-	-	644	-	-
Critical Hdwy	-	-	-	4.1	-	-	6.8	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	5.8	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.8	-	-
Follow-up Hdwy	-	-	-	2.2	-	-	3.5	-	3.3
Pot Cap-1 Maneuver	0	-	-	807	-	0	147	0	656
Stage 1	0	-	-	-	-	0	463	0	-
Stage 2	0	-	-	-	-	0	490	0	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	807	-	-	112	0	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	112	0	-
Stage 1	-	-	-	-	-	-	352	0	-
Stage 2	-	-	-	-	-	-	490	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	24.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	112	656	-	-	807	-
HCM Lane V/C Ratio	0.499	0.285	-	-	0.239	-
HCM Control Delay (s)	65.6	12.7	-	-	10.9	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	2.3	1.2	-	-	0.9	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	343	110	71	203	51	74	166	138	86	210	45
Future Volume (veh/h)	38	343	110	71	203	51	74	166	138	86	210	45
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	41	369	118	83	236	59	83	187	155	108	262	56
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.89	0.89	0.89	0.80	0.80	0.80
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	525	882	278	440	939	230	440	621	526	502	496	106
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	985	2558	807	826	2723	667	965	1800	1525	944	1437	307
Grp Volume(v), veh/h	41	245	242	83	146	149	83	187	155	108	0	318
Grp Sat Flow(s),veh/h/ln	985	1710	1655	826	1710	1680	965	1800	1525	944	0	1745
Q Serve(g_s), s	0.9	3.2	3.3	2.5	1.8	1.8	2.2	2.2	2.1	2.7	0.0	4.2
Cycle Q Clear(g_c), s	2.7	3.2	3.3	5.7	1.8	1.8	6.4	2.2	2.1	4.9	0.0	4.2
Prop In Lane	1.00		0.49	1.00		0.40	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	525	589	570	440	589	579	440	621	526	502	0	602
V/C Ratio(X)	0.08	0.42	0.42	0.19	0.25	0.26	0.19	0.30	0.29	0.22	0.00	0.53
Avail Cap(c_a), veh/h	797	1062	1027	668	1062	1043	707	1118	947	763	0	1083
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	0.00	1.00
Uniform Delay (d), s/veh	7.8	7.3	7.3	9.5	6.8	6.8	10.2	6.9	6.9	8.7	0.0	7.6
Incr Delay (d2), s/veh	0.1	0.5	0.5	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.0	0.7
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	0.1	0.6	0.6	0.3	0.3	0.3	0.3	0.5	0.4	0.4	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.9	7.7	7.8	9.7	7.0	7.1	10.4	7.2	7.2	9.0	0.0	8.3
LnGrp LOS	A	A	A	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		528			378			425			426	
Approach Delay, s/veh		7.8			7.6			7.8			8.5	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.5		14.5		14.5		14.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		8.4		5.3		6.9		7.7				
Green Ext Time (p_c), s		1.4		2.3		1.8		1.4				
Intersection Summary												
HCM 6th Ctrl Delay			7.9									
HCM 6th LOS			A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	354	193	111	300	54	96	213	133	100	334	144
Future Volume (veh/h)	118	354	193	111	300	54	96	213	133	100	334	144
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	146	437	238	132	357	64	112	248	155	111	371	160
Peak Hour Factor	0.81	0.81	0.81	0.84	0.84	0.84	0.86	0.86	0.86	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	486	770	652	352	1241	220	356	707	426	406	806	342
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	878	1800	1525	694	2902	515	793	2051	1236	893	2338	993
Grp Volume(v), veh/h	146	437	238	132	209	212	112	205	198	111	270	261
Grp Sat Flow(s),veh/h/ln	878	1800	1525	694	1710	1707	793	1710	1577	893	1710	1621
Q Serve(g_s), s	5.2	7.3	4.2	7.0	3.1	3.2	5.1	3.5	3.7	4.2	4.9	5.0
Cycle Q Clear(g_c), s	8.4	7.3	4.2	14.3	3.1	3.2	10.0	3.5	3.7	7.9	4.9	5.0
Prop In Lane	1.00		1.00	1.00		0.30	1.00		0.78	1.00		0.61
Lane Grp Cap(c), veh/h	486	770	652	352	731	730	356	589	544	406	589	559
V/C Ratio(X)	0.30	0.57	0.36	0.38	0.29	0.29	0.31	0.35	0.36	0.27	0.46	0.47
Avail Cap(c_a), veh/h	511	820	695	371	779	778	444	779	719	505	779	739
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	10.1	8.5	7.7	13.9	7.4	7.4	14.0	9.6	9.7	12.7	10.1	10.1
Incr Delay (d2), s/veh	0.3	0.8	0.3	0.7	0.2	0.2	0.5	0.4	0.4	0.4	0.6	0.6
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	0.8	2.1	1.0	0.9	0.9	0.9	0.8	1.0	1.0	0.7	1.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.5	9.4	8.0	14.6	7.6	7.6	14.5	10.0	10.1	13.0	10.6	10.7
LnGrp LOS	B	A	A	B	A	A	B	A	B	B	B	B
Approach Vol, veh/h		821			553			515			642	
Approach Delay, s/veh		9.2			9.3			11.0			11.1	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		18.1		21.4		18.1		21.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		12.0		10.4		9.9		16.3				
Green Ext Time (p_c), s		1.6		2.7		2.4		0.6				

Intersection Summary		
HCM 6th Ctrl Delay		10.1
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	74	99	75	37	94	92	466	147	129	803	29
Future Volume (veh/h)	19	74	99	75	37	94	92	466	147	129	803	29
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	25	99	132	107	53	134	118	597	188	139	863	31
Peak Hour Factor	0.75	0.75	0.75	0.70	0.70	0.70	0.78	0.78	0.78	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	95	171	204	198	87	161	251	885	278	265	1193	43
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.16	0.35	0.35	0.16	0.35	0.35
Sat Flow, veh/h	87	722	862	448	365	681	1619	2560	805	1619	3367	121
Grp Volume(v), veh/h	256	0	0	294	0	0	118	398	387	139	438	456
Grp Sat Flow(s),veh/h/ln	1671	0	0	1494	0	0	1619	1710	1655	1619	1710	1778
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	3.5	10.6	10.6	4.2	11.8	11.8
Cycle Q Clear(g_c), s	7.3	0.0	0.0	9.7	0.0	0.0	3.5	10.6	10.6	4.2	11.8	11.8
Prop In Lane	0.10		0.52	0.36		0.46	1.00		0.49	1.00		0.07
Lane Grp Cap(c), veh/h	470	0	0	446	0	0	251	591	572	265	606	630
V/C Ratio(X)	0.54	0.00	0.00	0.66	0.00	0.00	0.47	0.67	0.68	0.52	0.72	0.72
Avail Cap(c_a), veh/h	629	0	0	585	0	0	307	591	572	307	606	630
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	0.0	19.0	0.0	0.0	20.5	14.9	14.9	20.4	14.9	14.9
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.7	0.0	0.0	1.4	6.0	6.3	1.6	7.3	7.1
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	2.7	0.0	0.0	3.2	0.0	0.0	1.3	4.4	4.3	1.5	5.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.3	0.0	0.0	20.7	0.0	0.0	21.9	20.9	21.2	22.0	22.2	22.0
LnGrp LOS	B	A	A	C	A	A	C	C	C	C	C	C
Approach Vol, veh/h		256			294			903			1033	
Approach Delay, s/veh		19.3			20.7			21.1			22.1	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.2	22.9		17.1	12.8	23.4		17.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.1	18.4		18.0	10.1	18.4		18.0				
Max Q Clear Time (g_c+I1), s	6.2	12.6		9.3	5.5	13.8		11.7				
Green Ext Time (p_c), s	0.1	2.4		1.0	0.1	2.2		1.0				

Intersection Summary		
HCM 6th Ctrl Delay		21.3
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	218	270	123	204	252	224	441	144	104	443	25
Future Volume (veh/h)	31	218	270	123	204	252	224	441	144	104	443	25
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	37	260	321	176	291	360	246	485	158	125	534	30
Peak Hour Factor	0.84	0.84	0.84	0.70	0.70	0.70	0.91	0.91	0.91	0.83	0.83	0.83
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	117	406	362	217	538	456	285	644	208	205	673	38
Arrive On Green	0.07	0.24	0.24	0.13	0.30	0.30	0.18	0.25	0.25	0.13	0.20	0.20
Sat Flow, veh/h	1619	1710	1525	1619	1800	1525	1619	2540	822	1619	3292	185
Grp Volume(v), veh/h	37	260	321	176	291	360	246	326	317	125	277	287
Grp Sat Flow(s),veh/h/ln	1619	1710	1525	1619	1800	1525	1619	1710	1652	1619	1710	1767
Q Serve(g_s), s	1.6	9.9	14.7	7.7	9.8	15.7	10.7	12.7	12.9	5.3	11.1	11.2
Cycle Q Clear(g_c), s	1.6	9.9	14.7	7.7	9.8	15.7	10.7	12.7	12.9	5.3	11.1	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.50	1.00		0.10
Lane Grp Cap(c), veh/h	117	406	362	217	538	456	285	433	419	205	350	361
V/C Ratio(X)	0.32	0.64	0.89	0.81	0.54	0.79	0.86	0.75	0.76	0.61	0.79	0.79
Avail Cap(c_a), veh/h	223	425	379	235	538	456	324	550	531	228	448	463
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	31.9	24.9	26.7	30.5	21.3	23.3	29.0	24.9	25.0	29.9	27.4	27.4
Incr Delay (d2), s/veh	1.5	3.0	21.0	17.9	1.1	9.1	19.1	4.3	4.8	3.9	7.3	7.2
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	0.6	4.0	6.9	3.8	3.8	6.1	5.5	5.4	5.3	2.2	5.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	27.9	47.7	48.4	22.4	32.4	48.1	29.3	29.8	33.8	34.6	34.6
LnGrp LOS	C	C	D	D	C	C	D	C	C	C	C	C
Approach Vol, veh/h		618			827			889			689	
Approach Delay, s/veh		38.5			32.3			34.6			34.5	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	22.9	14.2	21.7	17.2	19.3	9.8	26.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.2	23.3	10.5	18.0	14.5	19.0	10.0	18.5
Max Q Clear Time (g_c+I1), s	7.3	14.9	9.7	16.7	12.7	13.2	3.6	17.7
Green Ext Time (p_c), s	0.1	2.6	0.0	0.5	0.1	1.6	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	34.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	6	44	43	4	144	47	261	79	135	412	141
Future Volume (veh/h)	77	6	44	43	4	144	47	261	79	135	412	141
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1600	1800	1800
Adj Flow Rate, veh/h	97	8	56	55	5	185	53	293	89	144	438	150
Peak Hour Factor	0.79	0.79	0.79	0.78	0.78	0.78	0.89	0.89	0.89	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	207	36	252	157	279	236	154	1005	448	424	858	291
Arrive On Green	0.13	0.19	0.19	0.10	0.15	0.15	0.10	0.29	0.29	0.14	0.34	0.34
Sat Flow, veh/h	1619	194	1361	1619	1800	1525	1619	3420	1525	2956	2506	851
Grp Volume(v), veh/h	97	0	64	55	5	185	53	293	89	144	298	290
Grp Sat Flow(s),veh/h/ln	1619	0	1555	1619	1800	1525	1619	1710	1525	1478	1710	1647
Q Serve(g_s), s	3.6	0.0	2.2	2.0	0.2	7.5	2.0	4.3	2.8	2.8	8.9	9.1
Cycle Q Clear(g_c), s	3.6	0.0	2.2	2.0	0.2	7.5	2.0	4.3	2.8	2.8	8.9	9.1
Prop In Lane	1.00		0.88	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	207	0	289	157	279	236	154	1005	448	424	585	564
V/C Ratio(X)	0.47	0.00	0.22	0.35	0.02	0.78	0.34	0.29	0.20	0.34	0.51	0.52
Avail Cap(c_a), veh/h	254	0	438	252	504	427	252	1005	448	460	585	564
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	0.00	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	26.0	0.0	22.3	27.1	23.0	26.1	27.2	17.5	17.0	24.8	16.8	16.9
Incr Delay (d2), s/veh	1.6	0.0	0.4	1.3	0.0	5.6	1.3	0.7	1.0	0.5	3.1	3.3
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	1.4	0.0	0.8	0.8	0.1	2.9	0.8	1.6	1.0	0.9	3.4	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	0.0	22.6	28.5	23.1	31.8	28.5	18.3	18.0	25.3	20.0	20.2
LnGrp LOS	C	A	C	C	C	C	C	B	B	C	B	C
Approach Vol, veh/h		161			245			435			732	
Approach Delay, s/veh		25.7			30.9			19.5			21.1	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	23.4	10.8	16.4	10.6	26.5	12.7	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.9	10.0	18.1	10.0	18.9	10.1	18.0
Max Q Clear Time (g_c+I1), s	4.8	6.3	4.0	4.2	4.0	11.1	5.6	9.5
Green Ext Time (p_c), s	0.2	1.6	0.0	0.2	0.0	2.0	0.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	22.6
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	229	148	241	255	62	157	305	176	62	286	98
Future Volume (veh/h)	79	229	148	241	255	62	157	305	176	62	286	98
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		1.00	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	1700	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	84	244	157	277	293	71	165	321	185	68	314	108
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.95	0.95	0.95	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	194	522	233	448	506	121	235	1537	477	175	944	421
Arrive On Green	0.12	0.15	0.15	0.15	0.18	0.18	0.15	0.31	0.31	0.11	0.28	0.28
Sat Flow, veh/h	1619	3420	1525	2956	2739	653	1619	4914	1525	1619	3420	1525
Grp Volume(v), veh/h	84	244	157	277	181	183	165	321	185	68	314	108
Grp Sat Flow(s),veh/h/ln	1619	1710	1525	1478	1710	1682	1619	1638	1525	1619	1710	1525
Q Serve(g_s), s	3.2	4.3	6.4	5.7	6.3	6.5	6.4	3.1	6.2	2.6	4.8	3.6
Cycle Q Clear(g_c), s	3.2	4.3	6.4	5.7	6.3	6.5	6.4	3.1	6.2	2.6	4.8	3.6
Prop In Lane	1.00		1.00	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	194	522	233	448	316	311	235	1537	477	175	944	421
V/C Ratio(X)	0.43	0.47	0.67	0.62	0.57	0.59	0.70	0.21	0.39	0.39	0.33	0.26
Avail Cap(c_a), veh/h	247	939	419	451	470	462	269	1537	477	247	944	421
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	26.8	25.3	26.2	26.0	24.4	24.4	26.7	16.6	17.6	27.2	18.9	18.5
Incr Delay (d2), s/veh	1.5	0.7	3.4	2.5	1.6	1.8	6.8	0.3	2.4	1.4	0.9	1.5
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	1.2	1.6	2.3	2.0	2.4	2.5	2.7	1.1	2.2	1.0	1.8	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.3	26.0	29.6	28.6	26.0	26.2	33.5	16.9	20.0	28.6	19.9	19.9
LnGrp LOS	C	C	C	C	C	C	C	B	B	C	B	B
Approach Vol, veh/h		485			641			671			490	
Approach Delay, s/veh		27.6			27.2			21.8			21.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	25.0	14.4	14.5	14.0	22.6	12.3	16.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	19.0	10.0	18.0	10.9	18.1	10.0	18.0
Max Q Clear Time (g_c+I1), s	4.6	8.2	7.7	8.4	8.4	6.8	5.2	8.5
Green Ext Time (p_c), s	0.0	1.9	0.2	1.3	0.1	1.7	0.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
3: State St & I-210 WB Ramp

02/16/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	107	17	276	166	362	0	0	299	376
Future Volume (veh/h)	0	0	0	107	17	276	166	362	0	0	299	376
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1700	1800	1800	1600	1800	0	0	1800	1800
Adj Flow Rate, veh/h				88	0	363	180	393	0	0	352	442
Peak Hour Factor				0.88	0.88	0.88	0.92	0.92	0.92	0.85	0.85	0.85
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				311	0	586	526	2171	0	0	666	1129
Arrive On Green				0.19	0.00	0.19	0.18	0.63	0.00	0.00	0.37	0.37
Sat Flow, veh/h				1619	0	3051	2956	3510	0	0	1800	3051
Grp Volume(v), veh/h				88	0	363	180	393	0	0	352	442
Grp Sat Flow(s),veh/h/ln				1619	0	1525	1478	1710	0	0	1800	1525
Q Serve(g_s), s				2.4	0.0	5.7	2.8	2.5	0.0	0.0	8.0	5.5
Cycle Q Clear(g_c), s				2.4	0.0	5.7	2.8	2.5	0.0	0.0	8.0	5.5
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				311	0	586	526	2171	0	0	666	1129
V/C Ratio(X)				0.28	0.00	0.62	0.34	0.18	0.00	0.00	0.53	0.39
Avail Cap(c_a), veh/h				561	0	1056	569	2171	0	0	666	1129
HCM Platoon Ratio				1.00	1.00	1.00	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	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				17.9	0.0	19.3	18.7	3.9	0.0	0.0	12.8	12.1
Incr Delay (d2), s/veh				0.5	0.0	1.1	0.4	0.2	0.0	0.0	3.0	1.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.9	0.0	1.9	0.8	0.5	0.0	0.0	3.1	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				18.4	0.0	20.3	19.1	4.1	0.0	0.0	15.8	13.1
LnGrp LOS				B	A	C	B	A	A	A	B	B
Approach Vol, veh/h					451			573			794	
Approach Delay, s/veh					20.0			8.8			14.3	
Approach LOS					B			A			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		37.5			13.8	23.7		14.5				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		33.0			10.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s		4.5			4.8	10.0		7.7				
Green Ext Time (p_c), s		2.5			0.2	2.6		1.3				
Intersection Summary												
HCM 6th Ctrl Delay			14.0									
HCM 6th LOS			B									
Notes												

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	302	154	202	9	66	79	68	151	14	28	163	214
Future Volume (veh/h)	302	154	202	9	66	79	68	151	14	28	163	214
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		1.00	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	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	281	311	221	12	87	104	72	161	15	36	209	274
Peak Hour Factor	0.84	0.84	0.84	0.76	0.76	0.76	0.94	0.94	0.94	0.78	0.78	0.78
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	324	578	490	48	113	135	325	978	90	118	489	829
Arrive On Green	0.20	0.32	0.32	0.03	0.15	0.15	0.11	0.31	0.31	0.07	0.27	0.27
Sat Flow, veh/h	1619	1800	1525	1619	747	893	2956	3166	292	1619	1800	3051
Grp Volume(v), veh/h	281	311	221	12	0	191	72	86	90	36	209	274
Grp Sat Flow(s),veh/h/ln	1619	1800	1525	1619	0	1639	1478	1710	1747	1619	1800	1525
Q Serve(g_s), s	11.3	9.5	7.7	0.5	0.0	7.5	1.5	2.5	2.5	1.4	6.4	4.8
Cycle Q Clear(g_c), s	11.3	9.5	7.7	0.5	0.0	7.5	1.5	2.5	2.5	1.4	6.4	4.8
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	324	578	490	48	0	248	325	528	540	118	489	829
V/C Ratio(X)	0.87	0.54	0.45	0.25	0.00	0.77	0.22	0.16	0.17	0.31	0.43	0.33
Avail Cap(c_a), veh/h	378	634	537	241	0	438	439	528	540	241	489	829
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	18.8	18.1	31.9	0.0	27.5	27.3	16.9	16.9	29.6	20.2	19.6
Incr Delay (d2), s/veh	17.1	0.8	0.7	2.6	0.0	5.0	0.3	0.7	0.7	1.4	2.7	1.1
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	5.6	3.8	2.6	0.2	0.0	3.2	0.5	1.0	1.0	0.6	2.8	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.2	19.5	18.8	34.6	0.0	32.5	27.7	17.6	17.6	31.0	22.9	20.7
LnGrp LOS	D	B	B	C	A	C	C	B	B	C	C	C
Approach Vol, veh/h		813			203			248			519	
Approach Delay, s/veh		27.5			32.6			20.5			22.3	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.4	25.3	6.5	26.1	11.9	22.8	18.0	14.7				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.0	18.3	10.0	23.7	10.0	18.3	15.7	18.0				
Max Q Clear Time (g_c+I1), s	3.4	4.5	2.5	11.5	3.5	8.4	13.3	9.5				
Green Ext Time (p_c), s	0.0	0.7	0.0	2.1	0.1	1.6	0.2	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			25.6									
HCM 6th LOS			C									

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	169	56	5	245	111
Future Vol, veh/h	8	169	56	5	245	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	71	71	99	99
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	188	79	7	247	112

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	689	83	0	0	86	0
Stage 1	83	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	415	982	-	-	1523	-
Stage 1	945	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	343	982	-	-	1523	-
Mov Cap-2 Maneuver	343	-	-	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	548	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	5.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	343	982	1523	-
HCM Lane V/C Ratio	-	-	0.026	0.191	0.162	-
HCM Control Delay (s)	-	-	15.8	9.5	7.8	0
HCM Lane LOS	-	-	C	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.7	0.6	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	560	16	130	547	27	180
Future Volume (veh/h)	560	16	130	547	27	180
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	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	1800	1800	1700	1800	1700	1800
Adj Flow Rate, veh/h	636	18	140	588	39	261
Peak Hour Factor	0.88	0.88	0.93	0.93	0.69	0.69
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	843	24	263	1688	551	766
Arrive On Green	0.25	0.25	0.16	0.49	0.34	0.34
Sat Flow, veh/h	3487	96	1619	3510	1619	1525
Grp Volume(v), veh/h	320	334	140	588	39	261
Grp Sat Flow(s),veh/h/ln	1710	1783	1619	1710	1619	1525
Q Serve(g_s), s	9.4	9.4	4.3	5.7	0.9	5.6
Cycle Q Clear(g_c), s	9.4	9.4	4.3	5.7	0.9	5.6
Prop In Lane		0.05	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	424	442	263	1688	551	766
V/C Ratio(X)	0.75	0.76	0.53	0.35	0.07	0.34
Avail Cap(c_a), veh/h	569	593	302	2061	551	766
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	18.8	18.8	20.8	8.4	12.1	8.1
Incr Delay (d2), s/veh	4.0	3.8	1.7	0.1	0.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	3.7	1.5	1.6	0.3	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.8	22.6	22.5	8.5	12.3	9.3
LnGrp LOS	C	C	C	A	B	A
Approach Vol, veh/h	654			728	300	
Approach Delay, s/veh	22.7			11.2	9.7	
Approach LOS	C			B	A	

Timer - Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		22.9	13.3	17.9				31.2
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5
Max Green Setting (Gmax), s		18.4	10.1	18.0				32.6
Max Q Clear Time (g_c+I1), s		7.6	6.3	11.4				7.7
Green Ext Time (p_c), s		0.7	0.1	2.0				3.8

Intersection Summary		
HCM 6th Ctrl Delay		15.4
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	17.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	724	112	196	712	0	90	0	222	0	0	0
Future Vol, veh/h	0	724	112	196	712	0	90	0	222	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	150	-	-	0	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	92	92	92	89	89	89	25	25	25
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	762	118	213	774	0	101	0	249	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	-	0	0	880	0	0	1575	-	381
Stage 1	-	-	-	-	-	-	762	-	-
Stage 2	-	-	-	-	-	-	813	-	-
Critical Hdwy	-	-	-	4.1	-	-	6.8	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	5.8	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.8	-	-
Follow-up Hdwy	-	-	-	2.2	-	-	3.5	-	3.3
Pot Cap-1 Maneuver	0	-	-	777	-	0	103	0	623
Stage 1	0	-	-	-	-	0	427	0	-
Stage 2	0	-	-	-	-	0	402	0	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	777	-	-	~ 75	0	623
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 75	0	-
Stage 1	-	-	-	-	-	-	310	0	-
Stage 2	-	-	-	-	-	-	402	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	102.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	75	623	-	-	777	-
HCM Lane V/C Ratio	1.348	0.4	-	-	0.274	-
HCM Control Delay (s)	$ 319.2	14.6	-	-	11.4	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	8	1.9	-	-	1.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	249	108	134	376	91	139	213	104	89	215	35
Future Volume (veh/h)	32	249	108	134	376	91	139	213	104	89	215	35
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	40	307	133	138	388	94	148	227	111	105	253	41
Peak Hour Factor	0.81	0.81	0.81	0.97	0.97	0.97	0.94	0.94	0.94	0.85	0.85	0.85
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	431	851	361	446	996	239	451	657	557	476	552	89
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	830	2340	992	863	2736	656	986	1800	1525	947	1511	245
Grp Volume(v), veh/h	40	223	217	138	241	241	148	227	111	105	0	294
Grp Sat Flow(s),veh/h/ln	830	1710	1622	863	1710	1682	986	1800	1525	947	0	1756
Q Serve(g_s), s	1.2	3.2	3.3	4.6	3.5	3.5	4.5	3.0	1.7	3.0	0.0	4.2
Cycle Q Clear(g_c), s	4.8	3.2	3.3	7.9	3.5	3.5	8.7	3.0	1.7	6.0	0.0	4.2
Prop In Lane	1.00		0.61	1.00		0.39	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	431	622	590	446	622	612	451	657	557	476	0	641
V/C Ratio(X)	0.09	0.36	0.37	0.31	0.39	0.39	0.33	0.35	0.20	0.22	0.00	0.46
Avail Cap(c_a), veh/h	578	927	879	600	927	912	626	976	827	644	0	952
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	0.00	1.00
Uniform Delay (d), s/veh	9.6	7.7	7.8	10.7	7.8	7.8	11.4	7.7	7.2	9.9	0.0	8.0
Incr Delay (d2), s/veh	0.1	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.0	0.5
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	0.1	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.4	0.5	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	8.1	8.1	11.1	8.2	8.3	11.8	8.0	7.4	10.1	0.0	8.6
LnGrp LOS	A	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		480			620			486			399	
Approach Delay, s/veh		8.2			8.9			9.0			9.0	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.6		16.6		16.6		16.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		10.7		6.8		8.0		9.9				
Green Ext Time (p_c), s		1.4		2.0		1.6		2.2				
Intersection Summary												
HCM 6th Ctrl Delay			8.8									
HCM 6th LOS			A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	422	140	131	408	98	163	366	152	119	311	68
Future Volume (veh/h)	78	422	140	131	408	98	163	366	152	119	311	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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	80	431	143	147	458	110	172	385	160	134	349	76
Peak Hour Factor	0.98	0.98	0.98	0.89	0.89	0.89	0.95	0.95	0.95	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	406	759	643	355	1154	275	409	858	352	358	1015	218
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.42	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	767	1800	1525	762	2739	653	875	2366	970	783	2799	602
Grp Volume(v), veh/h	80	431	143	147	285	283	172	277	268	134	212	213
Grp Sat Flow(s),veh/h/ln	767	1800	1525	762	1710	1682	875	1710	1625	783	1710	1692
Q Serve(g_s), s	3.4	7.6	2.5	7.6	4.8	4.9	7.4	5.1	5.2	6.6	3.8	3.8
Cycle Q Clear(g_c), s	8.3	7.6	2.5	15.2	4.8	4.9	11.3	5.1	5.2	11.8	3.8	3.8
Prop In Lane	1.00		1.00	1.00		0.39	1.00		0.60	1.00		0.36
Lane Grp Cap(c), veh/h	406	759	643	355	721	709	409	620	589	358	620	613
V/C Ratio(X)	0.20	0.57	0.22	0.41	0.40	0.40	0.42	0.45	0.45	0.37	0.34	0.35
Avail Cap(c_a), veh/h	414	777	659	363	739	727	470	739	702	412	739	731
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	11.3	9.2	7.7	14.9	8.4	8.4	13.8	10.1	10.1	14.6	9.7	9.7
Incr Delay (d2), s/veh	0.2	0.9	0.2	0.8	0.4	0.4	0.7	0.5	0.5	0.6	0.3	0.3
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	0.5	2.4	0.6	1.2	1.4	1.4	1.2	1.5	1.5	1.0	1.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.5	10.1	7.9	15.7	8.7	8.8	14.5	10.6	10.7	15.3	10.0	10.0
LnGrp LOS	B	B	A	B	A	A	B	B	B	B	A	B
Approach Vol, veh/h		654			715			717			559	
Approach Delay, s/veh		9.8			10.2			11.6			11.3	
Approach LOS		A			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		19.6		22.1		19.6		22.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		13.3		10.3		13.8		17.2				
Green Ext Time (p_c), s		1.8		2.3		1.3		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		10.7
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	31	39	60	40	58	34	797	48	55	515	23
Future Volume (veh/h)	11	31	39	60	40	58	34	797	48	55	515	23
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	16	45	57	67	45	65	36	848	51	58	542	24
Peak Hour Factor	0.69	0.69	0.69	0.89	0.89	0.89	0.94	0.94	0.94	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	108	152	162	193	114	117	129	1287	77	183	1421	63
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.08	0.39	0.39	0.11	0.43	0.43
Sat Flow, veh/h	102	732	779	419	548	561	1619	3277	197	1619	3336	148
Grp Volume(v), veh/h	118	0	0	177	0	0	36	442	457	58	277	289
Grp Sat Flow(s),veh/h/ln	1613	0	0	1528	0	0	1619	1710	1765	1619	1710	1773
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	1.0	10.0	10.0	1.6	5.2	5.3
Cycle Q Clear(g_c), s	2.9	0.0	0.0	4.6	0.0	0.0	1.0	10.0	10.0	1.6	5.2	5.3
Prop In Lane	0.14		0.48	0.38		0.37	1.00		0.11	1.00		0.08
Lane Grp Cap(c), veh/h	422	0	0	423	0	0	129	672	693	183	728	755
V/C Ratio(X)	0.28	0.00	0.00	0.42	0.00	0.00	0.28	0.66	0.66	0.32	0.38	0.38
Avail Cap(c_a), veh/h	695	0	0	677	0	0	344	672	693	344	728	755
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	0.0	16.5	0.0	0.0	20.4	11.7	11.7	19.2	9.3	9.3
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.7	0.0	0.0	1.2	5.0	4.9	1.0	1.5	1.5
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	1.0	0.0	0.0	1.6	0.0	0.0	0.4	3.8	3.9	0.6	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	0.0	0.0	17.2	0.0	0.0	21.6	16.7	16.6	20.2	10.8	10.7
LnGrp LOS	B	A	A	B	A	A	C	B	B	C	B	B
Approach Vol, veh/h		118			177			935			624	
Approach Delay, s/veh		16.3			17.2			16.8			11.6	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	23.0		14.3	8.3	24.6		14.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.0	18.5		18.0	10.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	3.6	12.0		4.9	3.0	7.3		6.6				
Green Ext Time (p_c), s	0.0	2.9		0.4	0.0	2.5		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			15.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	318	185	98	280	106	214	736	168	109	409	29
Future Volume (veh/h)	62	318	185	98	280	106	214	736	168	109	409	29
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	67	342	199	115	329	125	225	775	177	115	431	31
Peak Hour Factor	0.93	0.93	0.93	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	163	424	242	198	402	341	264	859	196	198	873	63
Arrive On Green	0.10	0.20	0.20	0.12	0.22	0.22	0.16	0.31	0.31	0.12	0.27	0.27
Sat Flow, veh/h	1619	2098	1197	1619	1800	1525	1619	2765	631	1619	3236	232
Grp Volume(v), veh/h	67	278	263	115	329	125	225	479	473	115	227	235
Grp Sat Flow(s),veh/h/ln	1619	1710	1585	1619	1800	1525	1619	1710	1686	1619	1710	1758
Q Serve(g_s), s	2.9	11.5	11.8	5.0	12.9	5.1	10.0	19.9	19.9	5.0	8.3	8.4
Cycle Q Clear(g_c), s	2.9	11.5	11.8	5.0	12.9	5.1	10.0	19.9	19.9	5.0	8.3	8.4
Prop In Lane	1.00		0.76	1.00		1.00	1.00		0.37	1.00		0.13
Lane Grp Cap(c), veh/h	163	346	320	198	402	341	264	531	524	198	461	474
V/C Ratio(X)	0.41	0.80	0.82	0.58	0.82	0.37	0.85	0.90	0.90	0.58	0.49	0.50
Avail Cap(c_a), veh/h	218	417	387	218	439	372	330	549	541	221	461	474
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	31.3	28.2	28.3	30.7	27.4	24.3	30.2	24.5	24.5	30.7	22.8	22.8
Incr Delay (d2), s/veh	1.6	9.1	11.4	3.2	10.7	0.7	16.0	17.9	18.1	3.1	0.8	0.8
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	1.1	5.1	5.1	2.0	6.2	1.7	4.9	10.2	10.1	2.0	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	37.3	39.7	33.9	38.1	25.0	46.1	42.4	42.6	33.8	23.6	23.6
LnGrp LOS	C	D	D	C	D	C	D	D	D	C	C	C
Approach Vol, veh/h		608			569			1177			577	
Approach Delay, s/veh		37.8			34.4			43.2			25.7	
Approach LOS		D			C			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	27.5	13.6	19.5	16.6	24.5	12.0	21.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.1	23.8	10.0	18.1	15.1	18.8	10.0	18.1				
Max Q Clear Time (g_c+I1), s	7.0	21.9	7.0	13.8	12.0	10.4	4.9	14.9				
Green Ext Time (p_c), s	0.1	1.1	0.1	1.2	0.2	1.7	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			36.9									
HCM 6th LOS			D									

APPENDIX C -

OPENING YEAR (2022) PHASE 1 CONDITIONS PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	3	36	55	1	172	30	334	33	82	214	94
Future Volume (veh/h)	113	3	36	55	1	172	30	334	33	82	214	94
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1600	1800	1800
Adj Flow Rate, veh/h	119	3	38	58	1	181	32	352	35	86	225	99
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	225	22	279	164	284	241	110	1005	448	365	816	347
Arrive On Green	0.14	0.20	0.20	0.10	0.16	0.16	0.07	0.29	0.29	0.12	0.35	0.35
Sat Flow, veh/h	1619	113	1430	1619	1800	1525	1619	3420	1525	2956	2336	995
Grp Volume(v), veh/h	119	0	41	58	1	181	32	352	35	86	163	161
Grp Sat Flow(s),veh/h/ln	1619	0	1543	1619	1800	1525	1619	1710	1525	1478	1710	1621
Q Serve(g_s), s	4.3	0.0	1.4	2.1	0.0	7.1	1.2	5.1	1.0	1.7	4.3	4.5
Cycle Q Clear(g_c), s	4.3	0.0	1.4	2.1	0.0	7.1	1.2	5.1	1.0	1.7	4.3	4.5
Prop In Lane	1.00		0.93	1.00		1.00	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	225	0	302	164	284	241	110	1005	448	365	597	566
V/C Ratio(X)	0.53	0.00	0.14	0.35	0.00	0.75	0.29	0.35	0.08	0.24	0.27	0.28
Avail Cap(c_a), veh/h	270	0	453	257	515	436	257	1005	448	470	597	566
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	0.00	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	25.2	0.0	20.9	26.4	22.3	25.3	27.9	17.5	16.1	24.9	14.7	14.8
Incr Delay (d2), s/veh	1.9	0.0	0.2	1.3	0.0	4.7	1.4	1.0	0.3	0.3	1.1	1.3
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	1.7	0.0	0.5	0.8	0.0	2.7	0.5	1.9	0.4	0.5	1.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	0.0	21.1	27.7	22.4	30.1	29.3	18.5	16.4	25.2	15.9	16.1
LnGrp LOS	C	A	C	C	C	C	C	B	B	C	B	B
Approach Vol, veh/h		160			240			419			410	
Approach Delay, s/veh		25.6			29.4			19.1			17.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	23.0	10.9	16.8	8.8	26.5	13.3	14.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.0	18.5	10.0	18.5	10.5	18.0
Max Q Clear Time (g_c+I1), s	3.7	7.1	4.1	3.4	3.2	6.5	6.3	9.1
Green Ext Time (p_c), s	0.1	1.7	0.0	0.1	0.0	1.2	0.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	120	179	229	157	26	101	290	118	47	244	80
Future Volume (veh/h)	90	120	179	229	157	26	101	290	118	47	244	80
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		1.00	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	1700	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	95	126	188	241	165	27	106	305	124	49	257	84
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	203	550	245	446	549	88	211	1588	493	146	967	431
Arrive On Green	0.13	0.16	0.16	0.15	0.19	0.19	0.13	0.32	0.32	0.09	0.28	0.28
Sat Flow, veh/h	1619	3420	1525	2956	2950	474	1619	4914	1525	1619	3420	1525
Grp Volume(v), veh/h	95	126	188	241	94	98	106	305	124	49	257	84
Grp Sat Flow(s),veh/h/ln	1619	1710	1525	1478	1710	1715	1619	1638	1525	1619	1710	1525
Q Serve(g_s), s	3.6	2.1	7.7	4.9	3.1	3.2	4.0	2.9	3.9	1.9	3.8	2.7
Cycle Q Clear(g_c), s	3.6	2.1	7.7	4.9	3.1	3.2	4.0	2.9	3.9	1.9	3.8	2.7
Prop In Lane	1.00		1.00	1.00		0.28	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	550	245	446	318	319	211	1588	493	146	967	431
V/C Ratio(X)	0.47	0.23	0.77	0.54	0.30	0.31	0.50	0.19	0.25	0.34	0.27	0.19
Avail Cap(c_a), veh/h	257	941	420	474	473	474	247	1588	493	247	967	431
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	26.6	23.9	26.3	25.7	22.9	23.0	26.5	16.0	16.3	27.9	18.2	17.8
Incr Delay (d2), s/veh	1.7	0.2	5.0	1.1	0.5	0.5	1.8	0.3	1.2	1.3	0.7	1.0
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	1.3	0.8	2.8	1.6	1.2	1.2	1.5	1.0	1.3	0.7	1.4	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	24.1	31.2	26.8	23.5	23.5	28.3	16.3	17.5	29.3	18.9	18.8
LnGrp LOS	C	C	C	C	C	C	C	B	B	C	B	B
Approach Vol, veh/h		409			433			535			390	
Approach Delay, s/veh		28.4			25.3			18.9			20.2	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	25.6	14.4	15.0	13.0	23.0	12.7	16.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.5	18.0	10.0	18.5	10.4	18.1
Max Q Clear Time (g_c+I1), s	3.9	5.9	6.9	9.7	6.0	5.8	5.6	5.2
Green Ext Time (p_c), s	0.0	1.8	0.3	0.8	0.1	1.4	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	23.0
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	104	3	196	237	311	0	0	346	306
Future Volume (veh/h)	0	0	0	104	3	196	237	311	0	0	346	306
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1700	1800	1800	1600	1800	0	0	1800	1800
Adj Flow Rate, veh/h				74	0	246	249	327	0	0	504	229
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				309	0	582	554	2175	0	0	1302	552
Arrive On Green				0.19	0.00	0.19	0.19	0.64	0.00	0.00	0.36	0.36
Sat Flow, veh/h				1619	0	3051	2956	3510	0	0	3600	1525
Grp Volume(v), veh/h				74	0	246	249	327	0	0	504	229
Grp Sat Flow(s),veh/h/ln				1619	0	1525	1478	1710	0	0	1800	1525
Q Serve(g_s), s				2.0	0.0	3.7	3.9	2.0	0.0	0.0	5.4	5.9
Cycle Q Clear(g_c), s				2.0	0.0	3.7	3.9	2.0	0.0	0.0	5.4	5.9
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				309	0	582	554	2175	0	0	1302	552
V/C Ratio(X)				0.24	0.00	0.42	0.45	0.15	0.00	0.00	0.39	0.41
Avail Cap(c_a), veh/h				562	0	1058	570	2175	0	0	1302	552
HCM Platoon Ratio				1.00	1.00	1.00	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	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				17.8	0.0	18.5	18.7	3.8	0.0	0.0	12.3	12.4
Incr Delay (d2), s/veh				0.4	0.0	0.5	0.6	0.1	0.0	0.0	0.9	2.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.7	0.0	1.2	1.2	0.4	0.0	0.0	1.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				18.2	0.0	19.0	19.3	4.0	0.0	0.0	13.2	14.7
LnGrp LOS				B	A	B	B	A	A	A	B	B
Approach Vol, veh/h					320			576			733	
Approach Delay, s/veh					18.8			10.6			13.7	
Approach LOS					B			B			B	

Timer - Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		37.5			14.2	23.3		14.4
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5
Max Green Setting (Gmax), s		33.0			10.0	18.5		18.0
Max Q Clear Time (g_c+I1), s		4.0			5.9	7.9		5.7
Green Ext Time (p_c), s		2.0			0.3	2.9		0.9

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	114	125	8	69	80	86	248	4	25	190	237
Future Volume (veh/h)	222	114	125	8	69	80	86	248	4	25	190	237
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		1.00	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	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	179	201	128	8	73	84	91	261	4	26	199	249
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	242	513	434	34	119	137	370	1227	19	94	519	880
Arrive On Green	0.15	0.28	0.28	0.02	0.16	0.16	0.13	0.36	0.36	0.06	0.29	0.29
Sat Flow, veh/h	1619	1800	1525	1619	763	878	2956	3448	53	1619	1800	3051
Grp Volume(v), veh/h	179	201	128	8	0	157	91	129	136	26	199	249
Grp Sat Flow(s),veh/h/ln	1619	1800	1525	1619	0	1642	1478	1710	1791	1619	1800	1525
Q Serve(g_s), s	6.8	5.8	4.2	0.3	0.0	5.7	1.8	3.4	3.4	1.0	5.7	4.1
Cycle Q Clear(g_c), s	6.8	5.8	4.2	0.3	0.0	5.7	1.8	3.4	3.4	1.0	5.7	4.1
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	242	513	434	34	0	256	370	609	637	94	519	880
V/C Ratio(X)	0.74	0.39	0.29	0.24	0.00	0.61	0.25	0.21	0.21	0.28	0.38	0.28
Avail Cap(c_a), veh/h	265	519	440	253	0	461	461	609	637	253	519	880
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	18.5	17.9	30.9	0.0	25.2	25.3	14.4	14.4	28.9	18.2	17.7
Incr Delay (d2), s/veh	9.6	0.5	0.4	3.6	0.0	2.4	0.3	0.8	0.8	1.6	2.1	0.8
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	3.1	2.3	1.4	0.2	0.0	2.3	0.6	1.3	1.3	0.4	2.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.6	18.9	18.3	34.5	0.0	27.6	25.7	15.2	15.2	30.5	20.4	18.5
LnGrp LOS	D	B	B	C	A	C	C	B	B	C	C	B
Approach Vol, veh/h		508			165			356			474	
Approach Delay, s/veh		24.7			28.0			17.8			19.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	27.3	5.8	22.8	12.5	23.0	14.1	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.0	18.5	10.0	18.5	10.5	18.0
Max Q Clear Time (g_c+I1), s	3.0	5.4	2.3	7.8	3.8	7.7	8.8	7.7
Green Ext Time (p_c), s	0.0	1.1	0.0	1.1	0.1	1.5	0.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	219	93	4	237	94
Future Vol, veh/h	1	219	93	4	237	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	231	98	4	249	99

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	648	51	0	0	102	0
Stage 1	100	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	408	1013	-	-	1503	-
Stage 1	919	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	340	1013	-	-	1503	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	766	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	5.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	340	1013	1503	-
HCM Lane V/C Ratio	-	-	0.003	0.228	0.166	-
HCM Control Delay (s)	-	-	15.6	9.6	7.9	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.9	0.6	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	394	82	393	321	120	33	88	352	165	125	114
Future Volume (veh/h)	97	394	82	393	321	120	33	88	352	165	125	114
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		1.00	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	1700	1800	1900	1900	1800	1800	1900	1900	1900	1700	1900	1800
Adj Flow Rate, veh/h	102	415	86	414	338	126	35	93	371	174	132	120
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	202	540	111	329	609	223	263	793	647	235	410	343
Arrive On Green	0.12	0.19	0.19	0.18	0.25	0.25	0.15	0.22	0.22	0.15	0.22	0.22
Sat Flow, veh/h	1619	2825	581	1810	2451	898	1810	3610	1610	1619	1863	1561
Grp Volume(v), veh/h	102	250	251	414	234	230	35	93	371	174	128	124
Grp Sat Flow(s),veh/h/ln	1619	1710	1695	1810	1710	1638	1810	1805	1610	1619	1805	1619
Q Serve(g_s), s	4.0	9.5	9.7	12.5	8.2	8.4	1.2	1.4	12.3	7.1	4.1	4.5
Cycle Q Clear(g_c), s	4.0	9.5	9.7	12.5	8.2	8.4	1.2	1.4	12.3	7.1	4.1	4.5
Prop In Lane	1.00		0.34	1.00		0.55	1.00		1.00	1.00		0.96
Lane Grp Cap(c), veh/h	202	327	324	329	425	407	263	793	647	235	397	356
V/C Ratio(X)	0.51	0.76	0.77	1.26	0.55	0.57	0.13	0.12	0.57	0.74	0.32	0.35
Avail Cap(c_a), veh/h	268	448	444	329	475	455	474	971	726	424	486	436
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	28.1	26.3	26.4	28.1	22.5	22.6	25.6	21.5	16.0	28.1	22.5	22.7
Incr Delay (d2), s/veh	2.0	5.2	5.8	138.8	1.1	1.3	0.2	0.1	0.9	4.5	0.5	0.6
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	1.6	4.0	4.1	17.6	3.1	3.1	0.5	0.6	4.1	2.8	1.6	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1	31.5	32.2	166.9	23.6	23.9	25.8	21.5	16.9	32.6	23.0	23.3
LnGrp LOS	C	C	C	F	C	C	C	C	B	C	C	C
Approach Vol, veh/h		603			878			499			426	
Approach Delay, s/veh		31.6			91.2			18.4			27.0	
Approach LOS		C			F			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.5	19.6	17.0	17.7	14.5	19.6	13.1	21.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	18.5	12.5	18.0	18.0	18.5	11.4	19.1
Max Q Clear Time (g_c+I1), s	9.1	14.3	14.5	11.7	3.2	6.5	6.0	10.4
Green Ext Time (p_c), s	0.3	0.8	0.0	1.5	0.0	1.0	0.1	1.7

Intersection Summary	
HCM 6th Ctrl Delay	49.8
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	358	180	66	318	155	145	562	70	168	777	102
Future Volume (veh/h)	116	358	180	66	318	155	145	562	70	168	777	102
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	122	377	189	69	335	163	153	592	74	177	818	107
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	203	473	233	167	429	204	212	930	116	216	931	122
Arrive On Green	0.13	0.21	0.21	0.10	0.19	0.19	0.13	0.30	0.30	0.13	0.31	0.31
Sat Flow, veh/h	1619	2218	1095	1619	2246	1071	1619	3060	382	1619	3041	398
Grp Volume(v), veh/h	122	289	277	69	254	244	153	330	336	177	460	465
Grp Sat Flow(s),veh/h/ln	1619	1710	1603	1619	1710	1607	1619	1710	1731	1619	1710	1728
Q Serve(g_s), s	5.2	11.7	12.0	2.9	10.3	10.6	6.6	12.2	12.2	7.8	18.6	18.6
Cycle Q Clear(g_c), s	5.2	11.7	12.0	2.9	10.3	10.6	6.6	12.2	12.2	7.8	18.6	18.6
Prop In Lane	1.00		0.68	1.00		0.67	1.00		0.22	1.00		0.23
Lane Grp Cap(c), veh/h	203	364	342	167	326	307	212	520	526	216	524	529
V/C Ratio(X)	0.60	0.79	0.81	0.41	0.78	0.80	0.72	0.64	0.64	0.82	0.88	0.88
Avail Cap(c_a), veh/h	224	424	397	222	422	396	224	520	526	277	557	563
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	30.2	27.2	27.3	30.7	28.1	28.2	30.5	21.9	21.9	30.8	24.0	24.0
Incr Delay (d2), s/veh	3.7	8.7	10.5	1.6	6.7	8.4	10.3	2.5	2.6	14.1	14.3	14.2
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	2.1	5.3	5.2	1.1	4.5	4.5	3.1	5.0	5.1	3.8	9.1	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	36.0	37.8	32.3	34.8	36.6	40.7	24.5	24.5	44.9	38.3	38.2
LnGrp LOS	C	D	D	C	C	D	D	C	C	D	D	D
Approach Vol, veh/h		688			567			819			1102	
Approach Delay, s/veh		36.3			35.3			27.5			39.3	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.2	26.7	12.0	20.1	14.1	26.9	13.7	18.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	21.4	10.0	18.1	10.1	23.8	10.1	18.0
Max Q Clear Time (g_c+I1), s	9.8	14.2	4.9	14.0	8.6	20.6	7.2	12.6
Green Ext Time (p_c), s	0.1	2.4	0.0	1.3	0.1	1.7	0.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	34.9
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	646	73	49	470	146	46	252	37	149	341	262
Future Volume (veh/h)	191	646	73	49	470	146	46	252	37	149	341	262
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	201	680	77	52	495	154	48	265	39	157	359	276
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	314	977	110	169	771	344	240	896	130	375	538	456
Arrive On Green	0.19	0.32	0.32	0.10	0.23	0.23	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1619	3097	350	1619	3420	1525	720	2996	436	977	1800	1525
Grp Volume(v), veh/h	201	375	382	52	495	154	48	150	154	157	359	276
Grp Sat Flow(s),veh/h/ln	1619	1710	1737	1619	1710	1525	720	1710	1722	977	1800	1525
Q Serve(g_s), s	5.5	9.2	9.3	1.4	6.3	4.2	3.0	3.2	3.3	7.1	8.4	7.4
Cycle Q Clear(g_c), s	5.5	9.2	9.3	1.4	6.3	4.2	11.4	3.2	3.3	10.4	8.4	7.4
Prop In Lane	1.00		0.20	1.00		1.00	1.00		0.25	1.00		1.00
Lane Grp Cap(c), veh/h	314	539	548	169	771	344	240	511	515	375	538	456
V/C Ratio(X)	0.64	0.70	0.70	0.31	0.64	0.45	0.20	0.29	0.30	0.42	0.67	0.61
Avail Cap(c_a), veh/h	354	659	670	337	1283	572	294	641	646	449	675	572
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	17.8	14.4	14.4	19.9	16.8	16.0	19.7	12.9	12.9	16.9	14.7	14.4
Incr Delay (d2), s/veh	3.2	2.4	2.4	1.0	0.9	0.9	0.4	0.3	0.3	0.7	1.8	1.3
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	2.0	3.1	3.2	0.5	2.1	1.3	0.5	1.1	1.1	1.4	3.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	16.8	16.8	20.9	17.7	16.9	20.1	13.2	13.3	17.7	16.5	15.7
LnGrp LOS	C	B	B	C	B	B	C	B	B	B	B	B
Approach Vol, veh/h		958			701			352			792	
Approach Delay, s/veh		17.7			17.8			14.2			16.4	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.8	9.5	19.6		18.8	13.8	15.3				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	10.0	18.5		18.0	10.5	18.0				
Max Q Clear Time (g_c+I1), s		13.4	3.4	11.3		12.4	7.5	8.3				
Green Ext Time (p_c), s		0.8	0.0	2.6		2.0	0.2	2.5				
Intersection Summary												
HCM 6th Ctrl Delay			16.9									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	7	48	47	4	157	51	285	86	148	450	154
Future Volume (veh/h)	84	7	48	47	4	157	51	285	86	148	450	154
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1600	1800	1800
Adj Flow Rate, veh/h	88	7	51	49	4	165	54	300	91	156	474	162
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	200	35	256	147	279	236	156	1008	450	432	864	293
Arrive On Green	0.12	0.19	0.19	0.09	0.15	0.15	0.10	0.29	0.29	0.15	0.34	0.34
Sat Flow, veh/h	1619	188	1366	1619	1800	1525	1619	3420	1525	2956	2506	851
Grp Volume(v), veh/h	88	0	58	49	4	165	54	300	91	156	322	314
Grp Sat Flow(s),veh/h/ln	1619	0	1554	1619	1800	1525	1619	1710	1525	1478	1710	1647
Q Serve(g_s), s	3.2	0.0	2.0	1.8	0.1	6.6	2.0	4.3	2.9	3.0	9.8	9.9
Cycle Q Clear(g_c), s	3.2	0.0	2.0	1.8	0.1	6.6	2.0	4.3	2.9	3.0	9.8	9.9
Prop In Lane	1.00		0.88	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	200	0	291	147	279	236	156	1008	450	432	589	568
V/C Ratio(X)	0.44	0.00	0.20	0.33	0.01	0.70	0.35	0.30	0.20	0.36	0.55	0.55
Avail Cap(c_a), veh/h	255	0	439	253	505	428	253	1008	450	461	589	568
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	0.00	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	26.0	0.0	22.0	27.3	23.0	25.7	27.1	17.5	17.0	24.7	17.0	17.0
Incr Delay (d2), s/veh	1.5	0.0	0.3	1.3	0.0	3.7	1.3	0.8	1.0	0.5	3.6	3.8
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	1.3	0.0	0.7	0.7	0.1	2.5	0.8	1.6	1.1	1.0	3.7	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.6	0.0	22.3	28.6	23.0	29.4	28.4	18.2	18.0	25.2	20.6	20.8
LnGrp LOS	C	A	C	C	C	C	C	B	B	C	C	C
Approach Vol, veh/h		146			218			445			792	
Approach Delay, s/veh		25.5			29.1			19.4			21.6	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	23.4	10.3	16.5	10.7	26.6	12.4	14.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.9	10.0	18.1	10.0	18.9	10.1	18.0
Max Q Clear Time (g_c+I1), s	5.0	6.3	3.8	4.0	4.0	11.9	5.2	8.6
Green Ext Time (p_c), s	0.2	1.6	0.0	0.2	0.0	2.0	0.1	0.3

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	250	162	263	279	68	172	333	192	68	313	107
Future Volume (veh/h)	86	250	162	263	279	68	172	333	192	68	313	107
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		1.00	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	1700	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	91	263	171	277	294	72	181	351	202	72	329	113
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	198	537	240	442	503	121	235	1535	477	179	951	424
Arrive On Green	0.12	0.16	0.16	0.15	0.18	0.18	0.14	0.31	0.31	0.11	0.28	0.28
Sat Flow, veh/h	1619	3420	1525	2956	2733	659	1619	4914	1525	1619	3420	1525
Grp Volume(v), veh/h	91	263	171	277	182	184	181	351	202	72	329	113
Grp Sat Flow(s),veh/h/ln	1619	1710	1525	1478	1710	1681	1619	1638	1525	1619	1710	1525
Q Serve(g_s), s	3.5	4.7	7.1	5.9	6.5	6.7	7.2	3.5	7.0	2.8	5.1	3.8
Cycle Q Clear(g_c), s	3.5	4.7	7.1	5.9	6.5	6.7	7.2	3.5	7.0	2.8	5.1	3.8
Prop In Lane	1.00		1.00	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	537	240	442	315	310	235	1535	477	179	951	424
V/C Ratio(X)	0.46	0.49	0.71	0.63	0.58	0.59	0.77	0.23	0.42	0.40	0.35	0.27
Avail Cap(c_a), veh/h	243	925	413	444	463	455	255	1535	477	243	951	424
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	27.2	25.6	26.6	26.6	24.8	24.9	27.4	16.9	18.1	27.5	19.2	18.7
Incr Delay (d2), s/veh	1.7	0.7	3.9	2.8	1.7	1.8	12.5	0.3	2.7	1.5	1.0	1.5
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	1.3	1.8	2.6	2.0	2.5	2.5	3.3	1.2	2.5	1.1	2.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	26.3	30.5	29.3	26.5	26.7	39.9	17.3	20.9	29.0	20.2	20.3
LnGrp LOS	C	C	C	C	C	C	D	B	C	C	C	C
Approach Vol, veh/h		525			643			734			514	
Approach Delay, s/veh		28.1			27.8			23.8			21.4	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.9	25.3	14.4	15.0	14.1	23.0	12.6	16.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.0	19.0	10.0	18.0	10.5	18.5	10.0	18.0				
Max Q Clear Time (g_c+I1), s	4.8	9.0	7.9	9.1	9.2	7.1	5.5	8.7				
Green Ext Time (p_c), s	0.1	2.1	0.2	1.4	0.1	1.8	0.1	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			25.3									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	117	19	302	181	396	0	0	327	411
Future Volume (veh/h)	0	0	0	117	19	302	181	396	0	0	327	411
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1700	1800	1800	1600	1800	0	0	1800	1800
Adj Flow Rate, veh/h				89	0	368	191	417	0	0	344	433
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				311	0	586	533	2171	0	0	663	1123
Arrive On Green				0.19	0.00	0.19	0.18	0.63	0.00	0.00	0.37	0.37
Sat Flow, veh/h				1619	0	3051	2956	3510	0	0	1800	3051
Grp Volume(v), veh/h				89	0	368	191	417	0	0	344	433
Grp Sat Flow(s),veh/h/ln				1619	0	1525	1478	1710	0	0	1800	1525
Q Serve(g_s), s				2.4	0.0	5.8	2.9	2.6	0.0	0.0	7.8	5.4
Cycle Q Clear(g_c), s				2.4	0.0	5.8	2.9	2.6	0.0	0.0	7.8	5.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				311	0	586	533	2171	0	0	663	1123
V/C Ratio(X)				0.29	0.00	0.63	0.36	0.19	0.00	0.00	0.52	0.39
Avail Cap(c_a), veh/h				561	0	1056	569	2171	0	0	663	1123
HCM Platoon Ratio				1.00	1.00	1.00	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	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				18.0	0.0	19.3	18.7	3.9	0.0	0.0	12.8	12.1
Incr Delay (d2), s/veh				0.5	0.0	1.1	0.4	0.2	0.0	0.0	2.9	1.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.9	0.0	1.9	0.9	0.5	0.0	0.0	3.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				18.5	0.0	20.4	19.1	4.1	0.0	0.0	15.7	13.1
LnGrp LOS				B	A	C	B	A	A	A	B	B
Approach Vol, veh/h					457			608			777	
Approach Delay, s/veh					20.0			8.8			14.3	
Approach LOS					C			A			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		37.5			13.9	23.6		14.5				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		33.0			10.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s		4.6			4.9	9.8		7.8				
Green Ext Time (p_c), s		2.7			0.2	2.5		1.3				
Intersection Summary												
HCM 6th Ctrl Delay			13.9									
HCM 6th LOS			B									

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	168	221	10	72	86	74	165	15	31	178	234
Future Volume (veh/h)	330	168	221	10	72	86	74	165	15	31	178	234
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		1.00	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	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	271	300	214	11	76	91	78	174	16	33	187	246
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	314	567	481	45	111	133	337	1018	93	111	496	840
Arrive On Green	0.19	0.32	0.32	0.03	0.15	0.15	0.11	0.32	0.32	0.07	0.28	0.28
Sat Flow, veh/h	1619	1800	1525	1619	746	893	2956	3170	289	1619	1800	3051
Grp Volume(v), veh/h	271	300	214	11	0	167	78	93	97	33	187	246
Grp Sat Flow(s),veh/h/ln	1619	1800	1525	1619	0	1639	1478	1710	1748	1619	1800	1525
Q Serve(g_s), s	10.9	9.2	7.5	0.4	0.0	6.5	1.6	2.6	2.7	1.3	5.6	4.3
Cycle Q Clear(g_c), s	10.9	9.2	7.5	0.4	0.0	6.5	1.6	2.6	2.7	1.3	5.6	4.3
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	314	567	481	45	0	244	337	549	561	111	496	840
V/C Ratio(X)	0.86	0.53	0.45	0.25	0.00	0.68	0.23	0.17	0.17	0.30	0.38	0.29
Avail Cap(c_a), veh/h	374	630	534	241	0	439	440	549	561	241	496	840
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	18.9	18.3	32.0	0.0	27.1	27.1	16.4	16.4	29.8	19.7	19.2
Incr Delay (d2), s/veh	16.4	0.8	0.6	2.8	0.0	3.4	0.3	0.7	0.7	1.5	2.2	0.9
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	5.4	3.7	2.5	0.2	0.0	2.6	0.5	1.0	1.1	0.5	2.4	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	19.7	19.0	34.8	0.0	30.5	27.4	17.0	17.1	31.2	21.9	20.1
LnGrp LOS	D	B	B	C	A	C	C	B	B	C	C	C
Approach Vol, veh/h		785			178			268			466	
Approach Delay, s/veh		27.4			30.7			20.1			21.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	26.1	6.4	25.7	12.2	23.0	17.5	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.0	23.5	10.0	18.5	15.5	18.0
Max Q Clear Time (g_c+I1), s	3.3	4.7	2.4	11.2	3.6	7.6	12.9	8.5
Green Ext Time (p_c), s	0.0	0.7	0.0	2.0	0.1	1.5	0.2	0.6

Intersection Summary	
HCM 6th Ctrl Delay	25.0
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	185	61	5	268	121
Future Vol, veh/h	9	185	61	5	268	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	195	64	5	282	127

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	695	35	0	0	69	0
Stage 1	67	-	-	-	-	-
Stage 2	628	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	381	1037	-	-	1545	-
Stage 1	954	-	-	-	-	-
Stage 2	500	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	311	1037	-	-	1545	-
Mov Cap-2 Maneuver	311	-	-	-	-	-
Stage 1	779	-	-	-	-	-
Stage 2	500	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	5.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	311	1037	1545	-
HCM Lane V/C Ratio	-	-	0.03	0.188	0.183	-
HCM Control Delay (s)	-	-	16.9	9.3	7.9	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.7	0.7	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	602	11	101	335	252	5	78	67	197	127	100
Future Volume (veh/h)	225	602	11	101	335	252	5	78	67	197	127	100
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		1.00	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	1700	1800	1900	1900	1800	1800	1900	1900	1900	1700	1900	1800
Adj Flow Rate, veh/h	237	634	12	106	353	265	5	82	71	207	134	105
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	272	931	18	214	415	306	24	479	214	387	714	520
Arrive On Green	0.17	0.27	0.27	0.12	0.22	0.22	0.01	0.13	0.13	0.24	0.36	0.36
Sat Flow, veh/h	1619	3433	65	1810	1876	1385	1810	3610	1610	1619	1993	1451
Grp Volume(v), veh/h	237	316	330	106	321	297	5	82	71	207	120	119
Grp Sat Flow(s),veh/h/ln	1619	1710	1788	1810	1710	1551	1810	1805	1610	1619	1805	1639
Q Serve(g_s), s	10.7	12.4	12.4	4.1	13.6	13.9	0.2	1.5	3.0	8.4	3.5	3.8
Cycle Q Clear(g_c), s	10.7	12.4	12.4	4.1	13.6	13.9	0.2	1.5	3.0	8.4	3.5	3.8
Prop In Lane	1.00		0.04	1.00		0.89	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	272	464	485	214	378	343	24	479	214	387	647	587
V/C Ratio(X)	0.87	0.68	0.68	0.50	0.85	0.86	0.21	0.17	0.33	0.54	0.19	0.20
Avail Cap(c_a), veh/h	277	472	494	243	409	371	240	867	387	387	647	587
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	30.5	24.5	24.5	31.1	28.1	28.2	36.8	29.0	29.6	25.0	16.6	16.7
Incr Delay (d2), s/veh	24.2	3.9	3.7	1.8	14.6	17.9	4.3	0.2	0.9	5.2	0.6	0.8
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	5.7	5.1	5.3	1.8	6.7	6.5	0.1	0.7	1.2	3.5	1.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.8	28.4	28.3	32.9	42.8	46.1	41.1	29.2	30.5	30.2	17.2	17.5
LnGrp LOS	D	C	C	C	D	D	D	C	C	C	B	B
Approach Vol, veh/h		883			724			158			446	
Approach Delay, s/veh		35.4			42.7			30.2			23.3	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.5	14.5	13.4	24.9	5.5	31.5	17.2	21.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	18.1	10.1	20.8	10.0	26.1	12.9	18.0
Max Q Clear Time (g_c+I1), s	10.4	5.0	6.1	14.4	2.2	5.8	12.7	15.9
Green Ext Time (p_c), s	0.3	0.5	0.1	2.0	0.0	1.2	0.0	0.8

Intersection Summary			
HCM 6th Ctrl Delay			35.0
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	504	148	82	432	108	115	482	96	107	589	107
Future Volume (veh/h)	132	504	148	82	432	108	115	482	96	107	589	107
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	139	531	156	86	455	114	121	507	101	113	620	113
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	218	625	183	190	602	150	212	723	143	208	727	132
Arrive On Green	0.13	0.24	0.24	0.12	0.22	0.22	0.13	0.25	0.25	0.13	0.25	0.25
Sat Flow, veh/h	1619	2609	763	1619	2714	675	1619	2845	564	1619	2890	526
Grp Volume(v), veh/h	139	347	340	86	285	284	121	304	304	113	366	367
Grp Sat Flow(s),veh/h/ln	1619	1710	1663	1619	1710	1679	1619	1710	1698	1619	1710	1705
Q Serve(g_s), s	5.6	13.4	13.5	3.4	10.8	10.9	4.8	11.1	11.2	4.5	14.1	14.1
Cycle Q Clear(g_c), s	5.6	13.4	13.5	3.4	10.8	10.9	4.8	11.1	11.2	4.5	14.1	14.1
Prop In Lane	1.00		0.46	1.00		0.40	1.00		0.33	1.00		0.31
Lane Grp Cap(c), veh/h	218	410	398	190	379	372	212	435	432	208	430	429
V/C Ratio(X)	0.64	0.85	0.85	0.45	0.75	0.76	0.57	0.70	0.70	0.54	0.85	0.85
Avail Cap(c_a), veh/h	237	449	436	235	446	438	235	469	465	235	469	467
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	28.2	25.0	25.1	28.4	25.1	25.1	28.2	23.3	23.4	28.2	24.6	24.6
Incr Delay (d2), s/veh	4.9	13.2	14.1	1.7	6.0	6.5	2.7	4.2	4.4	2.2	13.2	13.5
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	2.3	6.4	6.4	1.3	4.6	4.6	2.0	4.7	4.8	1.8	6.9	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.2	38.3	39.2	30.1	31.1	31.7	30.9	27.5	27.8	30.4	37.7	38.1
LnGrp LOS	C	D	D	C	C	C	C	C	C	C	D	D
Approach Vol, veh/h		826			655			729			846	
Approach Delay, s/veh		37.8			31.2			28.2			36.9	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	22.0	12.6	21.0	13.5	21.9	13.8	19.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.9	10.0	18.1	10.0	18.9	10.1	18.0
Max Q Clear Time (g_c+I1), s	6.5	13.2	5.4	15.5	6.8	16.1	7.6	12.9
Green Ext Time (p_c), s	0.1	1.8	0.1	1.0	0.1	1.2	0.1	1.5

Intersection Summary	
HCM 6th Ctrl Delay	33.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	559	82	54	480	134	90	282	40	110	229	123
Future Volume (veh/h)	119	559	82	54	480	134	90	282	40	110	229	123
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	125	588	86	57	505	141	95	297	42	116	241	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	287	897	131	184	808	360	320	849	119	354	507	430
Arrive On Green	0.18	0.30	0.30	0.11	0.24	0.24	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1619	2994	437	1619	3420	1525	920	3012	422	947	1800	1525
Grp Volume(v), veh/h	125	335	339	57	505	141	95	167	172	116	241	129
Grp Sat Flow(s),veh/h/ln	1619	1710	1721	1619	1710	1525	920	1710	1724	947	1800	1525
Q Serve(g_s), s	3.1	7.6	7.6	1.4	5.9	3.4	4.2	3.5	3.5	4.9	4.9	2.9
Cycle Q Clear(g_c), s	3.1	7.6	7.6	1.4	5.9	3.4	9.1	3.5	3.5	8.5	4.9	2.9
Prop In Lane	1.00		0.25	1.00		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	287	512	516	184	808	360	320	482	486	354	507	430
V/C Ratio(X)	0.44	0.65	0.66	0.31	0.63	0.39	0.30	0.35	0.35	0.33	0.48	0.30
Avail Cap(c_a), veh/h	384	714	719	365	1389	620	434	695	700	472	731	620
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	16.3	13.5	13.5	18.0	15.2	14.2	17.0	12.7	12.7	16.1	13.2	12.5
Incr Delay (d2), s/veh	1.0	1.4	1.4	0.9	0.8	0.7	0.5	0.4	0.4	0.5	0.7	0.4
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	1.0	2.4	2.4	0.5	1.9	1.0	0.8	1.1	1.2	0.9	1.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	14.9	15.0	19.0	16.0	14.9	17.5	13.1	13.1	16.6	13.9	12.9
LnGrp LOS	B	B	B	B	B	B	B	B	B	B	B	B
Approach Vol, veh/h		799			703			434			486	
Approach Delay, s/veh		15.3			16.0			14.1			14.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		17.0	9.5	17.8		17.0	12.4	15.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	10.0	18.5		18.0	10.5	18.0				
Max Q Clear Time (g_c+I1), s		11.1	3.4	9.6		10.5	5.1	7.9				
Green Ext Time (p_c), s		1.3	0.0	2.6		1.5	0.1	2.6				
Intersection Summary												
HCM 6th Ctrl Delay			15.1									
HCM 6th LOS			B									

APPENDIX D -

OPENING YEAR (2022) PHASE 1 WITH DIVERTED TRIPS PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	358	180	180	318	155	145	562	70	168	777	102
Future Volume (veh/h)	116	358	180	180	318	155	145	562	70	168	777	102
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	122	377	189	189	335	163	153	592	74	177	818	107
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	241	448	221	224	429	205	195	936	117	212	962	126
Arrive On Green	0.15	0.20	0.20	0.14	0.19	0.19	0.12	0.31	0.31	0.13	0.32	0.32
Sat Flow, veh/h	1619	2218	1095	1619	2246	1071	1619	3060	382	1619	3041	398
Grp Volume(v), veh/h	122	289	277	189	254	244	153	330	336	177	460	465
Grp Sat Flow(s),veh/h/ln	1619	1710	1603	1619	1710	1607	1619	1710	1731	1619	1710	1728
Q Serve(g_s), s	5.6	13.1	13.4	9.2	11.3	11.7	7.4	13.4	13.4	8.6	20.3	20.3
Cycle Q Clear(g_c), s	5.6	13.1	13.4	9.2	11.3	11.7	7.4	13.4	13.4	8.6	20.3	20.3
Prop In Lane	1.00		0.68	1.00		0.67	1.00		0.22	1.00		0.23
Lane Grp Cap(c), veh/h	241	345	324	224	327	307	195	523	529	212	541	547
V/C Ratio(X)	0.51	0.84	0.85	0.85	0.78	0.80	0.79	0.63	0.63	0.84	0.85	0.85
Avail Cap(c_a), veh/h	241	382	358	272	450	423	231	569	576	276	616	623
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	31.5	30.9	31.0	33.9	30.9	31.1	34.4	24.0	24.1	34.2	25.7	25.7
Incr Delay (d2), s/veh	1.7	14.0	16.7	18.3	5.7	7.2	14.0	2.0	2.0	15.8	9.9	9.9
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	2.2	6.4	6.4	4.5	4.9	4.9	3.6	5.5	5.6	4.2	9.3	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.2	44.9	47.7	52.1	36.6	38.3	48.4	26.0	26.1	49.9	35.7	35.6
LnGrp LOS	C	D	D	D	D	D	D	C	C	D	D	D
Approach Vol, veh/h		688			687			819			1102	
Approach Delay, s/veh		44.0			41.5			30.2			37.9	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	29.1	15.6	20.7	14.2	30.0	16.5	19.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.7	26.8	13.5	18.0	11.5	29.0	10.3	21.2
Max Q Clear Time (g_c+I1), s	10.6	15.4	11.2	15.4	9.4	22.3	7.6	13.7
Green Ext Time (p_c), s	0.1	3.2	0.1	0.9	0.1	3.2	0.1	1.7

Intersection Summary	
HCM 6th Ctrl Delay	38.0
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	646	238	49	470	146	46	252	37	149	341	262
Future Volume (veh/h)	191	646	238	49	470	146	46	252	37	149	341	262
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	201	680	251	52	495	154	48	265	39	157	359	276
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	303	816	301	166	853	380	229	881	128	363	529	449
Arrive On Green	0.19	0.33	0.33	0.10	0.25	0.25	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1619	2445	902	1619	3420	1525	720	2996	436	977	1800	1525
Grp Volume(v), veh/h	201	476	455	52	495	154	48	150	154	157	359	276
Grp Sat Flow(s),veh/h/ln	1619	1710	1638	1619	1710	1525	720	1710	1722	977	1800	1525
Q Serve(g_s), s	5.8	12.9	12.9	1.5	6.4	4.2	3.2	3.4	3.5	7.4	8.8	7.8
Cycle Q Clear(g_c), s	5.8	12.9	12.9	1.5	6.4	4.2	12.0	3.4	3.5	10.9	8.8	7.8
Prop In Lane	1.00		0.55	1.00		1.00	1.00		0.25	1.00		1.00
Lane Grp Cap(c), veh/h	303	571	547	166	853	380	229	503	506	363	529	449
V/C Ratio(X)	0.66	0.83	0.83	0.31	0.58	0.40	0.21	0.30	0.30	0.43	0.68	0.62
Avail Cap(c_a), veh/h	326	631	604	323	1255	560	275	614	618	427	646	547
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	18.9	15.4	15.4	20.9	16.5	15.7	20.9	13.7	13.7	18.0	15.6	15.3
Incr Delay (d2), s/veh	4.5	8.6	9.0	1.1	0.6	0.7	0.5	0.3	0.3	0.8	2.1	1.4
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	2.2	5.3	5.1	0.5	2.1	1.3	0.5	1.2	1.2	1.5	3.3	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	24.1	24.4	21.9	17.1	16.4	21.3	14.0	14.1	18.8	17.7	16.7
LnGrp LOS	C	C	C	C	B	B	C	B	B	B	B	B
Approach Vol, veh/h		1132			701			352			792	
Approach Delay, s/veh		24.1			17.3			15.0			17.6	
Approach LOS		C			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.3	9.7	21.2		19.3	13.9	17.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	10.0	18.5		18.0	10.1	18.4				
Max Q Clear Time (g_c+I1), s		14.0	3.5	14.9		12.9	7.8	8.4				
Green Ext Time (p_c), s		0.7	0.0	1.9		1.8	0.1	2.6				
Intersection Summary												
HCM 6th Ctrl Delay			19.7									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	504	148	182	432	108	115	482	96	107	589	107
Future Volume (veh/h)	132	504	148	182	432	108	115	482	96	107	589	107
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	139	531	156	192	455	114	121	507	101	113	620	113
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	212	614	180	228	665	165	206	705	140	202	710	129
Arrive On Green	0.13	0.24	0.24	0.14	0.25	0.25	0.13	0.25	0.25	0.12	0.25	0.25
Sat Flow, veh/h	1619	2609	763	1619	2714	675	1619	2845	564	1619	2890	526
Grp Volume(v), veh/h	139	347	340	192	285	284	121	304	304	113	366	367
Grp Sat Flow(s),veh/h/ln	1619	1710	1663	1619	1710	1679	1619	1710	1698	1619	1710	1705
Q Serve(g_s), s	5.8	14.0	14.1	8.3	10.8	11.0	5.0	11.6	11.8	4.7	14.7	14.8
Cycle Q Clear(g_c), s	5.8	14.0	14.1	8.3	10.8	11.0	5.0	11.6	11.8	4.7	14.7	14.8
Prop In Lane	1.00		0.46	1.00		0.40	1.00		0.33	1.00		0.31
Lane Grp Cap(c), veh/h	212	403	391	228	419	412	206	424	421	202	420	419
V/C Ratio(X)	0.66	0.86	0.87	0.84	0.68	0.69	0.59	0.72	0.72	0.56	0.87	0.88
Avail Cap(c_a), veh/h	226	430	418	237	442	434	226	442	439	226	442	441
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	29.6	26.3	26.3	30.0	24.5	24.5	29.5	24.6	24.7	29.5	25.9	26.0
Incr Delay (d2), s/veh	6.2	15.6	16.7	22.6	4.0	4.3	3.3	5.3	5.5	2.4	16.6	17.0
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	2.5	6.9	6.9	4.4	4.5	4.5	2.1	5.1	5.1	1.9	7.6	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	41.9	43.0	52.6	28.5	28.8	32.8	29.9	30.2	31.9	42.6	43.0
LnGrp LOS	D	D	D	D	C	C	C	C	C	C	D	D
Approach Vol, veh/h		826			761			729			846	
Approach Delay, s/veh		41.3			34.7			30.5			41.3	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	22.2	14.6	21.4	13.6	22.1	13.9	22.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.5	18.0	10.0	18.5	10.0	18.5
Max Q Clear Time (g_c+I1), s	6.7	13.8	10.3	16.1	7.0	16.8	7.8	13.0
Green Ext Time (p_c), s	0.1	1.6	0.0	0.8	0.1	0.8	0.1	1.6

Intersection Summary		
HCM 6th Ctrl Delay		37.2
HCM 6th LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	559	279	54	480	134	90	282	40	110	229	123
Future Volume (veh/h)	119	559	279	54	480	134	90	282	40	110	229	123
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		1.00	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	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	125	588	294	57	505	141	95	297	42	116	241	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	274	733	366	180	936	418	301	830	116	335	496	420
Arrive On Green	0.17	0.33	0.33	0.11	0.27	0.27	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1619	2208	1103	1619	3420	1525	920	3012	422	947	1800	1525
Grp Volume(v), veh/h	125	455	427	57	505	141	95	167	172	116	241	129
Grp Sat Flow(s),veh/h/ln	1619	1710	1601	1619	1710	1525	920	1710	1724	947	1800	1525
Q Serve(g_s), s	3.3	11.6	11.6	1.6	6.0	3.5	4.6	3.8	3.8	5.4	5.4	3.2
Cycle Q Clear(g_c), s	3.3	11.6	11.6	1.6	6.0	3.5	10.0	3.8	3.8	9.2	5.4	3.2
Prop In Lane	1.00		0.69	1.00		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	274	568	532	180	936	418	301	471	475	335	496	420
V/C Ratio(X)	0.46	0.80	0.80	0.32	0.54	0.34	0.32	0.36	0.36	0.35	0.49	0.31
Avail Cap(c_a), veh/h	355	660	618	338	1284	573	393	642	647	430	676	573
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	17.9	14.6	14.6	19.6	14.8	13.9	18.7	13.9	14.0	17.7	14.5	13.7
Incr Delay (d2), s/veh	1.2	6.2	6.6	1.0	0.5	0.5	0.6	0.5	0.5	0.6	0.7	0.4
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	1.1	4.4	4.2	0.6	1.9	1.0	0.9	1.3	1.3	1.1	1.9	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.1	20.7	21.2	20.6	15.3	14.4	19.3	14.4	14.4	18.3	15.3	14.2
LnGrp LOS	B	C	C	C	B	B	B	B	B	B	B	B
Approach Vol, veh/h		1007			703			434			486	
Approach Delay, s/veh		20.7			15.6			15.5			15.7	
Approach LOS		C			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		17.7	9.8	20.4		17.7	12.6	17.6				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.0	10.0	18.5		18.0	10.5	18.0				
Max Q Clear Time (g_c+I1), s		12.0	3.6	13.6		11.2	5.3	8.0				
Green Ext Time (p_c), s		1.2	0.0	2.3		1.4	0.1	2.6				

Intersection Summary			
HCM 6th Ctrl Delay			17.6
HCM 6th LOS			B

APPENDIX E -

VOLUME FORECASTING

SBTAM 2012
State Street Roadway Extension
AM Peak Period Flow
CAJON BLVD
N STATE ST
Site
E BASE LINE RD
W 9TH ST
E FOOTHILL BLVD
E MILL ST
MERIDIAN ST
N MOUNT VERNON AVE
SAN BERNARDINO AVE
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
-999
0
.5
1
1.5
Miles


SBTAM 2012
State Street Roadway Extension
PM Peak Period Flow
Site
CAJON BLVD
N STATE ST
E BASE LINE RD
W 9TH ST
E FOOTHILL BLVD
E MILL ST
MERIDIAN ST
N MOUNT VERNON AVE
SAN BERNARDINO AVE
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
-999
0
.5
1
1.5
Miles

SBTAM 2040
State Street Roadway Extension
AM Peak Period Flow
Site
CAJON BLVD
N STATE ST
E BASE LINE RD
W 9TH ST
E FOOTHILL BLVD
E MILL ST
MERIDIAN ST
N MOUNT VERNON AVE
SAN BERNARDINO AVE
Map layers
Node
SBTAM 2040
Node selection sets
Centroids
Connectors
0
.5
1
1.5
Miles


SBTAM 2040
State Street Roadway Extension
PM Peak Period Flow
Site
CAJON BLVD
N STATE ST
E BASE LINE RD
E FOOTHILL BLVD
SAN BERNARDINO AVE
MERIDIAN ST
N MOUNT VERNON AVE
W 9TH ST
E MILL ST
Map layers
Node
SBTAM 2040
Node selection sets
Centroids
Connectors
0 .5 1 1.5
Miles

Intersection	Leg	AM Peak					PM Peak				
		SBTAM 2012	SBTAM 2040	Annual Growth Rate	2019 Count	2040 Adjusted	SBTAM 2012	SBTAM 2040	Annual Growth Rate	2019 Count	2040 Adjusted
1	EB	1471	1136	-0.81%	253	389	2484	1979	-0.73%	319	508
	SB	3149	4201	1.19%	923	1289	4797	5973	0.88%	1170	1675
	WB	1152	962	-0.59%	316	392	1952	1626	-0.60%	411	547
	NB	1610	4201	5.75%	642	1417	2211	5973	6.08%	886	2017
2	EB	645	3001	13.05%	665	1573	933	4903	15.20%	966	2285
	SB	2048	3789	3.04%	710	1163	2805	5329	3.21%	892	1494
	WB	1707	2275	1.19%	639	798	5121	4515	-0.42%	1025	1363
	NB	3979	3068	-0.82%	1062	1408	7881	4936	-1.33%	1313	1758
3	EB	2664	2706	0.06%	500	506	5847	3964	-1.15%	559	889
	SB	3979	3068	-0.82%	1061	1948	7881	4936	-1.33%	1313	2433
	WB	772	542	-1.06%	277	343	1487	1372	-0.28%	400	532
	NB	3410	3114	-0.31%	914	1409	5756	5331	-0.26%	934	1747
4	EB	3327	2215	-1.19%	780	1201	4924	1648	-2.38%	1006	1601
	SB	3410	3114	-0.31%	917	1684	5756	5331	-0.26%	937	1736
	WB	1626	982	-1.41%	274	340	3032	1502	-1.80%	350	465
	NB	1965	3130	2.12%	605	1416	3071	4986	2.23%	607	1634
5	EB										
	SB	1965	3130	2.12%	588	1084	3071	4986	2.23%	581	1544
	WB	309	1009	8.09%	422	1139	536	1552	6.77%	427	1034
	NB	1853	2467	1.18%	176	1116	2897	4052	1.42%	180	1328
6	EB	2450	2071	-0.55%	930	1432	4371	4341	-0.02%	1150	2496
	SB	1651	2304	1.41%		798	2550	3824	1.78%		1184
	WB	1523	2271	1.75%	1572	2151	2636	4318	2.28%	1417	2482
	NB		1538	N/A	964	1372		2647	N/A	353	867
7	EB	4089	5904	1.59%	1213	1617	6734	9844	1.65%	1638	2205
	SB		1538	N/A	N/A	1114		2647	N/A	N/A	1234
	WB	3617	5148	1.51%	1378	1815	5988	8672	1.60%	1854	2477
	NB	1035	1620	2.02%	515	733	1700	2863	2.44%	620	938
8	EB	988	1434	1.61%	813	1088	1635	2572	2.05%	939	1343
	SB	1035	1620	2.02%	596	1173	1700	2863	2.44%	675	1335
	WB	1601	1616	0.03%	892	898	2829	3060	0.29%	1043	1107
	NB	1289	2421	3.14%	769	1095	2186	4379	3.58%	913	1435
9	EB	1344	1714	0.98%	1205	1454	2174	2878	1.16%	1279	1590
	SB	1186	2086	2.71%	963	1511	1966	3739	3.22%	1040	1743
	WB	1212	1603	1.15%	1052	1307	1940	2714	1.42%	1330	1728
	NB	1664	2482	1.76%	1080	1478	2698	4262	2.07%	1263	1812
10	EB	N/A	N/A	N/A	350	385	N/A	N/A	N/A	178	196
	SB	2315	2756	0.68%	1540	1760	3779	4328	0.52%	1459	1618
	WB	91	N/A	N/A	556	612	144	N/A	N/A	292	321
	NB	2224	2756	0.85%	1682	1984	3635	4328	0.68%	1493	1706
11	EB	1421	2121	1.76%	972	1331	2245	4086	2.93%	1088	1757
	SB	2684	3415	0.97%	1296	1561	4171	5433	1.08%	1451	1780
	WB	214	508	4.91%	1045	1583	363	1093	7.18%	1079	1872
	NB	3692	5930	2.16%	1645	2393	5882	8272	1.45%	1810	2362

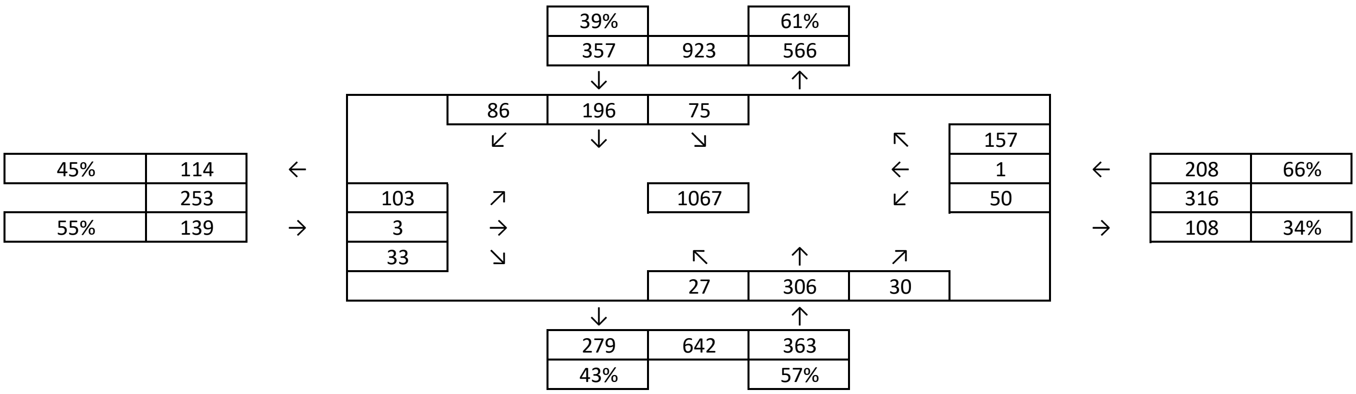
Intersection	Leg	Existing		Opening Year (2022) Phase 1		Buildout Conditions 2040	
		PM Peak (a)	ADT (b)	PM Peak (a)	ADT (b)	PM Peak (a)	ADT (b)
1. State Street & Nolan Street/ Short Street	EB	319	3669	349	4014	508	5842
	SB	1170	13455	1278	14697	1675	19257
	WB	411	4727	449	5164	547	6291
	NB	886	10189	968	11132	2017	23196
2. State Street & Highland Avenue	EB	966	11109	1056	12144	2285	26278
	SB	892	10258	975	11213	1494	17181
	WB	1025	11788	1120	12880	1363	15675
	NB	1313	15100	1435	16503	1758	20217
3. State Street & I-210 WB Ramps	EB	559	6429	611	7027	889	10224
	SB	1313	15100	1435	16503	2433	27980
	WB	400	4600	437	5026	532	6118
	NB	934	10741	1021	11742	1747	20086
4. State Street & I-210 EB Ramps/20th Street	EB	1006	11569	1099	12639	1601	18412
	SB	937	10776	1024	11776	1736	19964
	WB	350	4025	382	4393	465	5348
	NB	607	6981	663	7625	1634	18786
5. State Street & 16th Street	EB						
	SB	581	6682	635	7303	1544	17751
	WB	427	4911	467	5371	1034	11891
	NB	180	2070	197	2266	1328	15267
6. State Street/University Parkway & Baseline Street	EB	1150	13225	1257	14451	2496	28699
	SB		0	972	11178	1184	13614
	WB	1417	16296	1548	17807	2482	28547
	NB	353	4060	386	4436	867	9973
7. Rancho Avenue & Foothill Boulevard	EB	1638	18837	1790	20585	2205	25358
	SB					1234	14190
	WB	1854	21321	2026	23299	2477	28486
	NB	620	7130	677	7786	938	10787
8. Rancho Avenue & Rialto Avenue	EB	939	10799	1026	11799	1343	15445
	SB	675	7763	738	8487	1335	15348
	WB	1043	11995	1140	13110	1107	12731
	NB	913	10500	998	11477	1435	16499
9. Rancho Avenue & Mill Street	EB	1279	14709	1398	16077	1590	18285
	SB	1040	11960	1136	13064	1743	20045
	WB	1330	15295	1453	16710	1728	19872
	NB	1263	14525	1380	15870	1812	20838
10. Rancho Avenue & Laurel Street	EB	178	2047	195	2243	196	2252
	SB	1459	16779	1594	18331	1618	18607
	WB	292	3358	319	3669	321	3694
	NB	1493	17170	1631	18757	1706	19619
11. Rancho Avenue & Valley Boulevard	EB	1088	12512	1189	13674	1757	20206
	SB	1451	16687	1586	18239	1780	20470
	WB	1079	12409	1179	13559	1872	21528
	NB	1810	20815	1978	22747	2362	27163

Notes:

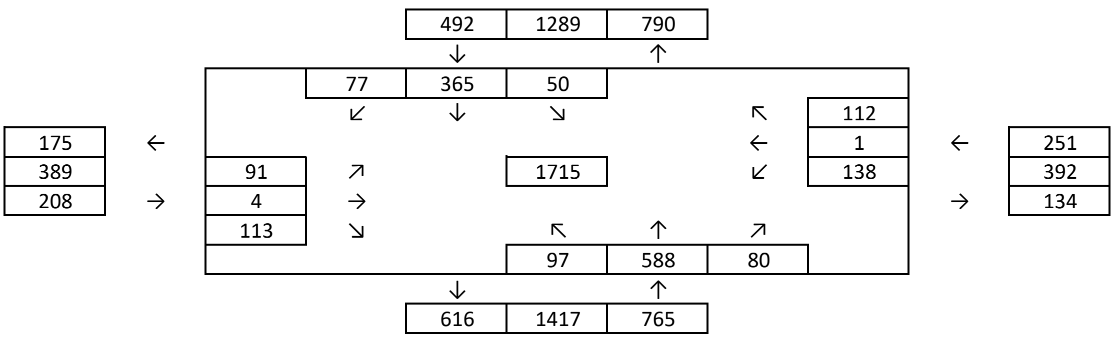
(a) Approach Volume + Exit Volume

(b) PM Peak Hour (Approach Volume + Exit Volume) x 11.5

Scenario: Existing Conditions AM
N/S Street: State Street
E/W Street: Nolan Street/Short Street
Intersection #: 1



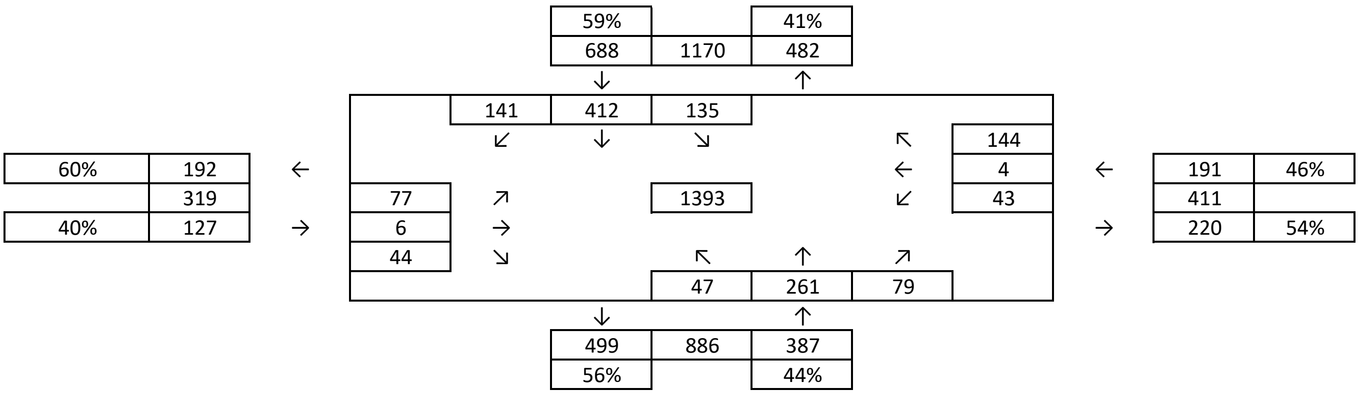
Scenario: Buildout Conditions 2040 AM
N/S Street: State Street
E/W Street: Nolan Street/Short Street



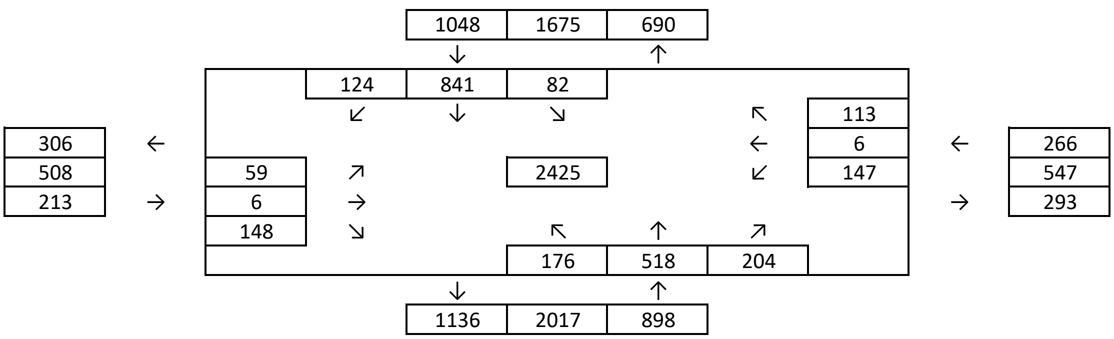
Tenth Iteration

	134	790	175	616
251	0	112	1	138
492	50	0	77	365
208	4	91	0	113
765	80	588	97	0

Scenario:	Existing Conditions PM
N/S Street:	State Street
E/W Street:	Nolan Street/Short Street
Intersection #:	1



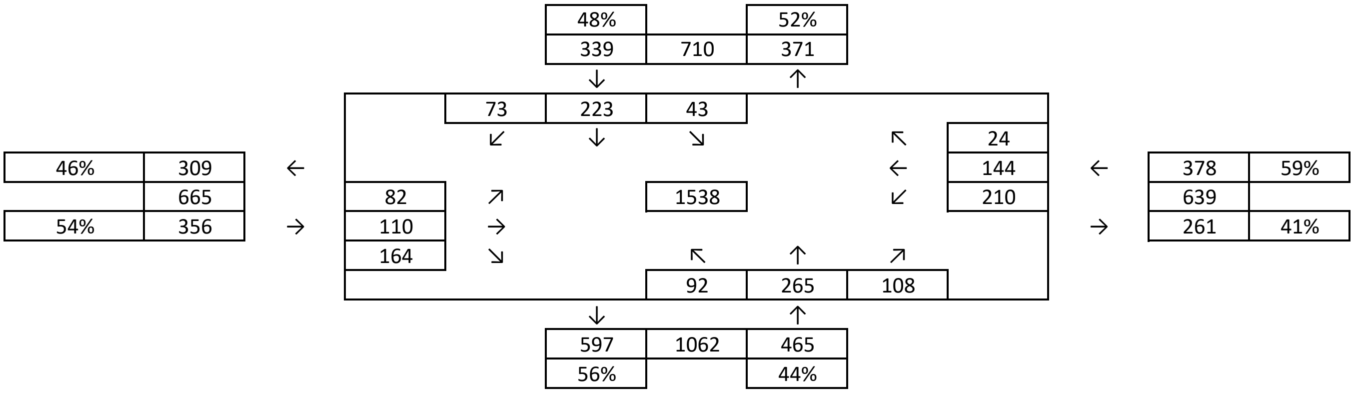
Scenario:	Buildout Conditions 2040 PM
N/S Street:	State Street
E/W Street:	Nolan Street/Short Street



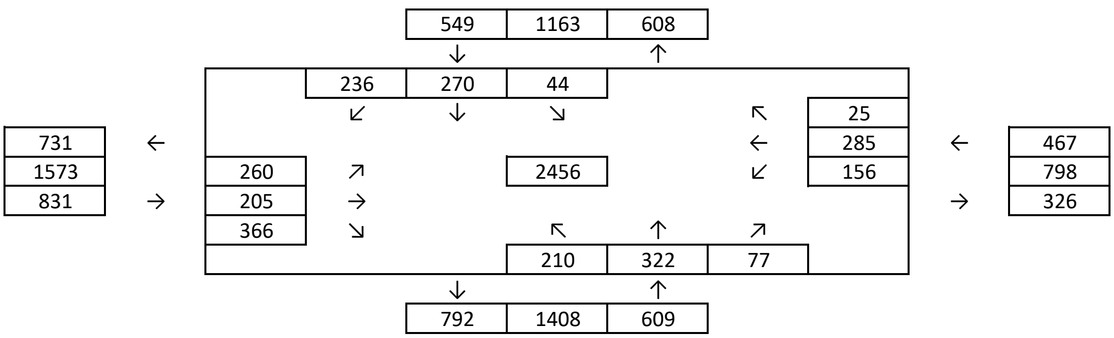
Tenth Iteration

	293	690	306	1136
266	0	113	6	147
1048	82	0	124	841
213	6	59	0	148
898	204	518	176	0

Scenario: Existing Conditions AM
N/S Street: State Street
E/W Street: Highland Avenue
Intersection #: 2



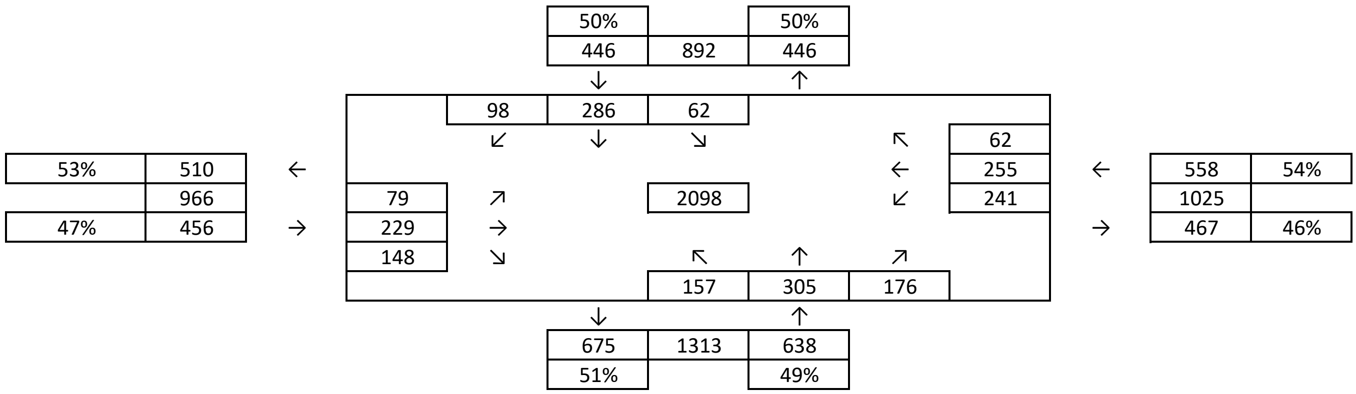
Scenario: Buildout Conditions 2040 AM
N/S Street: State Street
E/W Street: Highland Avenue



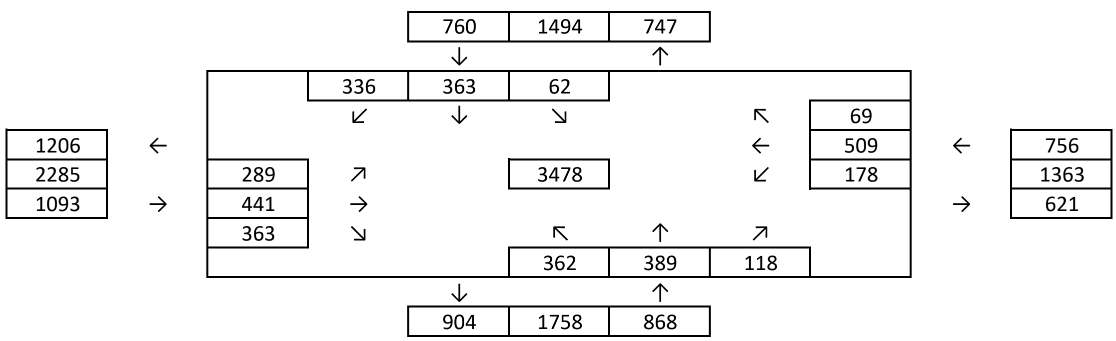
Tenth Iteration

	326	608	731	792
467	0	25	285	156
549	44	0	236	270
831	205	260	0	366
609	77	322	210	0

Scenario:	Existing Conditions PM
N/S Street:	State Street
E/W Street:	Highland Avenue
Intersection #:	2



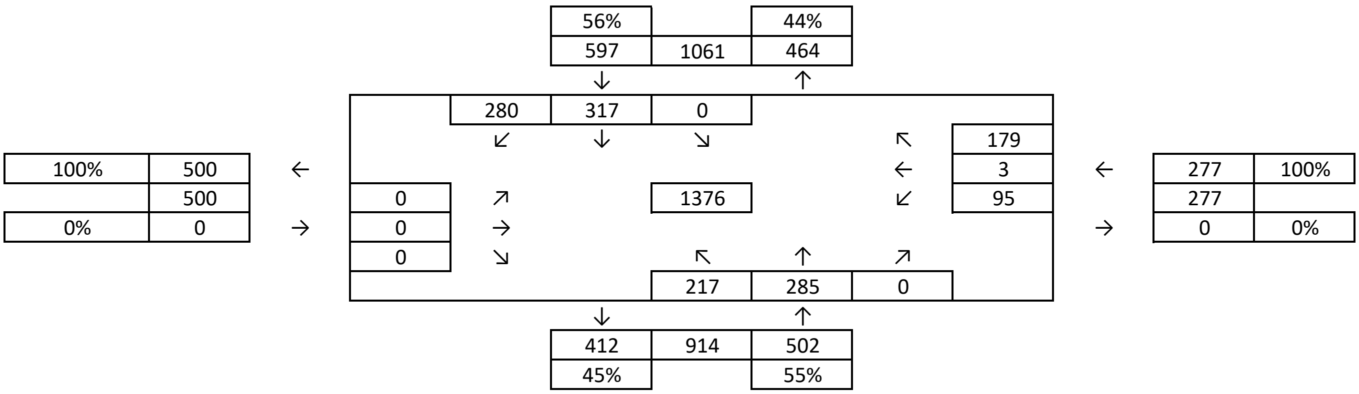
Scenario:	Buildout Conditions 2040 PM
N/S Street:	State Street
E/W Street:	Highland Avenue



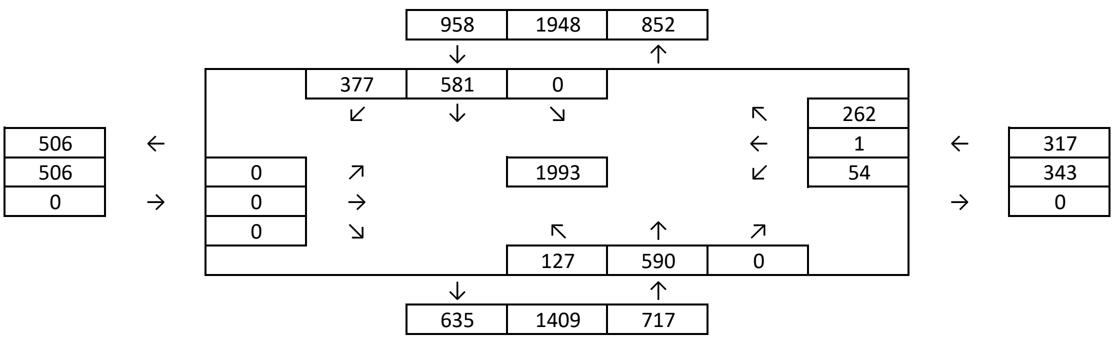
Tenth Iteration

	621	747	1206	904
756	0	69	509	178
760	62	0	336	363
1093	441	289	0	363
868	118	389	362	0

Scenario: Existing Conditions AM
N/S Street: State Street
E/W Street: I-210 WB Ramps
Intersection #: 3



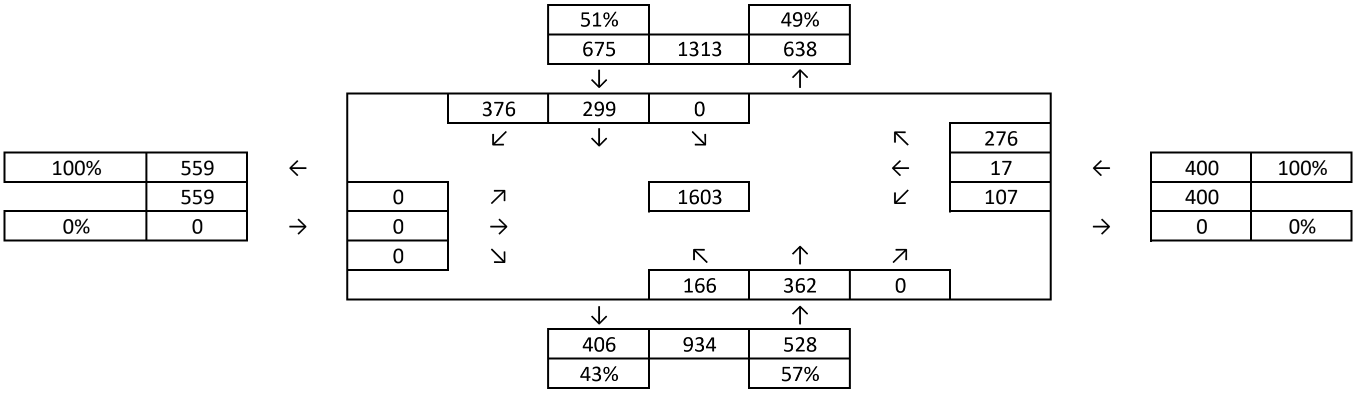
Scenario: Buildout Conditions 2040 AM
N/S Street: State Street
E/W Street: I-210 WB Ramps



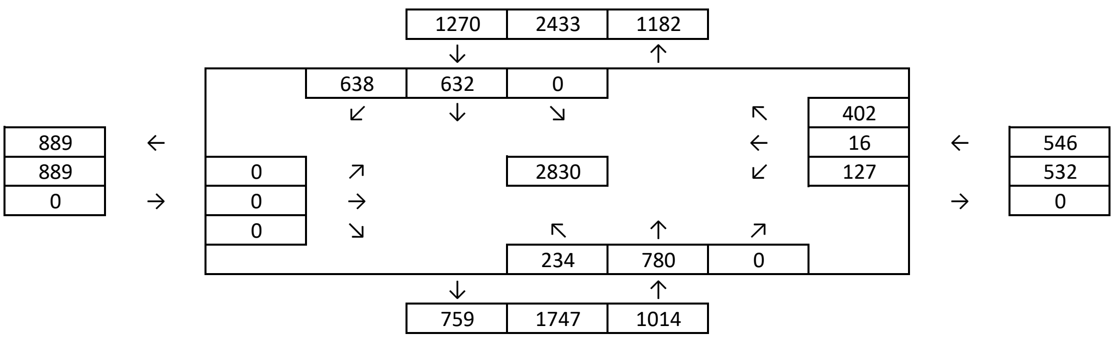
Tenth Iteration

	0	852	506	635
317	0	262	1	54
958	0	0	377	581
0	0	0	0	0
717	0	590	127	0

Scenario: Existing Conditions PM
N/S Street: State Street
E/W Street: I-210 WB Ramps
Intersection #: 3



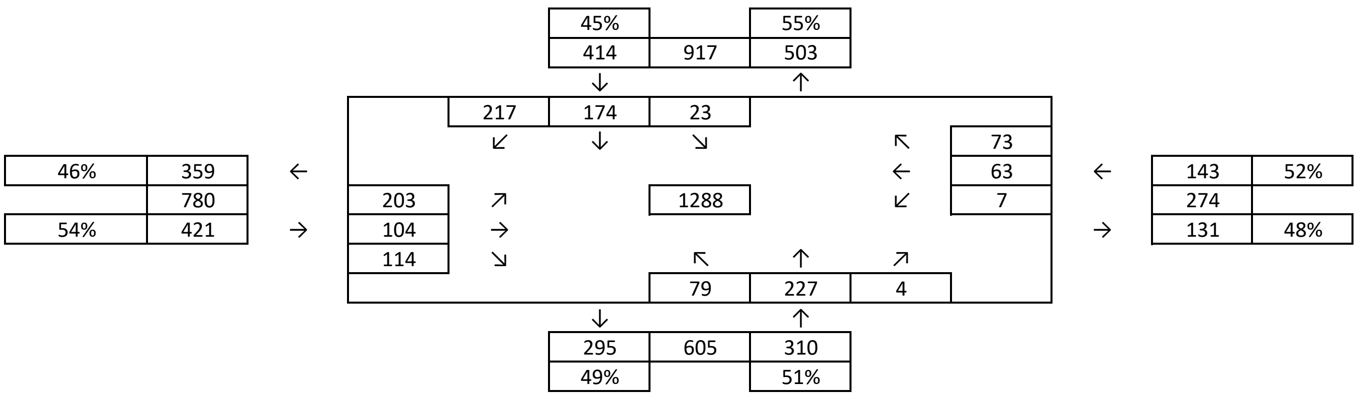
Scenario: Buildout Conditions 2040 PM
N/S Street: State Street
E/W Street: I-210 WB Ramps



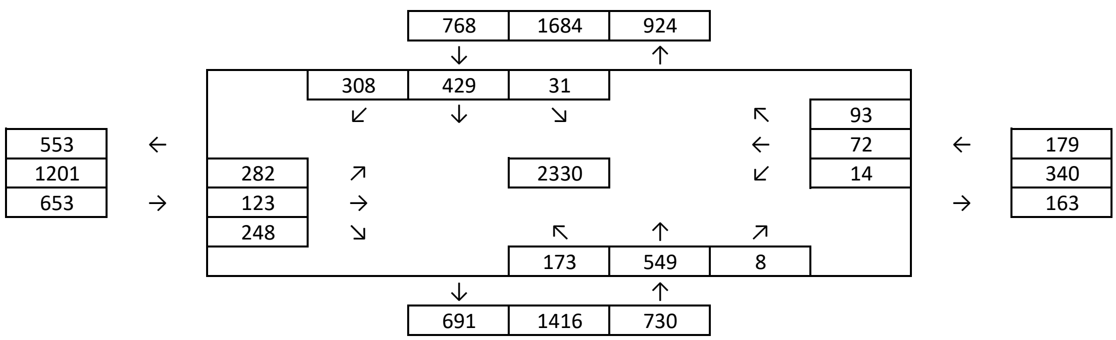
Tenth Iteration

	0	1182	889	759
546	0	402	16	127
1270	0	0	638	632
0	0	0	0	0
1014	0	780	234	0

Scenario: Existing Conditions AM
N/S Street: State Street
E/W Street: I-210 EB Ramps/20th Street
Intersection #: 4



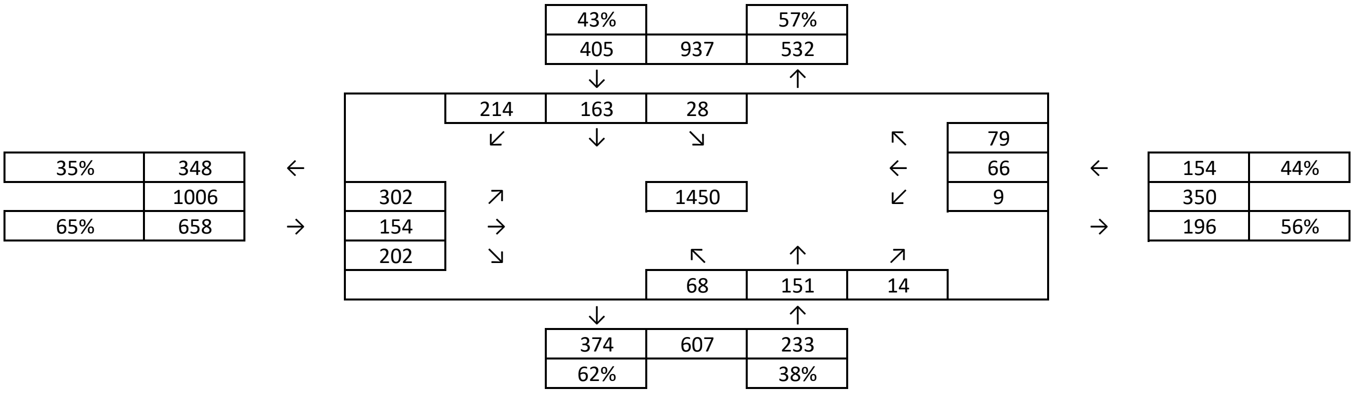
Scenario: Buildout Conditions 2040 AM
N/S Street: State Street
E/W Street: I-210 EB Ramps/20th Street



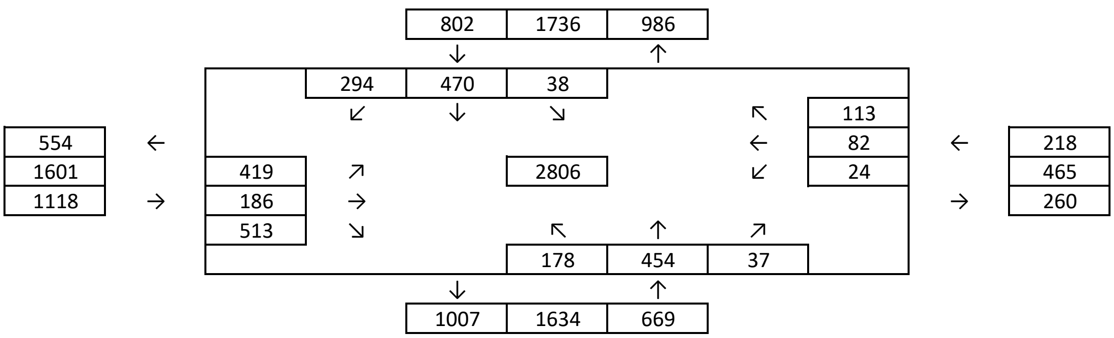
Tenth Iteration

	163	924	553	691
179	0	93	72	14
768	31	0	308	429
653	123	282	0	248
730	8	549	173	0

Scenario:	Existing Conditions PM
N/S Street:	State Street
E/W Street:	I-210 EB Ramps/20th Street
Intersection #:	4



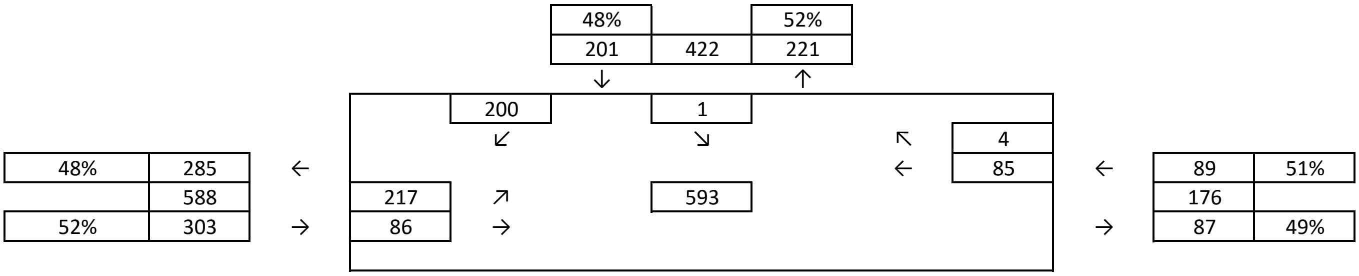
Scenario:	Buildout Conditions 2040 PM
N/S Street:	State Street
E/W Street:	I-210 EB Ramps/20th Street



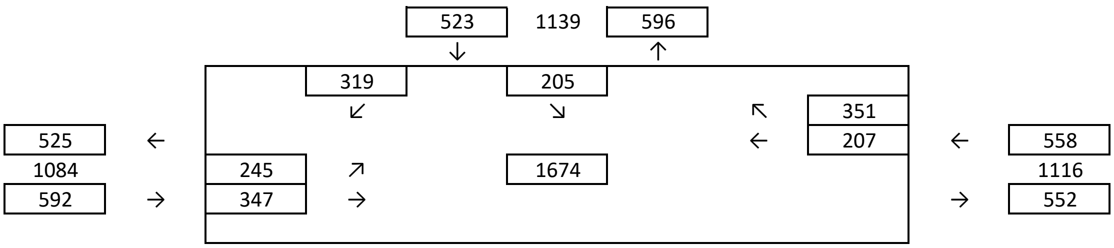
Tenth Iteration

	260	986	554	1007
218	0	113	82	24
802	38	0	294	470
1118	186	419	0	513
669	37	454	178	0

Scenario: Existing Conditions AM
2-leg Street State Street
1-leg Street 16th Street
Intersection #: 5



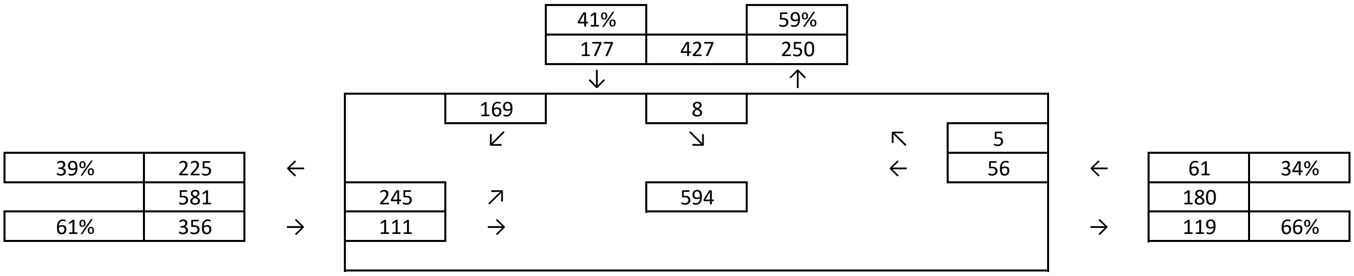
Scenario: Buildout Conditions 2040 AM
2-leg Street State Street
1-leg Street 16th Street



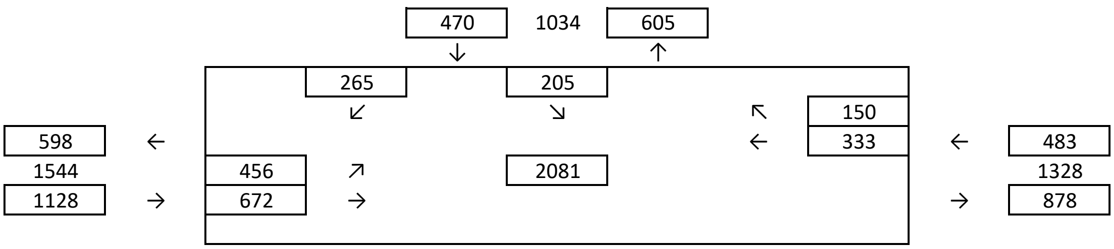
Tenth Iteration

	552	596	525
558	0	351	207
523	205	0	319
592	347	245	0

Scenario:	Existing Conditions PM
2-leg Street	State Street
1-leg Street	16th Street
Intersection #:	5



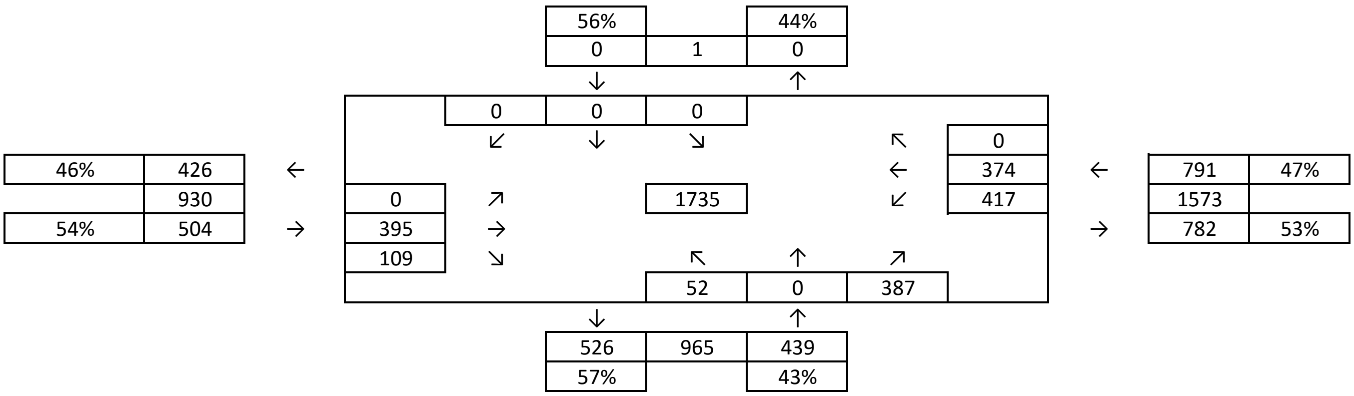
Scenario:	Buildout Conditions 2040 PM
2-leg Street	State Street
1-leg Street	16th Street



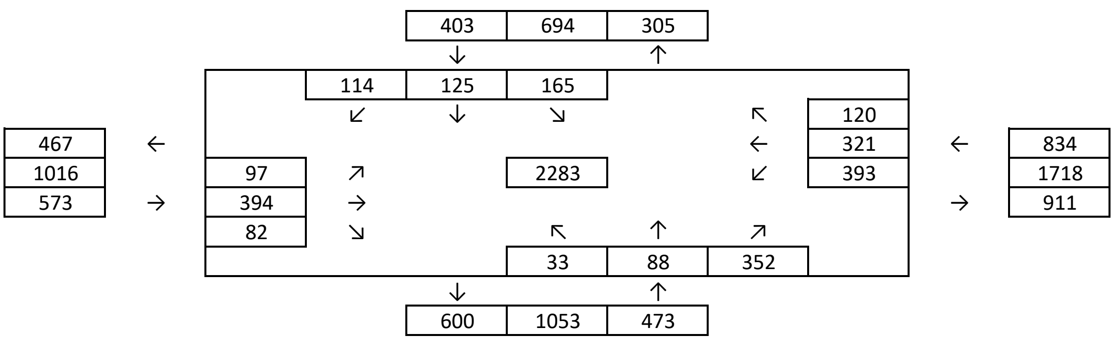
Tenth Iteration

	878	605	598
483	0	150	333
470	205	0	265
1128	672	456	0

Scenario: Existing Conditions AM
N/S Street: State Street/University Parkway
E/W Street: Baseline St
Intersection #: 6



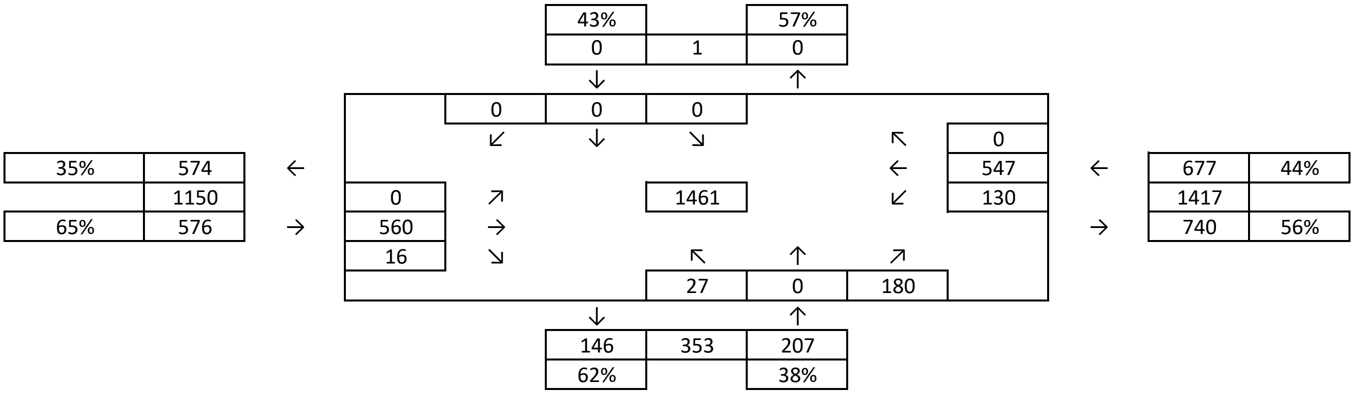
Scenario: Opening Year (2022) Phase 1 AM
N/S Street: State Street/University Parkway
E/W Street: Baseline St



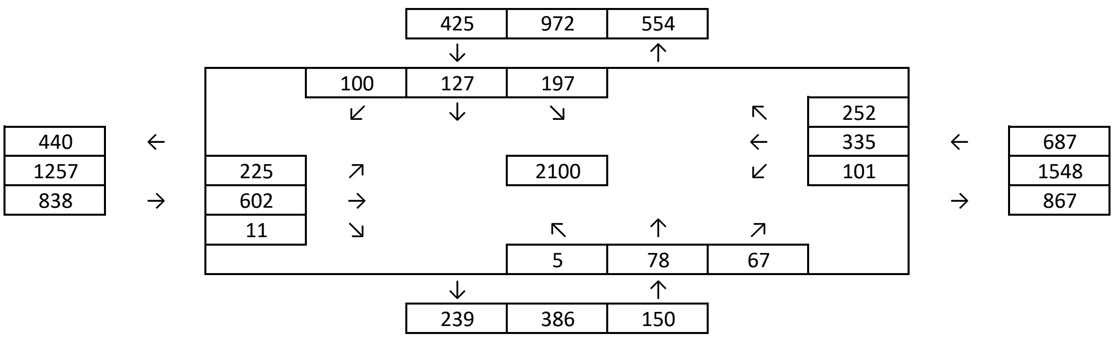
Tenth Iteration

	911	305	467	600
834	0	120	321	393
403	165	0	114	125
573	394	97	0	82
473	352	88	33	0

Scenario: Existing Conditions PM
N/S Street: State Street/University Parkway
E/W Street: Baseline St
Intersection #: 6



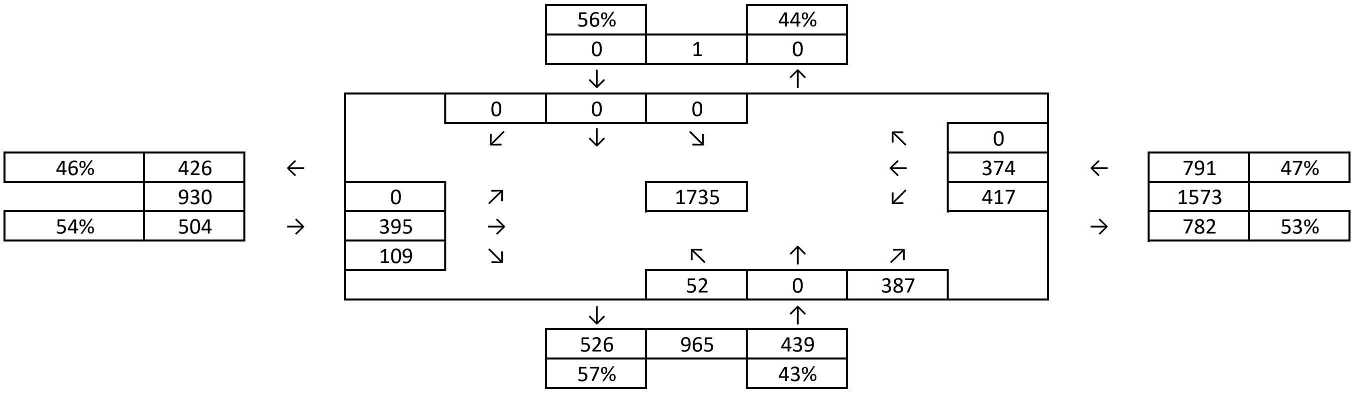
Scenario: Opening Year (2022) Phase 1 PM
N/S Street: State Street/University Parkway
E/W Street: Baseline St



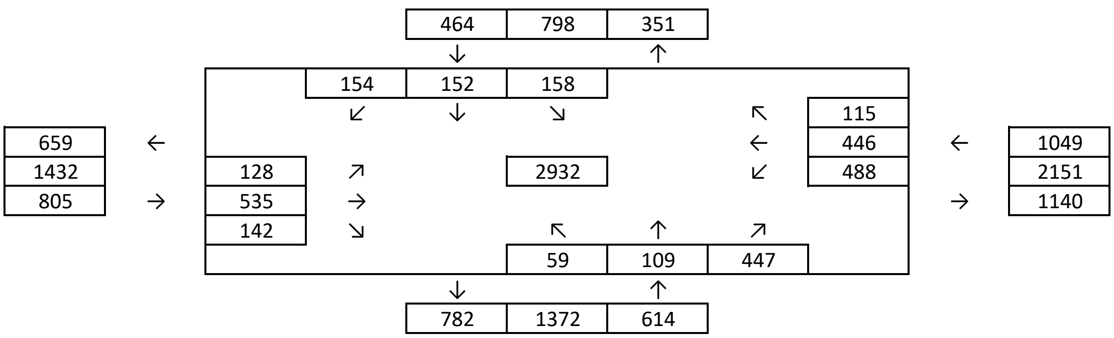
Tenth Iteration

	867	554	440	239
687	0	252	335	101
425	197	0	100	127
838	602	225	0	11
150	67	78	5	0

Scenario: Existing Conditions AM
N/S Street: State Street/University Parkway
E/W Street: Baseline St
Intersection #: 6



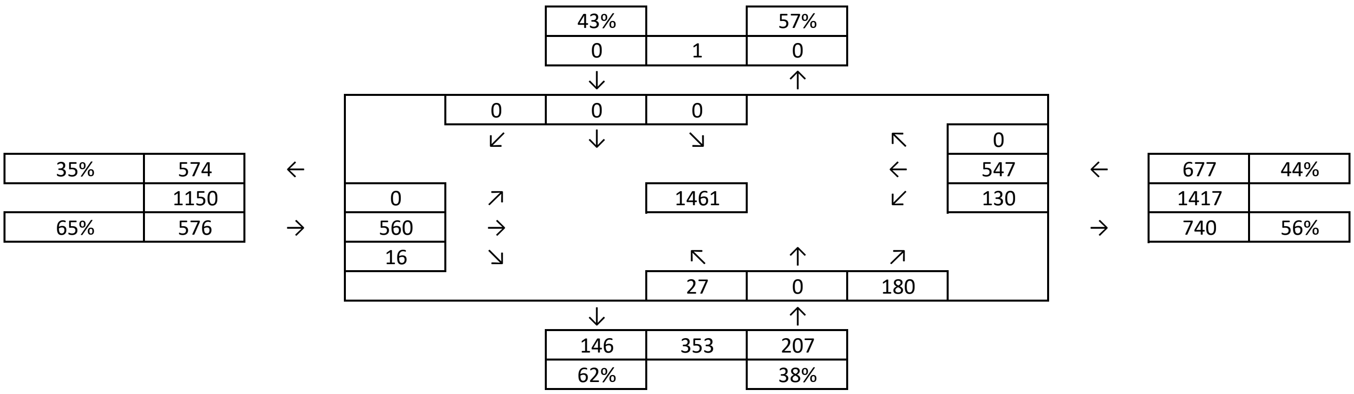
Scenario: Buildout Conditions 2040 AM
N/S Street: State Street/University Parkway
E/W Street: Baseline St



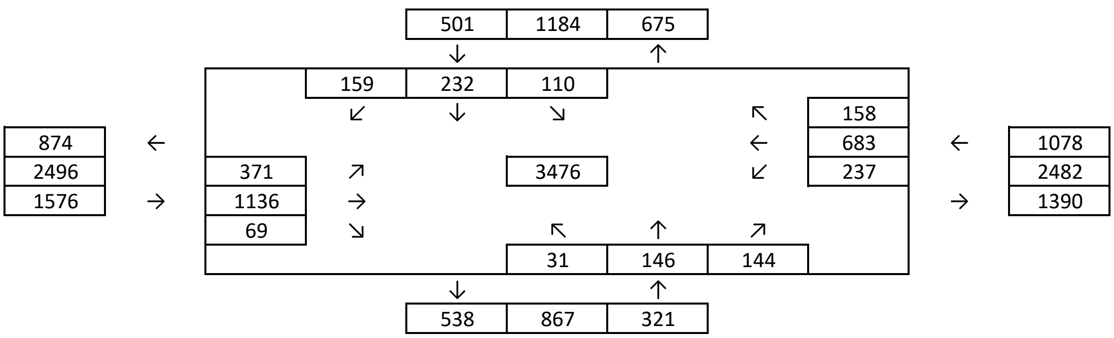
Tenth Iteration

	1140	351	659	782
1049	0	115	446	488
464	158	0	154	152
805	535	128	0	142
614	447	109	59	0

Scenario: Existing Conditions PM
N/S Street: State Street/University Parkway
E/W Street: Baseline St
Intersection #: 6



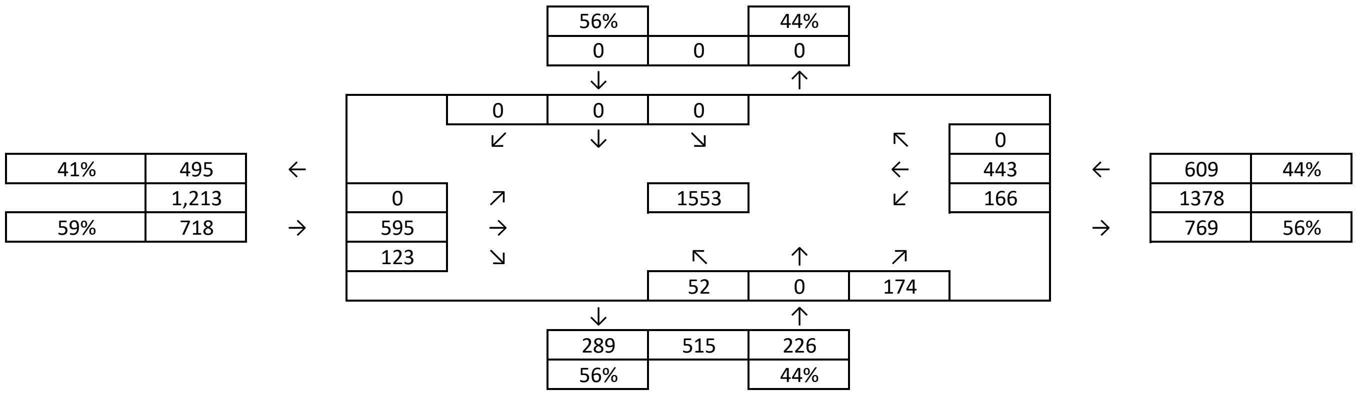
Scenario: Buildout Conditions 2040 PM
N/S Street: State Street/University Parkway
E/W Street: Baseline St



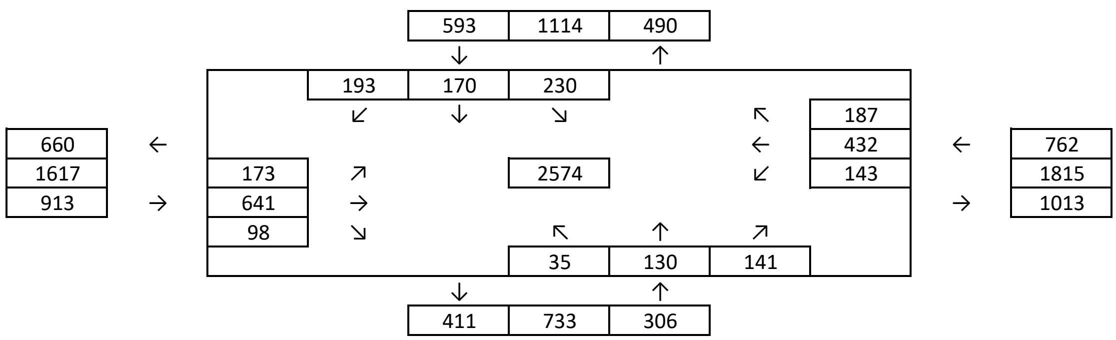
Tenth Iteration

	1390	675	874	538
1078	0	158	683	237
501	110	0	159	232
1576	1136	371	0	69
321	144	146	31	0

Scenario: Existing Conditions AM
N/S Street: Rancho Avenue
E/W Street: Foothill Boulevard
Intersection #: 7



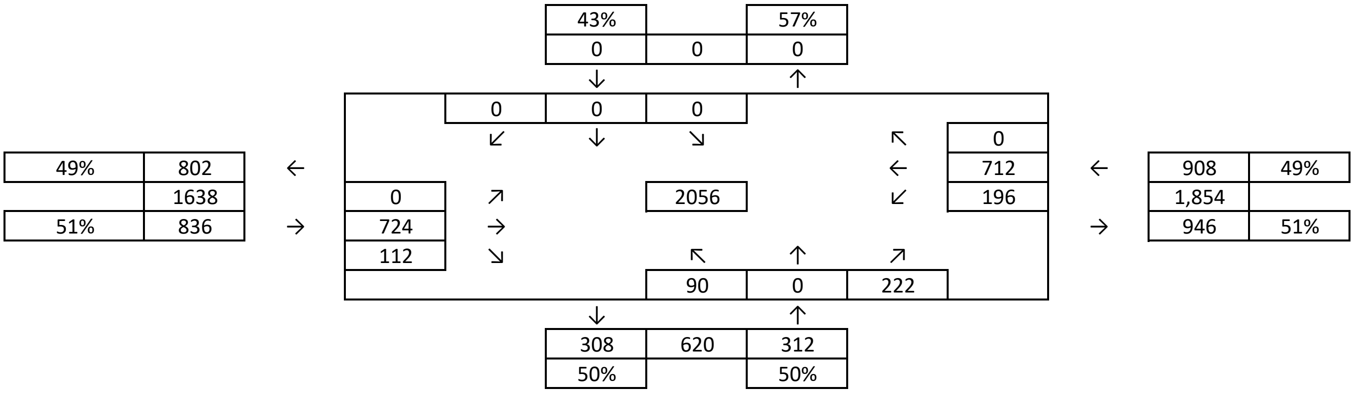
Scenario: Buildout Conditions 2040 AM
N/S Street: Rancho Avenue
E/W Street: Foothill Boulevard



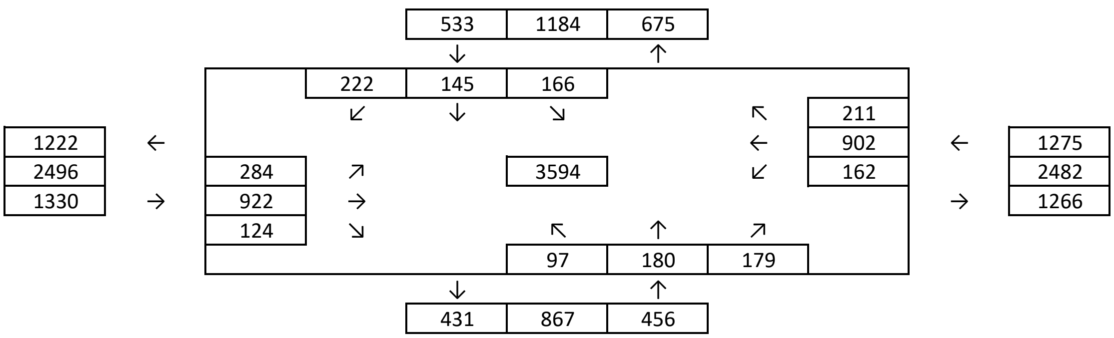
Tenth Iteration

	1013	490	660	411
762	0	187	432	143
593	230	0	193	170
913	641	173	0	98
306	141	130	35	0

Scenario: Existing Conditions PM
N/S Street: Rancho Avenue
E/W Street: Foothill Boulevard
Intersection #: 7



Scenario: Buildout Conditions 2040 PM
N/S Street: Rancho Avenue
E/W Street: Foothill Boulevard



Tenth Iteration

	1266	675	1222	431
1275	0	211	902	162
533	166	0	222	145
1330	922	284	0	124
456	179	180	97	0

Scenario: Existing Conditions AM
N/S Street: Rancho Avenue
E/W Street: Rialto Avenue
Intersection #: 8

57% 43%
341 596 255
↓ ↑
45 210 86
↙ ↓ ↘
↖ 51
40% 322 ← ← 203 ← 325 36%
813 38 ↗ 1535 ↙ 71 892
60% 491 → 343 → → 567 64%
110 ↘ ↖ ↑ ↗
74 166 138
↓ ↑
391 769 378
51% 49%

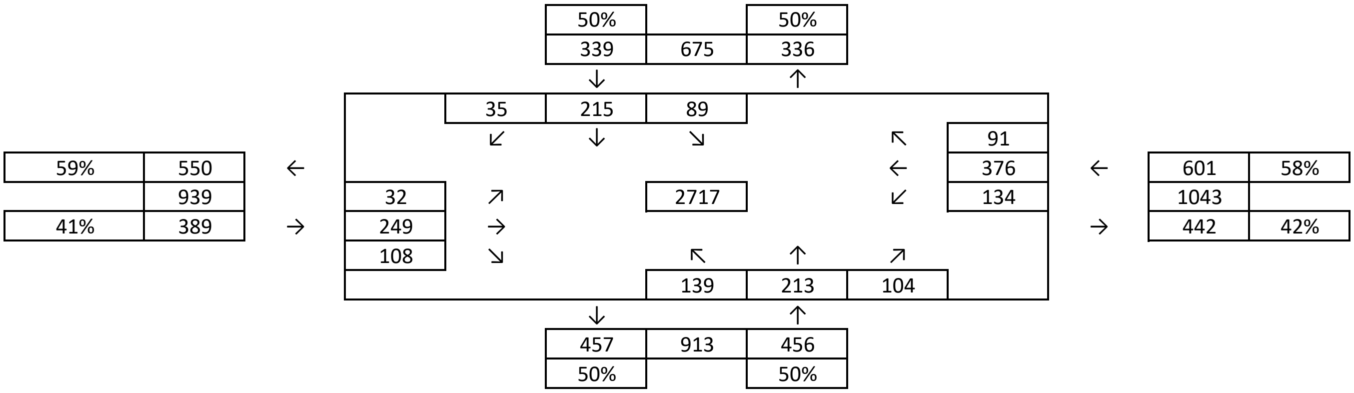
Scenario: Buildout Conditions 2040 AM
N/S Street: Rancho Avenue
E/W Street: Rialto Avenue

628 1173 502
↓ ↑
133 373 123
↙ ↓ ↘
↖ 70
431 ← ← 197 ← 309
1088 115 ↗ 2061 ↙ 42 898
616 → 358 → → 571
143 ↘ ↖ ↑ ↗
101 317 91
↓ ↑
557 1095 508

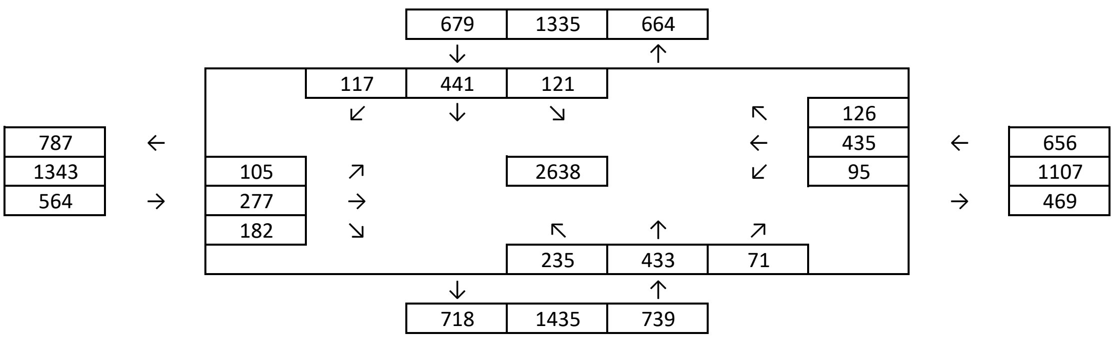
Tenth Iteration

	571	502	431	557
309	0	70	197	42
628	123	0	133	373
616	358	115	0	143
508	91	317	101	0

Scenario: Existing Conditions PM
N/S Street: Rancho Avenue
E/W Street: Rialto Avenue
Intersection #: 8



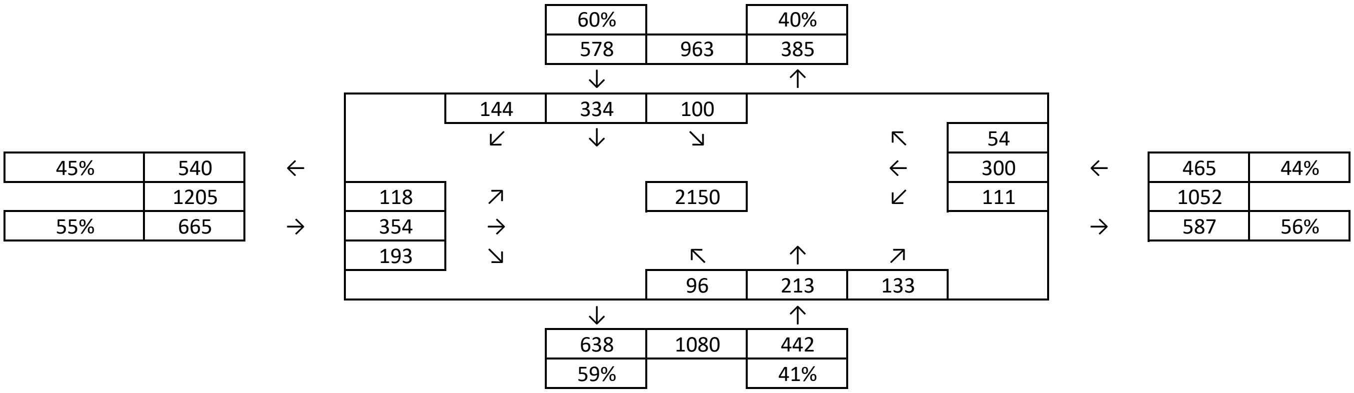
Scenario: Buildout Conditions 2040 PM
N/S Street: Rancho Avenue
E/W Street: Rialto Avenue



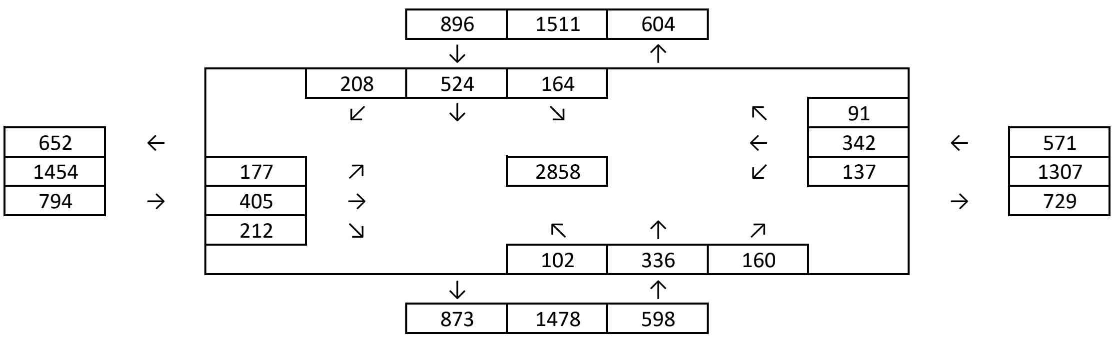
Tenth Iteration

	469	664	787	718
656	0	126	435	95
679	121	0	117	441
564	277	105	0	182
739	71	433	235	0

Scenario: Existing Conditions AM
N/S Street: Rancho Avenue
E/W Street: Mill Street
Intersection #: 9



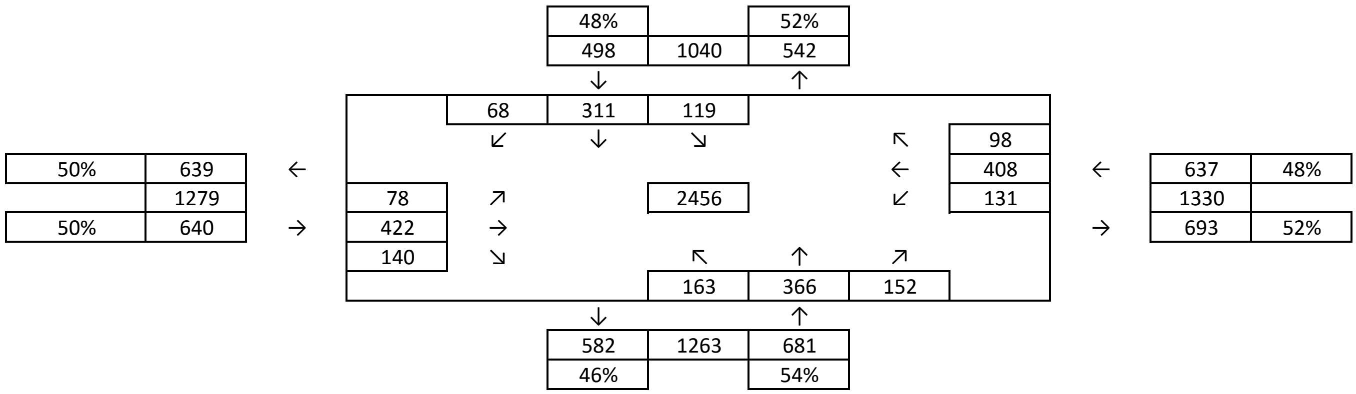
Scenario: Buildout Conditions 2040 AM
N/S Street: Rancho Avenue
E/W Street: Mill Street



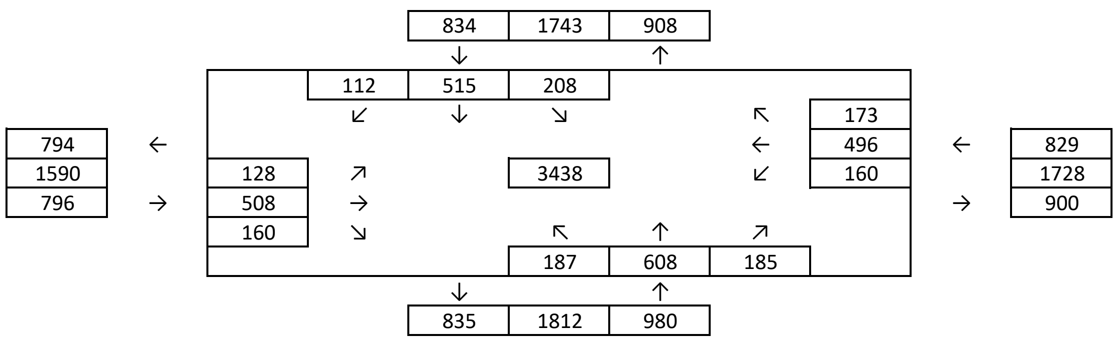
Tenth Iteration

	729	604	652	873
571	0	91	342	137
896	164	0	208	524
794	405	177	0	212
598	160	336	102	0

Scenario: Existing Conditions PM
N/S Street: Rancho Avenue
E/W Street: Mill Street
Intersection #: 9



Scenario: Buildout Conditions 2040 PM
N/S Street: Rancho Avenue
E/W Street: Mill Street



Tenth Iteration

	900	908	794	835
829	0	173	496	160
834	208	0	112	515
796	508	128	0	160
980	185	608	187	0

Scenario: Existing Conditions AM
N/S Street: Rancho Avenue
E/W Street: Laurel Street
Intersection #: 10

					62%		38%					
					961	1540	579					
					↓		↑					
				29	803	129						
				↙	↓	↘		↖	94			
45%	158	←						←	37	←	206	37%
	350		19	↗		2064		↙	75		556	
55%	192	→	74	→						→	350	63%
			99	↘		↖	↑	↗				
						92	466	147				
					↓		↑					
					977	1682	705					
					58%		42%					

Scenario: Buildout Conditions 2040 AM
N/S Street: Rancho Avenue
E/W Street: Laurel Street

				1106	1760	662				
				↓		↑				
			29	944	132					
			↙	↓	↘		↖	97		
174	←						←	38	←	227
385		19	↗		2373		↙	91		612
212	→	76	→						→	385
		117	↘		↖	↑	↗			
					107	545	176			
				↓		↑				
				1152	1984	829				

Tenth Iteration

	385	662	174	1152
227	0	97	38	91
1106	132	0	29	944
212	76	19	0	117
829	176	545	107	0

Scenario: Existing Conditions PM
N/S Street: Rancho Avenue
E/W Street: Laurel Street
Intersection #: 10

					41%		59%					
					593	1459	866					
					↓		↑					
				23	515	55						
				↙	↓	↘		↖	58			
54%	97	←						←	40	←	158	54%
	178		11	↗		1711		↙	60		292	
46%	81	→	31	→						→	134	46%
			39	↘		↖	↑	↗				
						34	797	48				
					↓		↑					
					614	1493	879					
					41%		59%					

Scenario: Buildout Conditions 2040 PM
N/S Street: Rancho Avenue
E/W Street: Laurel Street

				662	1618	960				
				↓		↑				
			23	583	56					
			↙	↓	↘		↖	58		
107	←						←	43	←	173
196		11	↗		1916		↙	73		321
89	→	33	→						→	147
		46	↘		↖	↑	↗			
					41	892	59			
				↓		↑				
				702	1706	991				

Tenth Iteration

	147	960	107	702
173	0	58	43	73
662	56	0	23	583
89	33	11	0	46
991	59	892	41	0

Scenario: Existing Conditions AM
N/S Street: Rancho Avenue
E/W Street: Valley Boulevard
Intersection #: 11

44% | | 56%
572 | 1296 | 724
↓ ↑

25 | 443 | 104
↙ ↓ ↘

↖ 252
47% 453 ← ← 204 ← 579 55%
972 | 31 ↗ | 2479 | ↙ 123 | 1045
53% 519 → 218 → → 466 45%
270 ↘

↖ ↑ ↗
224 | 441 | 144
↓ ↑
836 | 1645 | 809
51% | | 49%

Scenario: Buildout Conditions 2040 AM
N/S Street: Rancho Avenue
E/W Street: Valley Boulevard

680 | 1561 | 872
↓ ↑

30 | 499 | 152
↙ ↓ ↘

↖ 358
620 ← ← 321 ← 864
1331 | 35 ↗ | 3207 | ↙ 184 | 1583
702 → 341 → → 706
325 ↘

↖ ↑ ↗
269 | 478 | 213
↓ ↑
1008 | 1984 | 961

Tenth Iteration

	706	872	620	1008
864	0	358	321	184
680	152	0	30	499
702	341	35	0	325
961	213	478	269	0

Scenario: Existing Conditions PM
N/S Street: Rancho Avenue
E/W Street: Valley Boulevard
Intersection #: 11

					38%		62%					
					547	1451	904					
					↓		↑					
				29	409	109						
				↙	↓	↘		↖	106			
48%	523	←						←	280	←	484	45%
	1088		62	↗		2714		↙	98		1079	
52%	565	→	318	→						→	595	55%
			185	↘		↖	↑	↗				
						214	736	168				
					↓		↑					
					692	1810	1118					
					38%		62%					

Scenario: Buildout Conditions 2040 PM
N/S Street: Rancho Avenue
E/W Street: Valley Boulevard

				674	1780	1109				
				↓		↑				
			36	475	164					
			↙	↓	↘		↖	162		
845	←						←	509	←	840
1757		77	↗		3889		↙	169		1872
916	→	579	→						→	1032
		260	↘		↖	↑	↗			
					300	869	289			
				↓		↑				
				903	2362	1459				

Tenth Iteration

	1032	1109	845	903
840	0	162	509	169
674	164	0	36	475
916	579	77	0	260
1459	289	869	300	0

APPENDIX F -

BUILDOUT CONDITIONS (2040) PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	4	113	138	1	112	97	588	80	50	365	77
Future Volume (veh/h)	91	4	113	138	1	112	97	588	80	50	365	77
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1700	1900	1900
Adj Flow Rate, veh/h	96	4	119	145	1	118	102	619	84	53	384	81
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	219	8	246	247	330	279	224	1167	520	299	856	179
Arrive On Green	0.13	0.16	0.16	0.14	0.17	0.17	0.13	0.32	0.32	0.10	0.29	0.29
Sat Flow, veh/h	1714	53	1563	1714	1900	1607	1714	3610	1609	3141	2971	621
Grp Volume(v), veh/h	96	0	123	145	1	118	102	619	84	53	232	233
Grp Sat Flow(s),veh/h/ln	1714	0	1615	1714	1900	1607	1714	1805	1609	1570	1805	1787
Q Serve(g_s), s	3.3	0.0	4.5	5.1	0.0	4.2	3.5	9.0	2.4	1.0	6.7	6.9
Cycle Q Clear(g_c), s	3.3	0.0	4.5	5.1	0.0	4.2	3.5	9.0	2.4	1.0	6.7	6.9
Prop In Lane	1.00		0.97	1.00		1.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	219	0	254	247	330	279	224	1167	520	299	520	515
V/C Ratio(X)	0.44	0.00	0.48	0.59	0.00	0.42	0.46	0.53	0.16	0.18	0.45	0.45
Avail Cap(c_a), veh/h	267	0	453	280	547	463	267	1167	520	489	520	515
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	0.00	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	25.9	0.0	24.7	25.7	21.9	23.7	25.8	17.8	15.5	26.8	18.7	18.7
Incr Delay (d2), s/veh	1.4	0.0	1.4	2.5	0.0	1.0	1.5	1.7	0.7	0.3	2.8	2.9
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	1.4	0.0	1.7	2.1	0.0	1.6	1.4	3.5	0.9	0.3	2.8	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.3	0.0	26.1	28.2	21.9	24.7	27.3	19.5	16.2	27.0	21.4	21.6
LnGrp LOS	C	A	C	C	C	C	C	B	B	C	C	C
Approach Vol, veh/h		219			264			805			518	
Approach Delay, s/veh		26.6			26.6			20.1			22.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	25.3	13.7	14.6	12.9	23.0	12.7	15.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	10.5	18.0	10.0	18.5	10.0	18.5
Max Q Clear Time (g_c+I1), s	3.0	11.0	7.1	6.5	5.5	8.9	5.3	6.2
Green Ext Time (p_c), s	0.0	2.5	0.1	0.5	0.1	1.7	0.1	0.2

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	205	366	156	285	25	210	322	77	44	270	236
Future Volume (veh/h)	260	205	366	156	285	25	210	322	77	44	270	236
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		1.00	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	1800	1900	1900	1700	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	274	216	385	164	300	26	221	339	81	46	284	248
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	301	950	423	388	711	61	251	1574	488	138	859	382
Arrive On Green	0.18	0.26	0.26	0.12	0.21	0.21	0.15	0.30	0.30	0.08	0.24	0.24
Sat Flow, veh/h	1714	3610	1608	3141	3363	290	1714	5187	1609	1714	3610	1608
Grp Volume(v), veh/h	274	216	385	164	160	166	221	339	81	46	284	248
Grp Sat Flow(s),veh/h/ln	1714	1805	1608	1570	1805	1847	1714	1729	1609	1714	1805	1608
Q Serve(g_s), s	12.3	3.7	18.2	3.8	6.0	6.1	9.9	3.8	2.9	2.0	5.1	10.9
Cycle Q Clear(g_c), s	12.3	3.7	18.2	3.8	6.0	6.1	9.9	3.8	2.9	2.0	5.1	10.9
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	301	950	423	388	382	391	251	1574	488	138	859	382
V/C Ratio(X)	0.91	0.23	0.91	0.42	0.42	0.42	0.88	0.22	0.17	0.33	0.33	0.65
Avail Cap(c_a), veh/h	301	1001	446	400	413	423	251	1574	488	218	859	382
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	31.8	22.7	28.1	31.9	26.8	26.9	32.9	20.4	20.1	34.1	24.8	27.0
Incr Delay (d2), s/veh	30.0	0.1	21.8	0.7	0.7	0.7	28.4	0.3	0.7	1.4	1.0	8.2
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	7.2	1.5	8.9	1.4	2.5	2.6	5.9	1.5	1.1	0.8	2.2	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.8	22.8	49.9	32.6	27.6	27.6	61.2	20.7	20.8	35.5	25.8	35.2
LnGrp LOS	E	C	D	C	C	C	E	C	C	D	C	D
Approach Vol, veh/h		875			490			641			578	
Approach Delay, s/veh		46.9			29.3			34.7			30.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	28.4	14.2	25.2	16.0	23.2	18.3	21.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	20.2	10.0	21.8	11.5	18.7	13.8	18.0
Max Q Clear Time (g_c+I1), s	4.0	5.8	5.8	20.2	11.9	12.9	14.3	8.1
Green Ext Time (p_c), s	0.0	2.0	0.2	0.5	0.0	1.3	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	36.9
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	54	1	262	127	590	0	0	581	377
Future Volume (veh/h)	0	0	0	54	1	262	127	590	0	0	581	377
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1800	1900	1900	1700	1900	0	0	1900	1900
Adj Flow Rate, veh/h				38	0	297	134	621	0	0	703	336
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				329	0	617	517	2292	0	0	1458	617
Arrive On Green				0.19	0.00	0.19	0.16	0.63	0.00	0.00	0.38	0.38
Sat Flow, veh/h				1714	0	3215	3141	3705	0	0	3800	1609
Grp Volume(v), veh/h				38	0	297	134	621	0	0	703	336
Grp Sat Flow(s),veh/h/ln				1714	0	1608	1570	1805	0	0	1900	1609
Q Serve(g_s), s				1.0	0.0	4.3	1.9	3.9	0.0	0.0	7.3	8.5
Cycle Q Clear(g_c), s				1.0	0.0	4.3	1.9	3.9	0.0	0.0	7.3	8.5
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				329	0	617	517	2292	0	0	1458	617
V/C Ratio(X)				0.12	0.00	0.48	0.26	0.27	0.00	0.00	0.48	0.54
Avail Cap(c_a), veh/h				594	0	1113	604	2292	0	0	1458	617
HCM Platoon Ratio				1.00	1.00	1.00	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	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				17.4	0.0	18.7	18.9	4.2	0.0	0.0	12.1	12.5
Incr Delay (d2), s/veh				0.2	0.0	0.6	0.3	0.3	0.0	0.0	1.1	3.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.4	0.0	1.5	0.6	0.8	0.0	0.0	2.6	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				17.5	0.0	19.3	19.2	4.5	0.0	0.0	13.3	15.9
LnGrp LOS				B	A	B	B	A	A	A	B	B
Approach Vol, veh/h					335			755			1039	
Approach Delay, s/veh					19.1			7.1			14.1	
Approach LOS					B			A			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		37.5			13.1	24.4		14.5				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		33.0			10.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s		5.9			3.9	10.5		6.3				
Green Ext Time (p_c), s		4.2			0.2	3.5		1.0				

Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	282	123	248	14	72	93	173	549	8	31	429	308
Future Volume (veh/h)	282	123	248	14	72	93	173	549	8	31	429	308
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		1.00	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	1800	1900	1900	1800	1900	1900	1700	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	235	257	217	15	76	98	182	578	8	33	550	259
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	276	526	446	62	115	148	455	1268	18	118	1032	437
Arrive On Green	0.16	0.28	0.28	0.04	0.15	0.15	0.14	0.35	0.35	0.07	0.27	0.27
Sat Flow, veh/h	1714	1900	1608	1714	753	970	3141	3645	50	1714	3800	1608
Grp Volume(v), veh/h	235	257	217	15	0	174	182	286	300	33	550	259
Grp Sat Flow(s),veh/h/ln	1714	1900	1608	1714	0	1723	1570	1805	1891	1714	1900	1608
Q Serve(g_s), s	8.9	7.5	7.5	0.6	0.0	6.3	3.5	8.2	8.2	1.2	8.2	9.3
Cycle Q Clear(g_c), s	8.9	7.5	7.5	0.6	0.0	6.3	3.5	8.2	8.2	1.2	8.2	9.3
Prop In Lane	1.00		1.00	1.00		0.56	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	276	526	446	62	0	262	455	628	658	118	1032	437
V/C Ratio(X)	0.85	0.49	0.49	0.24	0.00	0.66	0.40	0.46	0.46	0.28	0.53	0.59
Avail Cap(c_a), veh/h	280	539	456	257	0	465	471	628	658	257	1032	437
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	20.1	20.1	31.2	0.0	26.6	25.9	16.8	16.8	29.5	20.7	21.1
Incr Delay (d2), s/veh	21.1	0.7	0.8	2.0	0.0	2.9	0.6	2.4	2.3	1.3	2.0	5.8
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	5.1	3.2	2.7	0.3	0.0	2.7	1.2	3.4	3.5	0.5	3.5	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.2	20.8	21.0	33.2	0.0	29.5	26.4	19.2	19.1	30.8	22.6	26.9
LnGrp LOS	D	C	C	C	A	C	C	B	B	C	C	C
Approach Vol, veh/h		709			189			768			842	
Approach Delay, s/veh		30.0			29.8			20.9			24.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	27.7	6.9	23.0	14.2	22.6	15.2	14.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.1	10.0	18.9	10.0	18.1	10.9	18.0
Max Q Clear Time (g_c+I1), s	3.2	10.2	2.6	9.5	5.5	11.3	10.9	8.3
Green Ext Time (p_c), s	0.0	2.0	0.0	1.6	0.2	2.4	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	25.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	37.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	205	319	207	351	245	347
Future Vol, veh/h	205	319	207	351	245	347
Conflicting Peds, #/hr	1	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	216	336	218	369	258	365

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1104	296	0	0	588	0
Stage 1	404	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 208	706	-	-	997	-
Stage 1	649	-	-	-	-	-
Stage 2	459	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 154	705	-	-	996	-
Mov Cap-2 Maneuver	~ 154	-	-	-	-	-
Stage 1	480	-	-	-	-	-
Stage 2	459	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	114.5	0	4.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	154	705	996	-
HCM Lane V/C Ratio	-	-	1.401	0.476	0.259	-
HCM Control Delay (s)	-	-	269.9	14.7	9.9	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	13.7	2.6	1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	535	142	488	446	115	59	109	447	158	152	154
Future Volume (veh/h)	128	535	142	488	446	115	59	109	447	158	152	154
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	135	563	149	514	469	121	62	115	471	166	160	162
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	184	565	149	486	1070	274	150	371	330	190	414	368
Arrive On Green	0.11	0.20	0.20	0.28	0.38	0.38	0.09	0.21	0.21	0.11	0.23	0.23
Sat Flow, veh/h	1714	2825	745	1714	2844	729	1714	1805	1608	1714	1805	1608
Grp Volume(v), veh/h	135	359	353	514	296	294	62	115	471	166	160	162
Grp Sat Flow(s),veh/h/ln	1714	1805	1765	1714	1805	1768	1714	1805	1608	1714	1805	1608
Q Serve(g_s), s	6.9	17.9	18.0	25.5	11.0	11.2	3.1	4.9	18.5	8.6	6.7	7.8
Cycle Q Clear(g_c), s	6.9	17.9	18.0	25.5	11.0	11.2	3.1	4.9	18.5	8.6	6.7	7.8
Prop In Lane	1.00		0.42	1.00		0.41	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	184	361	353	486	679	665	150	371	330	190	414	368
V/C Ratio(X)	0.73	0.99	1.00	1.06	0.44	0.44	0.41	0.31	1.43	0.87	0.39	0.44
Avail Cap(c_a), veh/h	263	361	353	486	679	665	190	371	330	190	414	368
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	38.9	36.0	36.0	32.3	21.0	21.0	38.9	30.3	35.8	39.4	29.3	29.7
Incr Delay (d2), s/veh	6.1	45.9	47.9	57.1	0.4	0.5	1.8	0.5	208.1	32.7	0.6	0.8
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	3.1	12.1	12.0	17.6	4.4	4.4	1.3	2.1	26.0	5.2	2.9	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	81.8	83.9	89.4	21.4	21.5	40.7	30.8	243.8	72.1	29.9	30.6
LnGrp LOS	D	F	F	F	C	C	D	C	F	E	C	C
Approach Vol, veh/h		847			1104			648			488	
Approach Delay, s/veh		76.8			53.1			186.6			44.5	
Approach LOS		E			D			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.5	23.0	30.0	22.5	12.4	25.1	14.2	38.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	25.5	18.0	10.0	18.5	13.8	29.7
Max Q Clear Time (g_c+I1), s	10.6	20.5	27.5	20.0	5.1	9.8	8.9	13.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.1	0.1	3.1

Intersection Summary	
HCM 6th Ctrl Delay	86.3
HCM 6th LOS	F

Intersection												
Int Delay, s/veh	1.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	173	641	98	143	432	187	35	130	141	230	170	193
Future Vol, veh/h	173	641	98	143	432	187	35	130	141	230	170	193
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	150	150	-	150	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	182	675	103	151	455	197	37	137	148	242	179	203

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	653	0	0	779	0	0	1660	1995	340	1529	1901	230
Stage 1	-	-	-	-	-	-	1040	1040	-	758	758	-
Stage 2	-	-	-	-	-	-	620	955	-	771	1143	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	943	-	-	847	-	-	65	~ 61	662	~ 82	~ 70	779
Stage 1	-	-	-	-	-	-	250	310	-	370	418	-
Stage 2	-	-	-	-	-	-	447	339	-	363	277	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	942	-	-	846	-	-	-	~ 40	661	-	~ 46	778
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 40	-	-	~ 46	-
Stage 1	-	-	-	-	-	-	202	250	-	298	343	-
Stage 2	-	-	-	-	-	-	130	278	-	~ 103	223	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	1.9		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	-	40	112	942	-	-	846	-	-	-	46	133
HCM Lane V/C Ratio	-	1.711	1.936	0.193	-	-	0.178	-	-	-	1.945	2.2
HCM Control Delay (s)	-	$ 562.8	$ 516.8	9.7	-	-	10.2	-	-	-	$ 633.1	$ 617.9
HCM Lane LOS	-	F	F	A	-	-	B	-	-	-	F	F
HCM 95th %tile Q(veh)	-	7.1	17.7	0.7	-	-	0.6	-	-	-	9.1	24.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	358	143	42	197	70	101	317	91	123	373	133
Future Volume (veh/h)	115	358	143	42	197	70	101	317	91	123	373	133
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	121	377	151	44	207	74	106	334	96	129	393	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	442	737	291	339	766	266	395	871	738	516	613	218
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	1056	2527	998	842	2629	911	838	1900	1609	922	1337	476
Grp Volume(v), veh/h	121	268	260	44	140	141	106	334	96	129	0	533
Grp Sat Flow(s),veh/h/ln	1056	1805	1719	842	1805	1735	838	1900	1609	922	0	1814
Q Serve(g_s), s	3.6	4.4	4.6	1.7	2.1	2.3	4.0	4.2	1.2	3.9	0.0	8.1
Cycle Q Clear(g_c), s	5.8	4.4	4.6	6.2	2.1	2.3	12.1	4.2	1.2	8.0	0.0	8.1
Prop In Lane	1.00		0.58	1.00		0.53	1.00		1.00	1.00		0.26
Lane Grp Cap(c), veh/h	442	526	501	339	526	506	395	871	738	516	0	832
V/C Ratio(X)	0.27	0.51	0.52	0.13	0.27	0.28	0.27	0.38	0.13	0.25	0.00	0.64
Avail Cap(c_a), veh/h	676	927	883	526	927	891	639	1424	1206	784	0	1360
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	0.00	1.00
Uniform Delay (d), s/veh	12.1	10.6	10.7	13.2	9.8	9.8	12.1	6.4	5.6	9.0	0.0	7.5
Incr Delay (d2), s/veh	0.3	0.8	0.8	0.2	0.3	0.3	0.4	0.3	0.1	0.3	0.0	0.8
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	0.6	1.2	1.2	0.2	0.6	0.6	0.6	1.0	0.3	0.6	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.4	11.4	11.5	13.4	10.1	10.1	12.5	6.7	5.7	9.3	0.0	8.3
LnGrp LOS	B	B	B	B	B	B	B	A	A	A	A	A
Approach Vol, veh/h		649			325			536			662	
Approach Delay, s/veh		11.6			10.5			7.7			8.5	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.0		15.0		21.0		15.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		27.0		18.5		27.0		18.5				
Max Q Clear Time (g_c+I1), s		14.1		7.8		10.1		8.2				
Green Ext Time (p_c), s		2.4		2.6		3.9		1.2				

Intersection Summary			
HCM 6th Ctrl Delay			9.5
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	405	212	137	342	91	102	336	160	164	524	208
Future Volume (veh/h)	177	405	212	137	342	91	102	336	160	164	524	208
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	186	426	223	144	360	96	107	354	168	173	552	219
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	452	771	653	342	1147	302	310	924	431	401	976	386
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	900	1900	1609	753	2826	744	672	2389	1114	846	2525	999
Grp Volume(v), veh/h	186	426	223	144	228	228	107	266	256	173	394	377
Grp Sat Flow(s),veh/h/ln	900	1900	1609	753	1805	1765	672	1805	1698	846	1805	1719
Q Serve(g_s), s	7.7	7.4	4.1	7.9	3.7	3.8	6.5	4.6	4.7	8.0	7.4	7.5
Cycle Q Clear(g_c), s	11.5	7.4	4.1	15.3	3.7	3.8	13.9	4.6	4.7	12.8	7.4	7.5
Prop In Lane	1.00		1.00	1.00		0.42	1.00		0.66	1.00		0.58
Lane Grp Cap(c), veh/h	452	771	653	342	732	716	310	698	656	401	698	665
V/C Ratio(X)	0.41	0.55	0.34	0.42	0.31	0.32	0.34	0.38	0.39	0.43	0.56	0.57
Avail Cap(c_a), veh/h	460	789	668	349	749	733	329	749	705	425	749	714
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	12.7	9.9	8.9	15.7	8.8	8.8	15.9	9.6	9.6	14.2	10.4	10.4
Incr Delay (d2), s/veh	0.6	0.8	0.3	0.8	0.2	0.3	0.7	0.3	0.4	0.7	0.9	0.9
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	1.3	2.5	1.2	1.2	1.2	1.2	0.9	1.4	1.4	1.3	2.3	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	10.7	9.2	16.6	9.0	9.0	16.6	9.9	10.0	14.9	11.3	11.4
LnGrp LOS	B	B	A	B	A	A	B	A	A	B	B	B
Approach Vol, veh/h		835			600			629			944	
Approach Delay, s/veh		10.9			10.8			11.1			12.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.3		22.1		21.3		22.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		15.9		13.5		14.8		17.3				
Green Ext Time (p_c), s		0.8		1.9		1.7		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			11.3									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	76	117	91	38	97	107	545	176	132	944	29
Future Volume (veh/h)	19	76	117	91	38	97	107	545	176	132	944	29
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	20	80	123	96	40	102	113	574	185	139	994	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	94	139	190	209	77	140	270	977	314	291	1344	42
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.16	0.36	0.36	0.17	0.38	0.38
Sat Flow, veh/h	80	694	953	547	385	699	1714	2685	863	1714	3573	111
Grp Volume(v), veh/h	223	0	0	238	0	0	113	385	374	139	502	523
Grp Sat Flow(s),veh/h/ln	1728	0	0	1632	0	0	1714	1805	1743	1714	1805	1880
Q Serve(g_s), s	0.0	0.0	0.0	0.5	0.0	0.0	3.0	8.7	8.8	3.7	12.2	12.2
Cycle Q Clear(g_c), s	5.9	0.0	0.0	6.4	0.0	0.0	3.0	8.7	8.8	3.7	12.2	12.2
Prop In Lane	0.09		0.55	0.40		0.43	1.00		0.50	1.00		0.06
Lane Grp Cap(c), veh/h	422	0	0	426	0	0	270	657	634	291	679	707
V/C Ratio(X)	0.53	0.00	0.00	0.56	0.00	0.00	0.42	0.59	0.59	0.48	0.74	0.74
Avail Cap(c_a), veh/h	682	0	0	651	0	0	339	657	634	342	679	707
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	0.0	0.0	18.7	0.0	0.0	19.2	13.0	13.0	19.0	13.6	13.6
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.2	0.0	0.0	1.0	3.8	4.0	1.2	7.1	6.8
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	2.3	0.0	0.0	2.4	0.0	0.0	1.1	3.6	3.5	1.4	5.3	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.6	0.0	0.0	19.9	0.0	0.0	20.3	16.8	17.0	20.2	20.7	20.5
LnGrp LOS	B	A	A	B	A	A	C	B	B	C	C	C
Approach Vol, veh/h		223			238			872			1164	
Approach Delay, s/veh		19.6			19.9			17.4			20.5	
Approach LOS		B			B			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.1	22.9		14.6	12.5	23.5		14.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.1	18.4		18.0	10.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	5.7	10.8		7.9	5.0	14.2		8.4				
Green Ext Time (p_c), s	0.1	2.8		0.9	0.1	2.4		1.0				
Intersection Summary												
HCM 6th Ctrl Delay			19.3									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	341	325	184	321	358	269	478	213	152	499	30
Future Volume (veh/h)	35	341	325	184	321	358	269	478	213	152	499	30
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	37	359	342	194	338	377	283	503	224	160	525	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	123	429	382	232	571	484	322	618	274	223	679	41
Arrive On Green	0.07	0.24	0.24	0.14	0.30	0.30	0.19	0.25	0.25	0.13	0.20	0.20
Sat Flow, veh/h	1714	1805	1608	1714	1900	1609	1714	2432	1078	1714	3456	210
Grp Volume(v), veh/h	37	359	342	194	338	377	283	373	354	160	274	283
Grp Sat Flow(s),veh/h/ln	1714	1805	1608	1714	1900	1609	1714	1805	1705	1714	1805	1862
Q Serve(g_s), s	1.5	14.0	15.3	8.2	11.2	15.9	11.9	14.4	14.5	6.6	10.6	10.7
Cycle Q Clear(g_c), s	1.5	14.0	15.3	8.2	11.2	15.9	11.9	14.4	14.5	6.6	10.6	10.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.63	1.00		0.11
Lane Grp Cap(c), veh/h	123	429	382	232	571	484	322	459	433	223	355	366
V/C Ratio(X)	0.30	0.84	0.90	0.84	0.59	0.78	0.88	0.81	0.82	0.72	0.77	0.77
Avail Cap(c_a), veh/h	231	439	391	243	571	484	336	548	518	255	463	478
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	32.6	26.9	27.3	31.2	22.0	23.7	29.3	25.9	26.0	30.9	28.2	28.2
Incr Delay (d2), s/veh	1.3	13.1	22.0	21.3	1.6	8.0	21.8	7.7	8.5	8.1	5.8	5.8
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	0.6	7.0	7.6	4.5	4.7	6.4	6.6	6.8	6.6	3.1	4.9	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	40.0	49.4	52.5	23.7	31.6	51.1	33.7	34.5	39.0	34.0	34.0
LnGrp LOS	C	D	D	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		738			909			1010			717	
Approach Delay, s/veh		44.0			33.1			38.8			35.1	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	23.3	14.5	22.1	18.4	19.0	9.8	26.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.0	22.5	10.5	18.0	14.5	19.0	10.0	18.5
Max Q Clear Time (g_c+I1), s	8.6	16.5	10.2	17.3	13.9	12.7	3.5	17.9
Green Ext Time (p_c), s	0.1	2.3	0.0	0.3	0.1	1.7	0.0	0.2

Intersection Summary			
HCM 6th Ctrl Delay			37.6
HCM 6th LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	6	148	147	6	113	176	518	204	82	841	124
Future Volume (veh/h)	59	6	148	147	6	113	176	518	204	82	841	124
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1700	1900	1900
Adj Flow Rate, veh/h	62	6	156	155	6	119	185	545	215	86	885	131
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	160	8	204	208	301	254	222	1503	670	335	1241	184
Arrive On Green	0.09	0.13	0.13	0.12	0.16	0.16	0.13	0.42	0.42	0.11	0.39	0.39
Sat Flow, veh/h	1714	60	1556	1714	1900	1607	1714	3610	1609	3141	3154	467
Grp Volume(v), veh/h	62	0	162	155	6	119	185	545	215	86	507	509
Grp Sat Flow(s),veh/h/ln	1714	0	1616	1714	1900	1607	1714	1805	1609	1570	1805	1815
Q Serve(g_s), s	2.7	0.0	7.7	7.0	0.2	5.4	8.4	8.3	7.2	2.0	18.9	18.9
Cycle Q Clear(g_c), s	2.7	0.0	7.7	7.0	0.2	5.4	8.4	8.3	7.2	2.0	18.9	18.9
Prop In Lane	1.00		0.96	1.00		1.00	1.00		1.00	1.00		0.26
Lane Grp Cap(c), veh/h	160	0	211	208	301	254	222	1503	670	335	711	715
V/C Ratio(X)	0.39	0.00	0.77	0.75	0.02	0.47	0.83	0.36	0.32	0.26	0.71	0.71
Avail Cap(c_a), veh/h	214	0	364	229	444	376	268	1503	670	393	711	715
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	0.00	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	34.1	0.0	33.6	34.0	28.4	30.6	34.0	16.0	15.7	32.8	20.4	20.4
Incr Delay (d2), s/veh	1.5	0.0	5.7	11.4	0.0	1.3	17.1	0.7	1.3	0.4	6.0	6.0
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	1.2	0.0	3.3	3.5	0.1	2.1	4.4	3.2	2.7	0.7	8.0	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.6	0.0	39.3	45.4	28.4	31.9	51.1	16.7	17.0	33.2	26.4	26.4
LnGrp LOS	D	A	D	D	C	C	D	B	B	C	C	C
Approach Vol, veh/h		224			280			945			1102	
Approach Delay, s/veh		38.3			39.3			23.5			27.0	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	37.8	14.2	15.0	14.8	36.0	12.0	17.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.0	33.3	10.7	18.0	12.5	30.8	10.0	18.7				
Max Q Clear Time (g_c+I1), s	4.0	10.3	9.0	9.7	10.4	20.9	4.7	7.4				
Green Ext Time (p_c), s	0.1	4.2	0.1	0.5	0.1	4.1	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			28.0									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary
2: State St & Highland Ave 03/12/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	289	441	363	178	509	69	362	389	118	62	363	336
Future Volume (veh/h)	289	441	363	178	509	69	362	389	118	62	363	336
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		1.00	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	1800	1900	1900	1700	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	304	464	382	187	536	73	381	409	124	65	382	354
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	298	925	412	348	618	84	374	1771	549	154	768	342
Arrive On Green	0.17	0.26	0.26	0.11	0.19	0.19	0.22	0.34	0.34	0.09	0.21	0.21
Sat Flow, veh/h	1714	3610	1608	3141	3193	433	1714	5187	1609	1714	3610	1608
Grp Volume(v), veh/h	304	464	382	187	302	307	381	409	124	65	382	354
Grp Sat Flow(s),veh/h/ln	1714	1805	1608	1570	1805	1821	1714	1729	1609	1714	1805	1608
Q Serve(g_s), s	15.5	9.8	20.7	5.0	14.5	14.6	19.5	5.0	4.9	3.2	8.3	19.0
Cycle Q Clear(g_c), s	15.5	9.8	20.7	5.0	14.5	14.6	19.5	5.0	4.9	3.2	8.3	19.0
Prop In Lane	1.00		1.00	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	298	925	412	348	350	353	374	1771	549	154	768	342
V/C Ratio(X)	1.02	0.50	0.93	0.54	0.86	0.87	1.02	0.23	0.23	0.42	0.50	1.03
Avail Cap(c_a), veh/h	298	934	416	366	364	367	374	1771	549	192	768	342
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	36.9	28.3	32.4	37.5	34.9	34.9	34.9	21.0	21.0	38.5	30.9	35.1
Incr Delay (d2), s/veh	57.8	0.4	26.6	1.4	18.5	19.1	51.1	0.3	1.0	1.8	2.3	57.9
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	10.9	4.0	10.5	1.9	7.8	7.9	13.0	2.0	1.9	1.4	3.7	12.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.7	28.8	59.0	38.9	53.4	54.0	86.0	21.3	21.9	40.3	33.2	93.0
LnGrp LOS	F	C	E	D	D	D	F	C	C	D	C	F
Approach Vol, veh/h		1150			796			914			801	
Approach Delay, s/veh		56.2			50.2			48.3			60.2	
Approach LOS		E			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	35.0	14.4	27.4	24.0	23.5	20.0	21.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	28.5	10.4	23.1	19.5	19.0	15.5	18.0
Max Q Clear Time (g_c+I1), s	5.2	7.0	7.0	22.7	21.5	21.0	17.5	16.6
Green Ext Time (p_c), s	0.0	2.9	0.2	0.2	0.0	0.0	0.0	0.5

Intersection Summary		
HCM 6th Ctrl Delay		53.8
HCM 6th LOS		D

HCM 6th Signalized Intersection Summary
3: State St & I-210 WB Ramp

03/12/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	127	16	402	234	780	0	0	632	638
Future Volume (veh/h)	0	0	0	127	16	402	234	780	0	0	632	638
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1800	1900	1900	1700	1900	0	0	1900	1900
Adj Flow Rate, veh/h				95	0	476	246	821	0	0	559	743
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				354	0	664	578	2251	0	0	674	1141
Arrive On Green				0.21	0.00	0.21	0.18	0.62	0.00	0.00	0.35	0.35
Sat Flow, veh/h				1714	0	3216	3141	3705	0	0	1900	3218
Grp Volume(v), veh/h				95	0	476	246	821	0	0	559	743
Grp Sat Flow(s),veh/h/ln				1714	0	1608	1570	1805	0	0	1900	1609
Q Serve(g_s), s				2.5	0.0	7.3	3.7	5.9	0.0	0.0	14.2	10.3
Cycle Q Clear(g_c), s				2.5	0.0	7.3	3.7	5.9	0.0	0.0	14.2	10.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				354	0	664	578	2251	0	0	674	1141
V/C Ratio(X)				0.27	0.00	0.72	0.43	0.36	0.00	0.00	0.83	0.65
Avail Cap(c_a), veh/h				583	0	1094	593	2251	0	0	674	1141
HCM Platoon Ratio				1.00	1.00	1.00	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	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				17.6	0.0	19.6	19.1	4.9	0.0	0.0	15.6	14.3
Incr Delay (d2), s/veh				0.4	0.0	1.5	0.5	0.5	0.0	0.0	11.3	2.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.9	0.0	2.6	1.2	1.3	0.0	0.0	7.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				18.0	0.0	21.0	19.6	5.3	0.0	0.0	27.0	17.2
LnGrp LOS				B	A	C	B	A	A	A	C	B
Approach Vol, veh/h					571			1067			1302	
Approach Delay, s/veh					20.5			8.6			21.4	
Approach LOS					C			A			C	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		37.5			14.2	23.3		15.4				
Change Period (Y+Rc), s		4.5			4.5	4.5		4.5				
Max Green Setting (Gmax), s		33.0			10.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s		7.9			5.7	16.2		9.3				
Green Ext Time (p_c), s		5.7			0.3	1.4		1.6				

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	419	186	513	24	82	113	178	454	37	38	470	294
Future Volume (veh/h)	419	186	513	24	82	113	178	454	37	38	470	294
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		1.00	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	1800	1900	1900	1800	1900	1900	1700	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	359	433	409	25	86	119	187	478	39	40	556	268
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	408	637	539	93	109	151	406	1008	82	129	927	392
Arrive On Green	0.24	0.34	0.34	0.05	0.15	0.15	0.13	0.30	0.30	0.08	0.24	0.24
Sat Flow, veh/h	1714	1900	1609	1714	721	997	3141	3380	275	1714	3800	1608
Grp Volume(v), veh/h	359	433	409	25	0	205	187	255	262	40	556	268
Grp Sat Flow(s),veh/h/ln	1714	1900	1609	1714	0	1718	1570	1805	1850	1714	1900	1608
Q Serve(g_s), s	15.3	14.9	17.2	1.1	0.0	8.7	4.2	8.7	8.8	1.7	9.8	11.5
Cycle Q Clear(g_c), s	15.3	14.9	17.2	1.1	0.0	8.7	4.2	8.7	8.8	1.7	9.8	11.5
Prop In Lane	1.00		1.00	1.00		0.58	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	408	637	539	93	0	260	406	538	552	129	927	392
V/C Ratio(X)	0.88	0.68	0.76	0.27	0.00	0.79	0.46	0.47	0.48	0.31	0.60	0.68
Avail Cap(c_a), veh/h	577	839	711	226	0	408	414	538	552	226	927	392
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.9	21.7	22.5	34.4	0.0	31.0	30.6	21.7	21.8	33.2	25.4	26.0
Incr Delay (d2), s/veh	11.0	1.4	3.4	1.5	0.0	5.3	0.8	3.0	2.9	1.4	2.9	9.3
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	7.2	6.5	6.6	0.5	0.0	3.9	1.5	3.8	3.9	0.7	4.5	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	23.1	25.9	36.0	0.0	36.3	31.4	24.7	24.7	34.6	28.2	35.3
LnGrp LOS	D	C	C	D	A	D	C	C	C	C	C	D
Approach Vol, veh/h		1201			230			704			864	
Approach Delay, s/veh		28.8			36.3			26.5			30.7	
Approach LOS		C			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.2	27.1	8.6	29.9	14.3	23.0	22.5	16.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.0	18.5	10.0	33.5	10.0	18.5	25.5	18.0				
Max Q Clear Time (g_c+I1), s	3.7	10.8	3.1	19.2	6.2	13.5	17.3	10.7				
Green Ext Time (p_c), s	0.0	1.7	0.0	3.7	0.2	2.0	0.7	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			29.4									
HCM 6th LOS			C									

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	200.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	205	265	333	150	456	672
Future Vol, veh/h	205	265	333	150	456	672
Conflicting Peds, #/hr	1	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	216	279	351	158	480	707

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1746	257	0	0	510	0
Stage 1	431	-	-	-	-	-
Stage 2	1315	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 79	748	-	-	1065	-
Stage 1	629	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 43	747	-	-	1064	-
Mov Cap-2 Maneuver	~ 43	-	-	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	219	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 877.8	0	4.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	43	747	1064	-
HCM Lane V/C Ratio	-	-	5.018	0.373	0.451	-
HCM Control Delay (s)	-	-	$ 1996.1	12.7	11.1	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	24.9	1.7	2.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	371	1136	69	237	683	158	31	146	144	110	232	159
Future Volume (veh/h)	371	1136	69	237	683	158	31	146	144	110	232	159
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	391	1196	73	249	719	166	33	154	152	116	244	167
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	426	1264	77	280	817	188	111	238	212	197	380	250
Arrive On Green	0.25	0.37	0.37	0.16	0.28	0.28	0.06	0.13	0.13	0.12	0.18	0.18
Sat Flow, veh/h	1714	3456	211	1714	2911	672	1714	1805	1607	1714	2084	1372
Grp Volume(v), veh/h	391	624	645	249	446	439	33	154	152	116	210	201
Grp Sat Flow(s),veh/h/ln	1714	1805	1862	1714	1805	1778	1714	1805	1607	1714	1805	1650
Q Serve(g_s), s	17.8	26.9	27.0	11.4	19.0	19.0	1.5	6.5	7.3	5.2	8.7	9.1
Cycle Q Clear(g_c), s	17.8	26.9	27.0	11.4	19.0	19.0	1.5	6.5	7.3	5.2	8.7	9.1
Prop In Lane	1.00		0.11	1.00		0.38	1.00		1.00	1.00		0.83
Lane Grp Cap(c), veh/h	426	660	681	280	506	499	111	238	212	197	329	301
V/C Ratio(X)	0.92	0.95	0.95	0.89	0.88	0.88	0.30	0.65	0.72	0.59	0.64	0.67
Avail Cap(c_a), veh/h	437	663	684	280	506	499	213	436	388	213	436	399
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	29.4	24.7	24.7	32.9	27.6	27.6	35.8	33.1	33.4	33.7	30.4	30.6
Incr Delay (d2), s/veh	24.1	22.5	22.3	27.8	16.3	16.6	1.5	2.9	4.5	3.6	2.1	2.6
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	9.6	14.4	14.9	6.6	9.8	9.7	0.6	2.9	3.0	2.2	3.7	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.5	47.2	47.1	60.7	43.9	44.2	37.3	36.0	37.9	37.4	32.4	33.2
LnGrp LOS	D	D	D	E	D	D	D	D	D	D	C	C
Approach Vol, veh/h		1660			1134			339			527	
Approach Delay, s/veh		48.6			47.7			37.0			33.8	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	15.1	17.6	33.9	9.7	19.2	24.4	27.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	19.4	13.1	29.5	10.0	19.4	20.5	22.1
Max Q Clear Time (g_c+I1), s	7.2	9.3	13.4	29.0	3.5	11.1	19.8	21.0
Green Ext Time (p_c), s	0.1	1.2	0.0	0.4	0.0	1.4	0.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	45.1
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	284	922	124	162	902	211	97	180	179	166	145	222
Future Vol, veh/h	284	922	124	162	902	211	97	180	179	166	145	222
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	150	150	-	150	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	299	971	131	171	949	222	102	189	188	175	153	234

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1172	0	0	1103	0	0	2464	3084	488	2471	2993	477
Stage 1	-	-	-	-	-	-	1570	1570	-	1292	1292	-
Stage 2	-	-	-	-	-	-	894	1514	-	1179	1701	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	603	-	-	640	-	-	~ 16	~ 12	531	~ 16	~ 14	540
Stage 1	-	-	-	-	-	-	118	~ 173	-	175	236	-
Stage 2	-	-	-	-	-	-	306	~ 184	-	206	~ 149	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	602	-	-	639	-	-	-	~ 4	530	-	~ 5	539
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 4	-	-	~ 5	-
Stage 1	-	-	-	-	-	-	~ 59	~ 87	-	~ 88	173	-
Stage 2	-	-	-	-	-	-	~ 15	~ 135	-	-	~ 75	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.6	1.6		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	-	4	12	602	-	-	639	-	-	-	5	20
HCM Lane V/C Ratio	-	23.684	23.596	0.497	-	-	0.267	-	-	-	15.263	15.5
HCM Control Delay (s)	-	$ 11979.1	$ 10777.6	16.7	-	-	12.7	-	-	-	$ 7838.6	$ 6897.1
HCM Lane LOS	-	F	F	C	-	-	B	-	-	-	F	F
HCM 95th %tile Q(veh)	-	13.9	36.8	2.8	-	-	1.1	-	-	-	11.4	39.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	277	182	95	435	126	235	433	71	121	441	117
Future Volume (veh/h)	105	277	182	95	435	126	235	433	71	121	441	117
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	111	292	192	100	458	133	247	456	75	127	464	123
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	248	635	406	283	832	240	388	1042	883	461	794	210
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.55	0.55	0.55	0.55	0.55	0.55
Sat Flow, veh/h	794	2111	1349	877	2764	797	797	1900	1609	840	1447	384
Grp Volume(v), veh/h	111	248	236	100	298	293	247	456	75	127	0	587
Grp Sat Flow(s),veh/h/ln	794	1805	1656	877	1805	1756	797	1900	1609	840	0	1831
Q Serve(g_s), s	8.2	6.7	6.9	6.3	8.3	8.4	17.8	8.5	1.3	6.3	0.0	12.7
Cycle Q Clear(g_c), s	16.5	6.7	6.9	13.2	8.3	8.4	30.6	8.5	1.3	14.9	0.0	12.7
Prop In Lane	1.00		0.82	1.00		0.45	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	248	543	498	283	543	529	388	1042	883	461	0	1004
V/C Ratio(X)	0.45	0.46	0.47	0.35	0.55	0.55	0.64	0.44	0.08	0.28	0.00	0.58
Avail Cap(c_a), veh/h	248	543	498	283	543	529	391	1049	888	464	0	1010
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	0.00	1.00
Uniform Delay (d), s/veh	24.5	16.9	17.0	22.4	17.5	17.5	19.1	8.0	6.4	12.4	0.0	9.0
Incr Delay (d2), s/veh	1.3	0.6	0.7	0.8	1.2	1.3	3.4	0.3	0.0	0.3	0.0	0.9
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	1.4	2.4	2.3	1.2	3.0	3.0	3.2	2.7	0.4	1.1	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	17.5	17.7	23.2	18.7	18.8	22.5	8.3	6.4	12.8	0.0	9.8
LnGrp LOS	C	B	B	C	B	B	C	A	A	B	A	A
Approach Vol, veh/h		595			691			778			714	
Approach Delay, s/veh		19.1			19.4			12.6			10.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		37.3		22.5		37.3		22.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		33.0		18.0		33.0		18.0				
Max Q Clear Time (g_c+I1), s		32.6		18.5		16.9		15.2				
Green Ext Time (p_c), s		0.2		0.0		4.3		1.1				

Intersection Summary			
HCM 6th Ctrl Delay			15.1
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	128	508	160	160	496	173	187	608	185	208	515	112
Future Volume (veh/h)	128	508	160	160	496	173	187	608	185	208	515	112
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	135	535	168	168	522	182	197	640	195	219	542	118
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	296	703	595	232	972	337	387	1226	373	322	1327	288
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	715	1900	1609	716	2628	912	745	2725	829	633	2950	640
Grp Volume(v), veh/h	135	535	168	168	358	346	197	424	411	219	331	329
Grp Sat Flow(s),veh/h/ln	715	1900	1609	716	1805	1735	745	1805	1750	633	1805	1784
Q Serve(g_s), s	9.2	12.3	3.7	6.2	7.8	7.9	12.1	8.4	8.5	14.0	6.2	6.2
Cycle Q Clear(g_c), s	17.0	12.3	3.7	18.5	7.8	7.9	18.3	8.4	8.5	22.5	6.2	6.2
Prop In Lane	1.00		1.00	1.00		0.53	1.00		0.47	1.00		0.36
Lane Grp Cap(c), veh/h	296	703	595	232	668	642	387	812	787	322	812	803
V/C Ratio(X)	0.46	0.76	0.28	0.72	0.54	0.54	0.51	0.52	0.52	0.68	0.41	0.41
Avail Cap(c_a), veh/h	296	703	595	232	668	642	387	812	787	322	812	803
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	19.1	13.8	11.1	23.4	12.4	12.4	15.5	9.9	9.9	19.3	9.3	9.3
Incr Delay (d2), s/veh	1.1	4.9	0.3	10.6	0.8	0.9	1.1	0.6	0.6	5.7	0.3	0.3
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	1.4	5.3	1.1	2.5	2.8	2.7	1.8	2.6	2.6	2.8	1.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	18.7	11.3	34.0	13.2	13.3	16.6	10.5	10.5	25.0	9.6	9.6
LnGrp LOS	C	B	B	C	B	B	B	B	B	C	A	A
Approach Vol, veh/h		838			872			1032			879	
Approach Delay, s/veh		17.5			17.3			11.7			13.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		27.0		23.0		27.0		23.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		22.5		18.5		22.5		18.5				
Max Q Clear Time (g_c+I1), s		20.3		19.0		24.5		20.5				
Green Ext Time (p_c), s		1.3		0.0		0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		14.8
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	33	46	73	43	58	41	892	59	56	583	23
Future Volume (veh/h)	11	33	46	73	43	58	41	892	59	56	583	23
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	12	35	48	77	45	61	43	939	62	59	614	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	105	156	179	214	116	111	156	1346	89	196	1468	57
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.09	0.39	0.39	0.11	0.41	0.41
Sat Flow, veh/h	92	750	860	505	555	530	1714	3437	227	1714	3542	138
Grp Volume(v), veh/h	95	0	0	183	0	0	43	493	508	59	313	325
Grp Sat Flow(s),veh/h/ln	1702	0	0	1590	0	0	1714	1805	1859	1714	1805	1875
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	1.1	10.8	10.8	1.5	5.8	5.8
Cycle Q Clear(g_c), s	2.2	0.0	0.0	4.7	0.0	0.0	1.1	10.8	10.8	1.5	5.8	5.8
Prop In Lane	0.13		0.51	0.42		0.33	1.00		0.12	1.00		0.07
Lane Grp Cap(c), veh/h	441	0	0	440	0	0	156	707	728	196	748	777
V/C Ratio(X)	0.22	0.00	0.00	0.42	0.00	0.00	0.27	0.70	0.70	0.30	0.42	0.42
Avail Cap(c_a), veh/h	726	0	0	704	0	0	363	707	728	363	748	777
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.7	0.0	0.0	16.6	0.0	0.0	20.0	12.0	12.0	19.2	9.8	9.8
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.9	5.6	5.5	0.9	1.7	1.7
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	0.8	0.0	0.0	1.6	0.0	0.0	0.4	4.4	4.5	0.6	2.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	0.0	0.0	17.2	0.0	0.0	20.9	17.7	17.5	20.1	11.5	11.5
LnGrp LOS	B	A	A	B	A	A	C	B	B	C	B	B
Approach Vol, veh/h		95			183			1044			697	
Approach Delay, s/veh		15.9			17.2			17.7			12.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	23.0		14.3	8.8	24.1		14.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.0	18.5		18.0	10.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s	3.5	12.8		4.2	3.1	7.8		6.7				
Green Ext Time (p_c), s	0.0	2.9		0.3	0.0	2.8		0.7				

Intersection Summary			
HCM 6th Ctrl Delay			15.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	579	260	169	509	162	300	869	289	164	475	36
Future Volume (veh/h)	77	579	260	169	509	162	300	869	289	164	475	36
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	81	609	274	178	536	171	316	915	304	173	500	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	143	629	283	201	559	473	346	935	309	185	875	66
Arrive On Green	0.08	0.26	0.26	0.12	0.29	0.29	0.20	0.35	0.35	0.11	0.26	0.26
Sat Flow, veh/h	1714	2420	1088	1714	1900	1609	1714	2664	882	1714	3400	258
Grp Volume(v), veh/h	81	454	429	178	536	171	316	619	600	173	265	273
Grp Sat Flow(s),veh/h/ln	1714	1805	1703	1714	1900	1609	1714	1805	1740	1714	1805	1853
Q Serve(g_s), s	5.0	27.4	27.4	11.3	30.5	9.2	19.8	37.3	37.6	11.0	14.0	14.1
Cycle Q Clear(g_c), s	5.0	27.4	27.4	11.3	30.5	9.2	19.8	37.3	37.6	11.0	14.0	14.1
Prop In Lane	1.00		0.64	1.00		1.00	1.00		0.51	1.00		0.14
Lane Grp Cap(c), veh/h	143	469	443	201	559	473	346	633	611	185	464	477
V/C Ratio(X)	0.57	0.97	0.97	0.89	0.96	0.36	0.91	0.98	0.98	0.93	0.57	0.57
Avail Cap(c_a), veh/h	156	469	443	201	559	473	397	633	611	185	464	477
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	48.5	40.2	40.3	47.8	38.2	30.7	43.0	35.3	35.4	48.7	35.6	35.6
Incr Delay (d2), s/veh	4.0	33.2	34.6	34.1	28.1	0.5	23.3	30.0	31.9	47.1	1.7	1.7
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	2.2	15.9	15.2	6.6	17.8	3.5	10.6	21.2	20.9	7.1	6.3	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	73.5	74.9	82.0	66.3	31.1	66.3	65.2	67.2	95.8	37.2	37.2
LnGrp LOS	D	E	E	F	E	C	E	E	E	F	D	D
Approach Vol, veh/h		964			885			1535			711	
Approach Delay, s/veh		72.3			62.7			66.2			51.5	
Approach LOS		E			E			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.4	43.1	17.4	33.1	26.7	32.8	13.7	36.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.9	38.6	12.9	28.6	25.5	25.0	10.0	31.5
Max Q Clear Time (g_c+I1), s	13.0	39.6	13.3	29.4	21.8	16.1	7.0	32.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.4	2.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	64.3
HCM 6th LOS	E

APPENDIX G -

SIGNAL WARRANTS WORKSHEETS

Scenario: Existing Conditions (2019)
Major Approach: Foothill Boulevard
Minor Approach: Rancho Avenue

WARRANT 3 - PEAK HOUR

(Part A or Part B must be satisfied) SATISFIED ☒ YES ☐ NO

Part A SATISFIED ☐ YES ☐ NO

(All parts 1, 2, and 3 below must be satisfied for the same

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for one-lane approach, or five vehicle-hours for a two-lane approach; AND	☐ YES ☐ NO
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic or 150 vph for two moving lanes; AND	☐ YES ☐ NO
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches	☐ YES ☐ NO

Part B SATISFIED ☒ YES ☐ NO

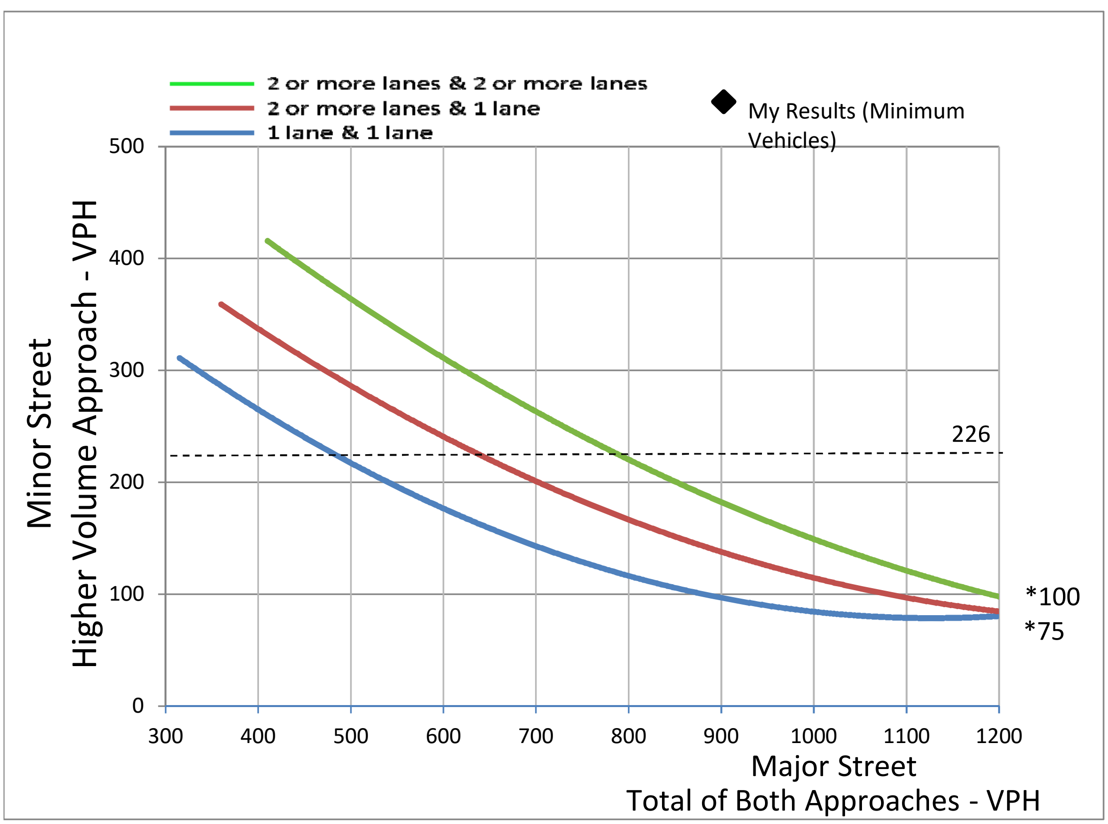
APPROACH LANES	One	Two or More	
Both Approaches - Major Street	☐	☒	1327
Higher Approach - Minor Street	☒	☐	226

← ENTER CORRECT HOURS

ENTER PEAK HOUR VOL.

The plotted point falls above the applicable curve in Figure 4C-3 (Urban Areas)	☐ YES ☐ NO
OR The plotted point falls above the applicable curve in Figure 4C-4 (Rural Areas)	☒ YES ☐ NO

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic



WARRANT 3 - PEAK HOUR

(Part A or Part B must be satisfied) SATISFIED ☐ YES ☒ NO

Part A

SATISFIED ☐ YES ☐ NO

(All parts 1, 2, and 3 below must be satisfied for the same

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	☐ YES ☐ NO
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic or 150 vph for two moving lanes; <u>AND</u>	☐ YES ☐ NO
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches	☐ YES ☐ NO

Part B

SATISFIED ☐ YES ☒ NO

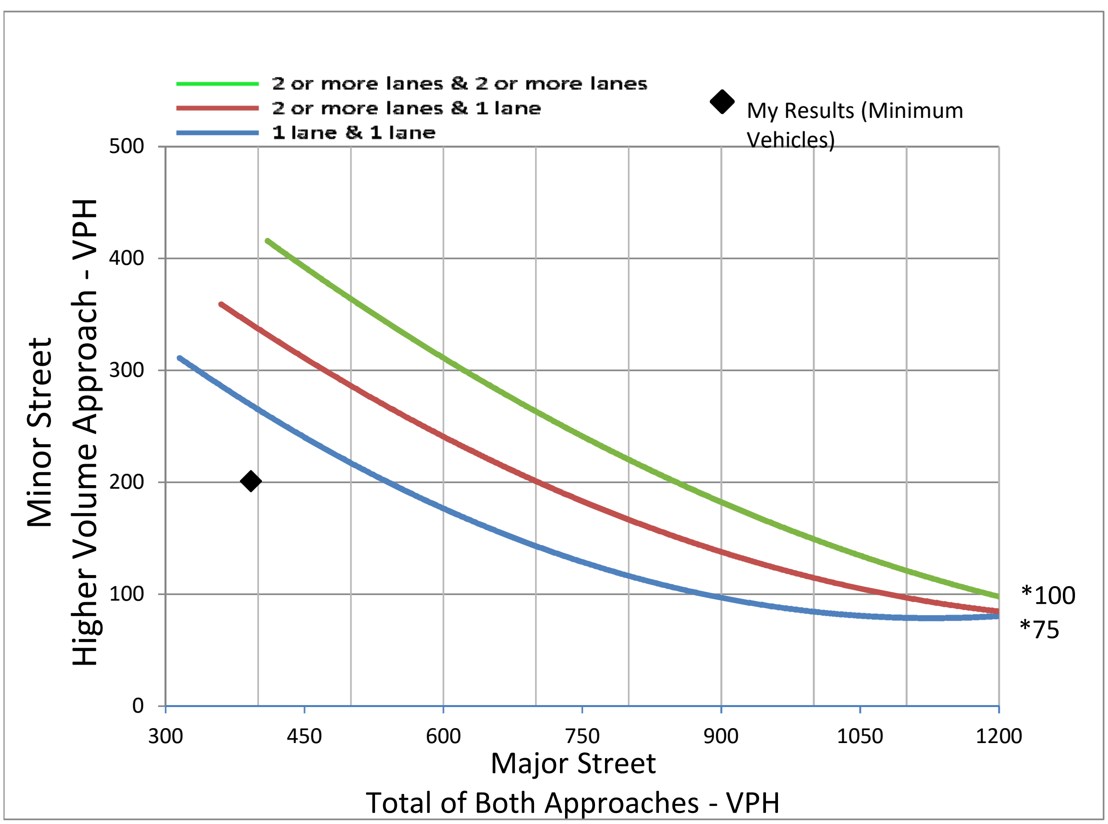
APPROACH LANES	One	Two or More	
Both Approaches - Major Street	☒	☐	392
Higher Approach - Minor Street	☒	☐	201

← ENTER CORRECT HOURS

ENTER PEAK HOUR VOL.

The plotted point falls above the applicable curve in Figure 4C-3 (Urban Areas)	☐ YES ☐ NO
<u>OR</u> The plotted point falls above the applicable curve in Figure 4C-4 (Rural Areas)	☐ YES ☒ NO

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic



California MUTCD 2012 Edition
(FHWA's MUTCD 2009 Edition, as amended for use in California)

SCENARIO Opening Year (2022) Phase 1

CALC ______ DATE ______

CHK ______ DATE ______

DIST ______ CO ______ RTE ______ PM ______

MAJOR ST. State Street

MINOR ST. 16th Street

Speed limit or critical speed on major street traffic > 64km/h (40 mph)....

In built up area of isolated community of < 10,000 population.........

RURAL (R)

URBAN(U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN		RURAL		Minimum Requirements EADT			
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					
		X					
Number of lanes for moving traffic on each approach							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1	5,233	1	2,231	8,000	5,600	1,200	850
2+		1		9,600	6,720	1,200	850
2+		2+		9,600	6,720	1,600	1,120
1		2+		8,000	5,600	1,600	1,120
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					
		X					
Number of lanes for moving traffic on each approach							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1	5,233	1	2,231	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 CONDITION A + B				2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied		Not Satisfied					
		X					
No one condition satisfied, but following conditions fulfilled 80% or more....		A	B				
		YES	NO				

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.

California MUTCD 2012 Edition
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SCENARIO Opening Year (2022) Phase 1

DIST	CO	RTE	PM	CALC	DATE
				CHK	DATE

MAJOR ST. State Street
MINOR ST. Baseline Street

Speed limit or critical speed on major street traffic > 64km/h (40 mph).... ☑

In built up area of isolated community of < 10,000 population......... ☐

☐

RURAL (R)

URBAN(U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
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				
X					
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 27,646	1 4,324	8,000	5,600	1,200	850
2+	1	9,600	6,720	1,200	850
2+	2+	9,600	6,720	1,600	1,120
1	2+	8,000	5,600	1,600	1,120
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				
X					
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 27,646	1 4,324	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 CONDITION A + B		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied	Not Satisfied				
X					
No one condition satisfied, but following conditions fulfilled 80% of more....	A 100% / B 100%				

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.

California MUTCD 2012 Edition
(FHWA's MUTCD 2009 Edition, as amended for use in California)

SCENARIO Buildout Conditions (2040)

DIST	CO	RTE	PM	CALC	DATE	CHK	DATE

MAJOR ST. State Street
MINOR ST. 16th Street

Speed limit or critical speed on major street traffic > 64km/h (40 mph).... ☑

In built up area of isolated community of < 10,000 population......... ☐

☐

RURAL (R)

URBAN(U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN			RURAL	Minimum Requirements EADT			
CONDITION A - Minimum Vehicular Volume							
Satisfied			Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
X							
Number of lines for moving traffic on each approach							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1	18,527	1	5,405	8,000	5,600	1,200	850
2+		1		9,600	6,720	1,200	850
2+		2+		9,600	6,720	1,600	1,120
1		2+		8,000	5,600	1,600	1,120
CONDITION B - Interruption of Continuous Traffic							
Satisfied			Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
X							
Number of lanes for moving traffic on each approach							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1	18,527	1	5,405	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 CONDITION A + B							
Satisfied			Not Satisfied	2 CONDITIONS 80%		2 CONDITIONS 80%	
X							
No one condition satisfied, but following conditions fulfilled 80% of more....		A	B				
		100%	100%				

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.

California MUTCD 2012 Edition
(FHWA's MUTCD 2009 Edition, as amended for use in California)

SCENARIO Buildout Conditions (2040)

DIST	CO	RTE	PM	CALC	DATE	CHK	DATE

MAJOR ST. State Street
MINOR ST. Baseline Street

Speed limit or critical speed on major street traffic > 64km/h (40 mph).... ☑
In built up area of isolated community of < 10,000 population......... ☐ ☐

RURAL (R)
URBAN(U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
CONDITION A - Minimum Vehicular Volume Satisfied: X / Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban	Rural	Urban	Rural
1 30,544 / 1 5,727	8,000	5,600	1,200	850
2+ / 1	9,600	6,720	1,200	850
2+ / 2+	9,600	6,720	1,600	1,120
1 / 2+	8,000	5,600	1,600	1,120
CONDITION B - Interruption of Continuous Traffic Satisfied: X / Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban	Rural	Urban	Rural
1 30,544 / 1 5,727	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 CONDITION A + B Satisfied: X / Not Satisfied No one condition satisfied, but following conditions fulfilled 80% of more.... A: 100% B: 100%	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.

APPENDIX H -

POST-MITIGATION PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	595	123	166	443	0	52	0	174	0	0	0
Future Volume (veh/h)	0	595	123	166	443	0	52	0	174	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1800	1800	1700	1800	0	1700	0	1800			
Adj Flow Rate, veh/h	0	692	143	193	515	0	56	0	187			
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.93	0.93	0.93			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	0	985	439	327	2016	0	342	0	322			
Arrive On Green	0.00	0.29	0.29	0.20	0.59	0.00	0.21	0.00	0.21			
Sat Flow, veh/h	0	3510	1525	1619	3510	0	1619	0	1525			
Grp Volume(v), veh/h	0	692	143	193	515	0	56	0	187			
Grp Sat Flow(s),veh/h/ln	0	1710	1525	1619	1710	0	1619	0	1525			
Q Serve(g_s), s	0.0	8.2	3.3	4.9	3.3	0.0	1.3	0.0	5.0			
Cycle Q Clear(g_c), s	0.0	8.2	3.3	4.9	3.3	0.0	1.3	0.0	5.0			
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	985	439	327	2016	0	342	0	322			
V/C Ratio(X)	0.00	0.70	0.33	0.59	0.26	0.00	0.16	0.00	0.58			
Avail Cap(c_a), veh/h	0	1364	608	448	2652	0	395	0	372			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	14.3	12.6	16.3	4.5	0.0	14.5	0.0	16.0			
Incr Delay (d2), s/veh	0.0	1.0	0.4	1.7	0.1	0.0	0.2	0.0	1.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.4	0.9	1.5	0.4	0.0	0.4	0.0	1.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	15.3	13.1	18.0	4.5	0.0	14.8	0.0	17.7			
LnGrp LOS	A	B	B	B	A	A	B	A	B			
Approach Vol, veh/h		835			708			243				
Approach Delay, s/veh		14.9			8.2			17.0				
Approach LOS		B			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		14.0	13.6	17.5				31.1				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		11.0	12.5	18.0				35.0				
Max Q Clear Time (g_c+I1), s		7.0	6.9	10.2				5.3				
Green Ext Time (p_c), s		0.3	0.2	2.8				3.2				
Intersection Summary												
HCM 6th Ctrl Delay			12.6									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	724	112	196	712	0	90	0	222	0	0	0
Future Volume (veh/h)	0	724	112	196	712	0	90	0	222	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1800	1800	1700	1800	0	1700	0	1800			
Adj Flow Rate, veh/h	0	762	118	213	774	0	101	0	249			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	0	1029	459	324	2041	0	342	0	322			
Arrive On Green	0.00	0.30	0.30	0.20	0.60	0.00	0.21	0.00	0.21			
Sat Flow, veh/h	0	3510	1525	1619	3510	0	1619	0	1525			
Grp Volume(v), veh/h	0	762	118	213	774	0	101	0	249			
Grp Sat Flow(s),veh/h/ln	0	1710	1525	1619	1710	0	1619	0	1525			
Q Serve(g_s), s	0.0	9.4	2.7	5.7	5.5	0.0	2.5	0.0	7.2			
Cycle Q Clear(g_c), s	0.0	9.4	2.7	5.7	5.5	0.0	2.5	0.0	7.2			
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1029	459	324	2041	0	342	0	322			
V/C Ratio(X)	0.00	0.74	0.26	0.66	0.38	0.00	0.30	0.00	0.77			
Avail Cap(c_a), veh/h	0	1313	586	363	2408	0	622	0	586			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	14.7	12.4	17.3	4.9	0.0	15.6	0.0	17.4			
Incr Delay (d2), s/veh	0.0	1.7	0.3	3.7	0.1	0.0	0.5	0.0	4.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.8	0.7	2.0	0.8	0.0	0.8	0.0	2.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	16.4	12.7	21.0	5.0	0.0	16.0	0.0	21.4			
LnGrp LOS	A	B	B	C	A	A	B	A	C			
Approach Vol, veh/h		880			987			350				
Approach Delay, s/veh		15.9			8.5			19.9				
Approach LOS		B			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		14.4	13.9	18.6				32.5				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		18.0	10.5	18.0				33.0				
Max Q Clear Time (g_c+I1), s		9.2	7.7	11.4				7.5				
Green Ext Time (p_c), s		0.8	0.2	2.7				5.0				
Intersection Summary												
HCM 6th Ctrl Delay			13.2									
HCM 6th LOS			B									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	205	319	207	351	245	347
Future Volume (veh/h)	205	319	207	351	245	347
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	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	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	216	336	218	369	258	365
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	454	426	969	864	477	1938
Arrive On Green	0.26	0.26	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1714	1610	1900	1609	797	3705
Grp Volume(v), veh/h	216	336	218	369	258	365
Grp Sat Flow(s),veh/h/ln	1714	1610	1805	1609	797	1805
Q Serve(g_s), s	4.8	8.8	2.9	6.3	13.0	2.4
Cycle Q Clear(g_c), s	4.8	8.8	2.9	6.3	19.3	2.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	454	426	969	864	477	1938
V/C Ratio(X)	0.48	0.79	0.22	0.43	0.54	0.19
Avail Cap(c_a), veh/h	692	650	1301	1160	624	2602
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.0	15.5	5.5	6.3	12.1	5.4
Incr Delay (d2), s/veh	0.8	3.7	0.1	0.3	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	3.1	0.7	1.3	1.7	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.8	19.2	5.6	6.6	13.1	5.5
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	552		587			623
Approach Delay, s/veh	17.5		6.3			8.6
Approach LOS	B		A			A

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	28.9	28.9	16.5
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	32.7	32.7	18.3
Max Q Clear Time (g_c+I1), s	8.3	21.3	10.8
Green Ext Time (p_c), s	3.7	3.1	1.2

Intersection Summary	
HCM 6th Ctrl Delay	10.6
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	535	142	488	446	115	59	109	447	158	152	154
Future Volume (veh/h)	128	535	142	488	446	115	59	109	447	158	152	154
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	135	563	149	514	469	121	62	115	471	166	160	162
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	184	565	149	486	1070	274	150	742	787	190	414	368
Arrive On Green	0.11	0.20	0.20	0.28	0.38	0.38	0.09	0.21	0.21	0.11	0.23	0.23
Sat Flow, veh/h	1714	2825	745	1714	2844	729	1714	3610	1608	1714	1805	1608
Grp Volume(v), veh/h	135	359	353	514	296	294	62	115	471	166	160	162
Grp Sat Flow(s),veh/h/ln	1714	1805	1765	1714	1805	1768	1714	1805	1608	1714	1805	1608
Q Serve(g_s), s	6.9	17.9	18.0	25.5	11.0	11.2	3.1	2.4	18.5	8.6	6.7	7.8
Cycle Q Clear(g_c), s	6.9	17.9	18.0	25.5	11.0	11.2	3.1	2.4	18.5	8.6	6.7	7.8
Prop In Lane	1.00		0.42	1.00		0.41	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	184	361	353	486	679	665	150	742	787	190	414	368
V/C Ratio(X)	0.73	0.99	1.00	1.06	0.44	0.44	0.41	0.15	0.60	0.87	0.39	0.44
Avail Cap(c_a), veh/h	263	361	353	486	679	665	190	742	787	190	414	368
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	38.9	36.0	36.0	32.3	21.0	21.0	38.9	29.3	16.6	39.4	29.3	29.7
Incr Delay (d2), s/veh	6.1	45.9	47.9	57.1	0.4	0.5	1.8	0.1	1.3	32.7	0.6	0.8
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	3.1	12.1	12.0	17.6	4.4	4.4	1.3	1.0	6.6	5.2	2.9	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	81.8	83.9	89.4	21.4	21.5	40.7	29.4	17.9	72.1	29.9	30.6
LnGrp LOS	D	F	F	F	C	C	D	C	B	E	C	C
Approach Vol, veh/h		847			1104			648			488	
Approach Delay, s/veh		76.8			53.1			22.1			44.5	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.5	23.0	30.0	22.5	12.4	25.1	14.2	38.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	18.5	25.5	18.0	10.0	18.5	13.8	29.7
Max Q Clear Time (g_c+I1), s	10.6	20.5	27.5	20.0	5.1	9.8	8.9	13.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.1	0.1	3.1

Intersection Summary	
HCM 6th Ctrl Delay	51.7
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	641	98	143	432	187	35	130	141	230	170	193
Future Volume (veh/h)	173	641	98	143	432	187	35	130	141	230	170	193
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	182	675	103	151	455	197	37	137	148	242	179	203
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	260	866	386	252	849	378	130	578	257	289	915	408
Arrive On Green	0.15	0.24	0.24	0.15	0.24	0.24	0.08	0.16	0.16	0.17	0.25	0.25
Sat Flow, veh/h	1714	3610	1608	1714	3610	1608	1714	3610	1607	1714	3610	1608
Grp Volume(v), veh/h	182	675	103	151	455	197	37	137	148	242	179	203
Grp Sat Flow(s),veh/h/ln	1714	1805	1608	1714	1805	1608	1714	1805	1607	1714	1805	1608
Q Serve(g_s), s	6.4	11.1	3.3	5.2	7.0	6.8	1.3	2.1	5.4	8.7	2.5	6.8
Cycle Q Clear(g_c), s	6.4	11.1	3.3	5.2	7.0	6.8	1.3	2.1	5.4	8.7	2.5	6.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	260	866	386	252	849	378	130	578	257	289	915	408
V/C Ratio(X)	0.70	0.78	0.27	0.60	0.54	0.52	0.29	0.24	0.57	0.84	0.20	0.50
Avail Cap(c_a), veh/h	284	1055	470	273	1032	460	271	1135	505	365	1334	594
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	25.5	22.5	19.5	25.3	21.2	21.1	27.7	23.2	24.6	25.5	18.6	20.2
Incr Delay (d2), s/veh	6.7	3.1	0.4	3.1	0.5	1.1	1.2	0.2	2.0	12.8	0.1	0.9
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	2.8	4.3	1.1	2.1	2.6	2.3	0.5	0.8	1.9	4.2	0.9	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.2	25.6	19.9	28.4	21.7	22.2	28.9	23.4	26.6	38.2	18.7	21.1
LnGrp LOS	C	C	B	C	C	C	C	C	C	D	B	C
Approach Vol, veh/h		960			803			322			624	
Approach Delay, s/veh		26.2			23.1			25.5			27.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.2	14.6	13.8	19.7	9.3	20.5	14.1	19.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	19.9	10.1	18.5	10.0	23.4	10.5	18.1
Max Q Clear Time (g_c+I1), s	10.7	7.4	7.2	13.1	3.3	8.8	8.4	9.0
Green Ext Time (p_c), s	0.2	1.0	0.1	2.1	0.0	1.4	0.1	2.3

Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
11: Rancho Ave & Valley Blvd

03/12/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	341	325	184	321	358	269	478	213	152	499	30
Future Volume (veh/h)	35	341	325	184	321	358	269	478	213	152	499	30
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	37	359	342	194	338	377	283	503	224	160	525	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	125	764	645	238	526	446	325	630	279	232	709	43
Arrive On Green	0.07	0.21	0.21	0.14	0.28	0.28	0.19	0.26	0.26	0.14	0.21	0.21
Sat Flow, veh/h	1714	3610	1608	1714	1900	1608	1714	2432	1078	1714	3456	210
Grp Volume(v), veh/h	37	359	342	194	338	377	283	373	354	160	274	283
Grp Sat Flow(s),veh/h/ln	1714	1805	1608	1714	1900	1608	1714	1805	1705	1714	1805	1862
Q Serve(g_s), s	1.4	6.1	11.4	7.8	11.0	15.6	11.3	13.6	13.7	6.3	10.0	10.1
Cycle Q Clear(g_c), s	1.4	6.1	11.4	7.8	11.0	15.6	11.3	13.6	13.7	6.3	10.0	10.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.63	1.00		0.11
Lane Grp Cap(c), veh/h	125	764	645	238	526	446	325	468	442	232	370	382
V/C Ratio(X)	0.30	0.47	0.53	0.82	0.64	0.85	0.87	0.80	0.80	0.69	0.74	0.74
Avail Cap(c_a), veh/h	243	921	715	255	526	446	352	576	544	267	486	501
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	31.0	24.3	16.1	29.5	22.4	24.1	27.8	24.4	24.4	29.1	26.3	26.3
Incr Delay (d2), s/veh	1.3	0.5	0.7	17.4	2.6	14.0	19.4	6.3	7.0	6.1	4.2	4.2
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	0.6	2.4	3.7	4.1	4.7	6.9	6.2	6.3	6.1	2.8	4.5	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	24.8	16.7	46.9	25.1	38.1	47.2	30.7	31.4	35.1	30.5	30.4
LnGrp LOS	C	C	B	D	C	D	D	C	C	D	C	C
Approach Vol, veh/h		738			909			1010			717	
Approach Delay, s/veh		21.4			35.1			35.6			31.5	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	22.8	14.3	19.4	17.9	19.0	9.7	24.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.0	22.5	10.5	18.0	14.5	19.0	10.0	18.5
Max Q Clear Time (g_c+I1), s	8.3	15.7	9.8	13.4	13.3	12.1	3.4	17.6
Green Ext Time (p_c), s	0.1	2.6	0.0	1.5	0.1	1.8	0.0	0.3

Intersection Summary			
HCM 6th Ctrl Delay			31.5
HCM 6th LOS			C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	205	265	333	150	456	672
Future Volume (veh/h)	205	265	333	150	456	672
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	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	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	216	279	351	158	480	707
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	347	326	763	337	522	2447
Arrive On Green	0.20	0.20	0.31	0.31	0.30	0.68
Sat Flow, veh/h	1714	1610	2528	1076	1714	3705
Grp Volume(v), veh/h	216	279	259	250	480	707
Grp Sat Flow(s),veh/h/ln	1714	1610	1805	1704	1714	1805
Q Serve(g_s), s	8.6	12.5	8.6	8.9	20.3	5.9
Cycle Q Clear(g_c), s	8.6	12.5	8.6	8.9	20.3	5.9
Prop In Lane	1.00	1.00		0.63	1.00	
Lane Grp Cap(c), veh/h	347	326	566	534	522	2447
V/C Ratio(X)	0.62	0.86	0.46	0.47	0.92	0.29
Avail Cap(c_a), veh/h	411	386	566	534	583	2447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.82	0.82	0.77	0.77
Uniform Delay (d), s/veh	27.3	28.9	20.6	20.7	25.2	4.8
Incr Delay (d2), s/veh	2.2	15.1	2.2	2.4	15.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	6.0	3.7	3.6	9.7	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.5	44.0	22.8	23.1	40.6	5.1
LnGrp LOS	C	D	C	C	D	A
Approach Vol, veh/h	495		509			1187
Approach Delay, s/veh	37.7		23.0			19.5
Approach LOS	D		C			B

Timer - Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	27.3	28.0				55.3		19.7
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	25.5	18.0				48.0		18.0
Max Q Clear Time (g_c+I1), s	22.3	10.9				7.9		14.5
Green Ext Time (p_c), s	0.5	1.7				5.2		0.6

Intersection Summary			
HCM 6th Ctrl Delay			24.4
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	371	1136	69	237	683	158	31	146	144	110	232	159
Future Volume (veh/h)	371	1136	69	237	683	158	31	146	144	110	232	159
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	391	1196	73	249	719	166	33	154	152	116	244	167
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	426	1269	77	281	823	190	111	460	469	198	371	244
Arrive On Green	0.25	0.37	0.37	0.16	0.28	0.28	0.07	0.13	0.13	0.12	0.18	0.18
Sat Flow, veh/h	1714	3456	211	1714	2911	672	1714	3610	1606	1714	2083	1372
Grp Volume(v), veh/h	391	624	645	249	446	439	33	154	152	116	210	201
Grp Sat Flow(s),veh/h/ln	1714	1805	1862	1714	1805	1778	1714	1805	1606	1714	1805	1650
Q Serve(g_s), s	17.7	26.7	26.8	11.3	18.8	18.8	1.5	3.1	5.9	5.1	8.6	9.1
Cycle Q Clear(g_c), s	17.7	26.7	26.8	11.3	18.8	18.8	1.5	3.1	5.9	5.1	8.6	9.1
Prop In Lane	1.00		0.11	1.00		0.38	1.00		1.00	1.00		0.83
Lane Grp Cap(c), veh/h	426	663	684	281	510	503	111	460	469	198	322	294
V/C Ratio(X)	0.92	0.94	0.94	0.89	0.87	0.87	0.30	0.33	0.32	0.58	0.65	0.68
Avail Cap(c_a), veh/h	440	667	688	281	510	503	215	877	655	215	439	401
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	29.2	24.4	24.5	32.6	27.3	27.3	35.6	31.7	22.1	33.5	30.5	30.7
Incr Delay (d2), s/veh	23.7	21.6	21.5	26.6	15.3	15.6	1.5	0.4	0.4	3.5	2.2	2.8
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	9.5	14.2	14.6	6.5	9.6	9.5	0.6	1.3	2.1	2.2	3.7	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.9	46.1	45.9	59.3	42.6	42.9	37.0	32.2	22.5	37.0	32.7	33.5
LnGrp LOS	D	D	D	E	D	D	D	C	C	D	C	C
Approach Vol, veh/h		1660			1134			339			527	
Approach Delay, s/veh		47.6			46.4			28.3			34.0	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	14.7	17.6	33.8	9.7	18.7	24.3	27.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.0	19.4	13.1	29.5	10.0	19.4	20.5	22.1
Max Q Clear Time (g_c+I1), s	7.1	7.9	13.3	28.8	3.5	11.1	19.7	20.8
Green Ext Time (p_c), s	0.1	1.0	0.0	0.5	0.0	1.5	0.1	0.7

Intersection Summary		
HCM 6th Ctrl Delay		43.5
HCM 6th LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	284	922	124	162	902	211	97	180	179	166	145	222
Future Volume (veh/h)	284	922	124	162	902	211	97	180	179	166	145	222
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	299	971	131	171	949	222	102	189	188	175	153	234
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	336	1334	594	207	1061	473	190	598	266	210	639	285
Arrive On Green	0.20	0.37	0.37	0.12	0.29	0.29	0.11	0.17	0.17	0.12	0.18	0.18
Sat Flow, veh/h	1714	3610	1609	1714	3610	1609	1714	3610	1607	1714	3610	1607
Grp Volume(v), veh/h	299	971	131	171	949	222	102	189	188	175	153	234
Grp Sat Flow(s),veh/h/ln	1714	1805	1609	1714	1805	1609	1714	1805	1607	1714	1805	1607
Q Serve(g_s), s	13.8	18.8	4.5	7.9	20.4	9.2	4.6	3.7	9.0	8.1	3.0	11.4
Cycle Q Clear(g_c), s	13.8	18.8	4.5	7.9	20.4	9.2	4.6	3.7	9.0	8.1	3.0	11.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	336	1334	594	207	1061	473	190	598	266	210	639	285
V/C Ratio(X)	0.89	0.73	0.22	0.83	0.89	0.47	0.54	0.32	0.71	0.83	0.24	0.82
Avail Cap(c_a), veh/h	370	1334	594	264	1099	490	211	859	382	222	881	392
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	31.7	22.1	17.6	34.8	27.4	23.5	34.1	29.8	32.0	34.8	28.7	32.1
Incr Delay (d2), s/veh	21.1	2.0	0.2	15.4	9.4	0.7	2.3	0.3	3.4	22.3	0.2	9.6
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	7.2	7.3	1.5	3.9	9.2	3.2	2.0	1.6	3.4	4.5	1.2	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.8	24.1	17.7	50.3	36.8	24.2	36.4	30.1	35.4	57.1	28.9	41.7
LnGrp LOS	D	C	B	D	D	C	D	C	D	E	C	D
Approach Vol, veh/h		1401			1342			479			562	
Approach Delay, s/veh		29.6			36.5			33.5			43.0	
Approach LOS		C			D			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.4	17.9	14.3	34.5	13.5	18.9	20.4	28.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.5	19.3	12.5	29.7	10.0	19.8	17.5	24.7				
Max Q Clear Time (g_c+I1), s	10.1	11.0	9.9	20.8	6.6	13.4	15.8	22.4				
Green Ext Time (p_c), s	0.0	1.1	0.1	4.2	0.1	0.9	0.2	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			34.5									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	579	260	169	509	162	300	869	289	164	475	36
Future Volume (veh/h)	77	579	260	169	509	162	300	869	289	164	475	36
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		1.00	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	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	81	609	274	178	536	171	316	915	268	173	500	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	144	913	732	207	550	466	346	968	283	188	880	67
Arrive On Green	0.08	0.25	0.25	0.12	0.29	0.29	0.20	0.35	0.35	0.11	0.26	0.26
Sat Flow, veh/h	1714	3610	1608	1714	1900	1609	1714	2754	805	1714	3400	258
Grp Volume(v), veh/h	81	609	274	178	536	171	316	599	584	173	265	273
Grp Sat Flow(s),veh/h/ln	1714	1805	1608	1714	1900	1609	1714	1805	1754	1714	1805	1853
Q Serve(g_s), s	4.9	16.5	12.2	11.1	30.4	9.2	19.6	35.0	35.2	10.9	13.9	13.9
Cycle Q Clear(g_c), s	4.9	16.5	12.2	11.1	30.4	9.2	19.6	35.0	35.2	10.9	13.9	13.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.14
Lane Grp Cap(c), veh/h	144	913	732	207	550	466	346	634	616	188	467	479
V/C Ratio(X)	0.56	0.67	0.37	0.86	0.97	0.37	0.91	0.94	0.95	0.92	0.57	0.57
Avail Cap(c_a), veh/h	158	913	732	244	550	466	402	641	623	188	467	479
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	47.9	36.5	19.5	46.9	38.2	30.7	42.4	34.2	34.3	48.0	35.0	35.0
Incr Delay (d2), s/veh	3.7	1.9	0.3	22.7	31.6	0.5	22.7	22.7	23.8	44.1	1.6	1.6
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	2.2	7.2	4.3	5.9	18.2	3.5	10.4	19.0	18.7	6.9	6.2	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	38.3	19.8	69.6	69.8	31.2	65.2	56.9	58.1	92.1	36.6	36.7
LnGrp LOS	D	D	B	E	E	C	E	E	E	F	D	D
Approach Vol, veh/h		964			885			1499			711	
Approach Delay, s/veh		34.2			62.3			59.1			50.1	
Approach LOS		C			E			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.4	42.7	17.6	32.0	26.5	32.6	13.6	36.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.9	38.6	15.5	26.0	25.5	25.0	10.0	31.5
Max Q Clear Time (g_c+I1), s	12.9	37.2	13.1	18.5	21.6	15.9	6.9	32.4
Green Ext Time (p_c), s	0.0	1.0	0.1	2.8	0.4	2.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	52.3
HCM 6th LOS	D

APPENDIX I -

QUEUE ANALYSIS WORKSHEETS

Intersection: 5: State St & 16th St

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	T	TR	L	T	T
Maximum Queue (ft)	115	94	68	101	147	56	53
Average Queue (ft)	73	58	39	66	99	32	35
95th Queue (ft)	141	111	80	109	166	68	70
Link Distance (ft)		557	2756	2756		1409	1409
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200				200		
Storage Blk Time (%)	0	0			1		
Queuing Penalty (veh)	0	0			1		

Intersection: 6: State St & Baseline St

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	123	191	183	115	149	289	168	83	69	49	43	121
Average Queue (ft)	77	126	132	62	138	192	97	29	44	25	27	79
95th Queue (ft)	139	211	213	156	171	359	214	93	86	58	54	131
Link Distance (ft)		5627	5627			3342	3342			5223	5223	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150	125			150	250			150
Storage Blk Time (%)	0	4	6	0	33	0	1	0				0
Queuing Penalty (veh)	0	5	8	0	73	2	1	0				0

Intersection: 6: State St & Baseline St

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	136	100	141
Average Queue (ft)	95	50	89
95th Queue (ft)	161	115	165
Link Distance (ft)		2756	2756
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		
Storage Blk Time (%)	3		
Queuing Penalty (veh)	2		

Intersection: 7: Rancho Ave/State St & Foothill Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	TR	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	144	184	187	36	113	136	101	51	49	52	41	77
Average Queue (ft)	94	142	134	10	80	93	62	30	28	34	30	46
95th Queue (ft)	170	215	211	38	132	149	112	53	59	62	52	85
Link Distance (ft)		1076	1076			1024	1024			295	295	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			150	150			150	200			150
Storage Blk Time (%)	1	1	6			1	0					
Queuing Penalty (veh)	2	1	3			2	0					

Intersection: 7: Rancho Ave/State St & Foothill Blvd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	174	80	40	44
Average Queue (ft)	109	49	10	24
95th Queue (ft)	194	87	42	50
Link Distance (ft)		5223	5223	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200			150
Storage Blk Time (%)	1			
Queuing Penalty (veh)	1			

Intersection: 11: Rancho Ave & Valley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	R	L	T	TR	L	T
Maximum Queue (ft)	72	166	108	106	143	212	105	124	202	171	108	130
Average Queue (ft)	35	114	47	58	118	141	67	113	158	126	63	77
95th Queue (ft)	91	175	118	113	168	262	116	142	243	201	133	136
Link Distance (ft)		650	650			668	668		412	412		4581
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150	125			100			150	
Storage Blk Time (%)		2	0	0	8	8		16	12		2	0
Queuing Penalty (veh)		1	0	1	26	15		37	33		5	0

Intersection: 11: Rancho Ave & Valley Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	145
Average Queue (ft)	96
95th Queue (ft)	159
Link Distance (ft)	4581
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 220

Intersection: 5: State St & 16th St

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	T	TR	L	T	T
Maximum Queue (ft)	142	84	106	119	214	236	84
Average Queue (ft)	102	54	70	76	178	88	58
95th Queue (ft)	153	95	131	130	245	247	99
Link Distance (ft)		557	2756	2756		1409	1409
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200				200		
Storage Blk Time (%)					7		
Queuing Penalty (veh)					24		

Intersection: 6: State St & Baseline St

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	175	338	303	150	148	185	203	105	36	56	57	80
Average Queue (ft)	170	268	235	57	120	143	147	43	16	38	35	39
95th Queue (ft)	192	410	351	175	175	231	232	128	43	67	70	80
Link Distance (ft)		5627	5627			3342	3342			5223	5223	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150	125			150	250			150
Storage Blk Time (%)	30	13	19	0	12	7	7	0				
Queuing Penalty (veh)	171	49	13	0	39	17	11	0				

Intersection: 6: State St & Baseline St

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	92	86	128
Average Queue (ft)	61	52	84
95th Queue (ft)	99	91	142
Link Distance (ft)		2756	2756
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 7: Rancho Ave/State St & Foothill Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	203	279	178	122	174	345	343	174	86	58	70	82
Average Queue (ft)	164	185	131	42	119	237	208	100	52	33	45	55
95th Queue (ft)	248	313	208	137	202	397	396	215	100	67	76	93
Link Distance (ft)		1076	1076			1024	1024			266	266	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			150	150			150	200			150
Storage Blk Time (%)	11	1	4	0	1	28	15	0				
Queuing Penalty (veh)	53	2	5	0	3	46	32	0				

Intersection: 7: Rancho Ave/State St & Foothill Blvd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	119	111	19	106
Average Queue (ft)	77	68	9	54
95th Queue (ft)	133	125	41	112
Link Distance (ft)		5223	5223	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200			150
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Rancho Ave & Valley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	R	L	T	TR	L	T
Maximum Queue (ft)	104	234	208	122	149	501	82	124	427	427	115	141
Average Queue (ft)	60	188	154	63	126	410	41	122	397	386	68	92
95th Queue (ft)	124	248	231	135	187	649	84	129	493	509	136	165
Link Distance (ft)		650	650			668	668		412	412		4581
Upstream Blk Time (%)						0			37	16		
Queuing Penalty (veh)						0			0	0		
Storage Bay Dist (ft)	150			150	125			100			150	
Storage Blk Time (%)		20	4	0	17	43		54	28		0	1
Queuing Penalty (veh)		15	9	0	85	73		236	84		1	2

Intersection: 11: Rancho Ave & Valley Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	159
Average Queue (ft)	106
95th Queue (ft)	177
Link Distance (ft)	4581
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 971

Appendix J – Response to Comments (Reserved)